Original Research Article

The Prevalence Study of Urinary Schistosomiasis among the Primary School Pupils in Kisayhip, Bassa Local Government Area, Plateau State-Nigeria

Abstract

Schistosomiasis is a parasitic disease caused by flukes (trematodes) of the genus *Schistosoma*. It is the third devastating tropical disease after malaria and intestinal helminthiasis and its prevalence and morbidity is highest among school children, adolescents and young adults. The study was aimed to determine the prevalence of urinary and intestinal schistosomiasis among primary school pupils in Kisayhip, Bassa local Government Area of Plateau State. This study was conducted in five primary schools in Kisayhip, Bassa Local Government Area, Plateau State. A total of 230 children who were within the age 5-14years participated in the study. The schools and participating subjects were selected randomly provided they met the inclusion criteria. Fresh urine samples were collected between 10am-2pm, twice a week. The samples were examined macroscopically and microscopically to determine physical characteristics and parasite presence respectively. The result showed that prevalence of urinary schistosomiasis in A, B, C, D and E schools in Bassa Local government area were 6.00%, 4.00%, 8.00 and 4.00% respectively. There was no significant difference in the prevalence among the participating schools, P-value>0.05. There was also no significant difference in gender based comparison, P-value>0.05. Also, there was no significant difference in the prevalence among the various age distributions. The study has revealed that though schistosomiasis was present in the area, the prevalence of the infection was very low and below WHO threshold.

Keywords: *Schistosomiasis, school children, prevalence, parasite, cercariae*

1.0 Introduction

Schistosomiasis is a parasitic disease caused by flukes (trematodes) of the genus *Schistosoma*. After malaria and intestinal helminthiasis, schistosomiasis is the third most devastating tropical disease in the world, being a major source of morbidity and mortality for developing countries in Africa, South America, the Caribbean, the Middle East, and Asia [1]. Schistosomiasis prevalence and morbidity is highest among school children, adolescents and young adults [2]. Thus, the

negative impacts on school performance and the debilitation caused by untreated infections demoralize both social and economic development in endemic areas.

In Kano, the prevalence of *Schistosomahaematobium* and *Schistosomamansoni*are 17.8% and 8.9% and occurring more among the poor and school children [3]. Although it has a low mortality rate, Schistosomiasis is often a chronic illness that can damage internal organs and in children, impair growth and cognitive development [4]. The urinary form of schistosomiasis is associated with increased risks for bladder disease in adults. Schistosomiasis is the second most socio-economically devastating parasitic disease after malaria [5]. Though the disease kills few people, its clinical effects, prevalence and expansion of agriculture and water development projects, movement of population and increase in population density and some social habits like passing urine and faeces near water bodies makes it a problem of great health importance [4]. The microscopic adult worms live in the veins draining the urinary tract and intestines. Schistosomiasis is a disease of poverty that leads to chronic ill-health. Infection is acquired when people come into contact with fresh water infested with the larval forms (cercariae) of parasitic blood flukes, known as schistosomes. Most of the eggs they lay are trapped in the tissues and the body's reaction to them can cause massive damage. The urinary tract or the intestines may be infected. Signs and symptoms may include abdominal pain, diarrhea, bloody stool, or blood in the urine. Those who have been infected for a long time may experience liver damage, kidney failure, infertility, or bladder cancer. In children, it may cause poor growth and learning difficulty [6]. Urinary Schistosomiasis is a major depilating diseases caused by *Schistosomahaematobium*and characterised by the presence of blood in urine. Other symptoms are proteinuria, dysuria, bladder carcinoma, bladder stones, calcification of bladder walls and sometimes renal failure. [7]. The lack of hygiene and certain play habits of school-aged children such as swimming or fishing in infested water make them especially vulnerable to infection. Therefore, the aim of the study was to determine the prevalence of urinary schistosomiasis among primary school pupils in Kisayhip, Bassa local Government Area Plateau State.

2.0 Materials and Methods

2.1 Study Area

This study was conducted in five primary schools in Kisayhip, Bassa Local Government Area, Plateau State, Nigeria. Bassa is a Local Government Area in the north of Plateau state, Nigeria, bordering Kaduna and Bauchi states. Some major occupations of the inhabitant include farming,

irrigation works, fishing and large production of vegetables and cereals. They are blessed with several water bodies which enable the inhabitants to engage in water contact such as fishing, swimming, rice farming, etc. The availability of water and the tropical type of weather may provide suitable breeding grounds for snail intermediate host leading to possible transmission of schistosomiasis.

2.2 Ethical consideration and consent

Ethical approval for the study was obtained from the Ethics Committee of Plateau Specialist Hospital, Jos. Document registration number is NHREC/05/01/2010b. Written consents were obtained from the parents or guardian of the pupils before they were considered for study participation.

Comment [H1]: you should note that all people diagnosed positive for schistosomiasis received treatment or not. You must also indicate the molecule used for the treatment

2.3 Sample size

Sample Size Determination

The sample was determined from the statistical equation below:

Sample size (N) = $(Zt\text{-}\alpha/2)^2P(1\text{-}P)/d2$

Where;

N= sample size

Zt-α/2= confidence interval (95%=1.96)

P= Expected proportion in population based on previous studies in Kano State (17.8%=0.178) Salwa et al. [3]

d = Absolute error or precision (5%=0.05)

Thus;

N= 1.96^2 x $0.178(1\text{-}0.178)/0.05^2$

N= 0.562/0.0025

N=225

The same size was approximated to 230.

2.4 Eligibility Criteria

Pupils within the age bracket of 5-14 years old were included in the study provided they were registered pupils of the selected schools and their parents or guardians provided written consent for study participation on their behalf. Pupils on anti-parasitic treatments were excluded from the study and those were yet to complete their school registration.

2.5 Sampling method

Five schools were randomly selected for the study and students were also randomly selected using a numbering system [8,9]. All the pupil were interviewed using structured questionnaire in order to find out their knowledge of personal hygiene and practices that could expose them to infective cercaria of schistosome parasite.

2.6 Sample collection

Urine (15ml) samples were collected into sterile, leak-proof containers from the pupils in different schools and were properly labeled, kept in ice and transported to the laboratory for processing within 2 hours of collection. As described in Cheesbrough [10].

2.7 Laboratory methods

Examination of Urine Specimen

Macroscopic examination: Each urine sample was observed for colour appearance of amber, reddish, and the presence or absence of blood.

Microscopy (Centrifugation technique**).**

Simple centrifugation and sedimentation techniques for microscopic examination were used. The method described by Dazo in 1974 was employed [11].

Ten (10) ml of each well mixed urine sample were transferred into a centrifuge tube, labelled and centrifuged at 4000 rpm for 5 minutes. The supernatant was discarded into a disinfectant jar and a drop of well mixed sediment was placed on a clean grease-free slide with the aid of a Pasteur pipette which was covered gently with cover-slip avoiding air bubbles and over flooding. The preparation was then examined using x10 and x 40 objective for the terminally spined ova of *Schistosomahaematobium*. The results were recorded appropriately.

2.8 Statistical analysis

The study data were collected and the prevalence among the schools was compared using Chi-square function in SPSS 23.0. The difference in prevalence among the schools was considered statistically significant at $p<0.05$.

3.0 Results

The results of the study are presented in the tables 1-3.

Table 1 shows the prevalence of schistosomiasis among the primary schools. It shows there was no significant difference in the level of infection among the five primary school designated A, B, C, D and E, sampled in the study area, ($P>0.05$). The overall prevalence was 11(4.80%). School

A had a prevalence of 3(6.00%), B 2(4.00%), no infection was observed in C, D had 4(8.00%), and E 2(4.00%).

Comment [H2]: Macroscopic observation found how many bloody urine?You must add the number of bloody urine.

Table1: **Prevalence of Urinary Schistosomiasis among the Primary Schools**

Primary school	**No. Examined**	**No. Infected (%)**
A	50	3(6.00)
B	50	2(4.00)
C	30	-
D	50	4(8.00)
E	50	2(4.00)
TOTAL	230	11(4.80)
χ^2=2.941	Df=4	P=0.568

Result is significant at (P<0.05)

Key: A is LEA Bangai
B is LEA Kisayhip B
C is LEA Kubeaye
D is Breadwinner International School Kisayhip
E is Baptist Nursery and Primary School Kisayhip

Table 2 shows the prevalence of urinary schistosomiasisaccording to sex. It shows that there is no significant difference in level of infection of *S. haematobium* based on sex of pupils at (P>0.05). Male had 3(2.60%) while female had 1(0.90%). The overall prevalence for *S. haematobium* is 4(1.7%).

Table2:Prevalence of Urinary *Schistosomiasis* between Sex Groups

Sex	**No. Examined**	**No. Infected with S.*haematobium*(%)**
Male	115	3(2.60)
Female	115	1(0.90)
TOTAL	**230**	**4(1.70)**

χ^2=2.400	df=1

Comment [H3]: Table 2 shows 4 people infected including 3 men and 1 woman.which is not consistent.You must therefore correct Table 2 to be consistent. The table 2 must also have a total of 11 infected persons

Result is significant at (P<0.05).

Table 3 shows the prevalence of urinary schistosomiasis according to age groups. It shows that there was no significant difference in the levels of infection based on age group at (P>0.05), all age groups had some levels of infection except 5-6 years that showed no prevalence. Overall prevalence based on age group was 11(4.80%).

Table 3:Prevalence of Urinary Schistosomiasis among Age Groups

Age	No. Examined	No. Infected (%)
5-6	50	-
7-8	55	3(5.50)
9-10	45	2(4.40)
11-12	40	1(2.50)
13-14	40	5(12.50)
TOTAL	**230**	**11(4.80)**
χ^2=8.266	df=4	P=0.082

Result is significant at (P<0.05)

4.0 Discussion

According to World Health Organization in 2013 [13], the prevalence from this study should be considered low. However, the observed prevalence lies in the continual contamination and repeated exposure of these school-aged children, [14]. This could be attributed to a number of reasons, some of which include the location of the study area, their source of water, occupation, poor sanitation conditions as well as ignorance of the source of infection and the mode of the disease transmission. This prevalence (4.80%) is much lower than 19.0% recorded by Damen and his team in 2006 [15] in Jema's Local Government, Kaduna State. The lower prevalence reported by the present study could be attributed to the integrated and cost-effective approaches

implemented by the Federal Ministry of Health to eliminate multiple NTDs in Nigeria by the year 2020 [16].

The high prevalence recorded in males in this study than females agrees with Gaji and Thilza in 2010 [17], who reported that males recorded a higher prevalence than females in relation to sex. This study is also consistent with the study by Hassan and his colleagues in 2017 [18] who reported the higher prevalence in males (35.1%) compared with females (19.7%) in the distribution of schistosomiasis based on gender at Aliero Local Government Area of Kebbi state. This may be attributed to socio-cultural practices such as bathing, washing and fishing in cercariae-contaminated water bodies which facilitate disease transmission and since males participate more in such activities, they are more prone to infection. However, it varies with Ugbomako and Heukelback study who reported insignificantly higher prevalence in females than males [19].

The higher infection among pupils of ages 13 and 14 years in this study is in agreement with report by Hassan and his colleagues who reported 38.80% in age group 11-14 years at Aliero, Kebbi state [18] and Ejinaka*et al*. [20] in Jos who reported 10% in the age range 15-16 years. This could probably due to the degree of exposure and engagement in many outdoor activities including swimming and fishing due to the youthful exuberance. The excessive mobility of adolescents in terms of swimming, bathing and playing in open water could explain the higher prevalence rate in this age group. Moreover, previous studies from Nigeria and Kenya reported an increasing trend of infection among children aged 6-13 years with a decline from the age of 14 years [20]. There is no doubt that control measures highlighted by Ejinaka*et al*. [22] could not be ignored especially among the pupils in Bassa Local Government Area of Plateau State.

Conclusion

This study has shown that urinary schistosomiasis is present among pupils from Kisayhip, Bassa Local Government Area though not endemic according to World Health Organization range of 40% and above prevalence.

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