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Prevalence of Urinary Schistosomiasis Among Children Attending Some Selected Primary Schools In Zangon Shanu Zaria

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Abstract
Urinary schistosomiasis is endemic in Nigeria, and continues to pose public health challenges, especially among the inhabitants of rural areas. Urinary schistosomiasis occurs in all the states of Nigeria with the highest infection rate among school age children between 6 to 17 years. This study aimed at determining the prevalence of *Schistosoma heamatobium* infection among primary school pupils in Zangon shanu Zaria, and its relationship with some physicochemical indices of urine, studied through urinalysis. A total of one hundred and fifty (150) urine samples (75 samples from each of the two schools) were collected and examined using sedimentation technique. The parameters examined include symptoms of the disease as haematuria (presence of blood in urine), proteinuria (presence of protein in the urine) and dysuria (painful urination). The associations of risk and demographic factors with the disease were also examined, using structured questionnaire. An overall prevalence of 5.33% with 7.5% among male and 1.8% among female was obtained. The age group 13-16 years has the highest prevalence of 9.8%among the rest. The research also revealed the statistical association of shistosomiasis with haematuria, proteinuria and dysuria($p<0.05$) among the subjects. The outcome of the research is an indication that schistosomiasis remained endemic in the study area, and hence recommended that control measures should be applied with a greater vigor.
Key words: Children, schistosomiasis, prevalence, physicochemical indices Haematuria, proteinuria, dysuria

INTRODUCTION

Schistosomiasis also known as Bilharziasis is a parasitic disease caused by infection from one of the species of parasitic trematodes (Flukes) of the genus *Schistosoma* (Adewunmi *et al.*, 2008). It is one of the most common parasitic infections in the world (Steinmann *et al.*, 2006), particularly in sub-Saharan Africa, ranking second only to malaria in terms of its socio-economic and public health importance in tropical and subtropical areas (Rudge*et al.*, 2008). Schistosoma belongs to the class *Trematoda*, phylum *Platyhelminthes*, order *Strigeatoidea,* and family *Schistosoma toidae*. Ten species of Schistosoma are known but the main prevalent species affecting humans are *Schistosoma haematobium, S.mansoni, S. intercalatum, S. japonicum* and *S. Mekongi*(Ivoke *et al.,* 2014). Other *Schistosoma* species of parasitological importance include; *S.bovis,* S. *mathei,* S. *hippopotami,* S. *sprinadalis* and *S. rhaini*, some of which have also been reported in man (Ifeanyi *et al.*, 2009). *Schistosoma haematobium* is endemic in over 77 countries of Africa and the Middle East (WHO, 2012). It is also occasionally seen in Western Asia. The World Health Organization considers it a significant health problem in Africa. Nigeria is one of the African countries endemic for the disease (GSA) with a prevalence of 9.5% (Bishop and Akoh, 2018).An emphasis on unawareness of the disease among children had been made as the cause of its continued spread (Bishop and Akoh, 2018). People at high risk of infection are those involved in fishing activities, farming, bathing, paddling and swimming in cercaria infested water bodies (Ivoke *et al.*, 2014).Studies have shown high incidence of the disease in some areas of Zaria with the very poor personal and public hygiene, among children within the age 5-13 years old (Bello *et al.,* 2003).So many complications can arise from *Schistosoma* infection: bladder cancer, anemia, funiculitis (Bishop and Akoh, 2018),hydronephrosis (John *et al.*, 2006)nutritional deficiencies and growth retardation in children (Nmorsi *et al.*, 2005). It has been estimated that 150,000 people die each year from resultant renal failure, meanwhile an unknown but significant number from bladder and other genitourinary cancers (John *et al.*, 2006).

The disease continues to pose public health challenges especially among children in rural areas, thus this study was designed to determine the prevalence, socio demographic and risk factors of urinary schistosomiasis, and it's association with some symptoms, among children attending some selected primary schools in Zangon Shanu Zaria.

METHODOLOGY

Study Area

The study area isZangonShanu Zaria.

Ethical Approval

Before the commencement of the study, ethical approval was obtained from Sabon Gari Local Government Education authority (reference number:797/T.I./128, date 17th July, 2017).Informed consent was also obtained from the parent or guardian of the pupils in the primary schools.

Inclusion Criteria:

Any pupil in the selected primary schools whose guardian/parent consented.

Sample Size

The sample size (n) was calculated using the formula:

$n=Z^2 p (l-p)/d^2$.

Z=standard normal distribution at 95% confidence interval = 1.96. For the calculation,

P= prevalence rate which is 10.5 % from previous study (Bishop and Akoh, 2017).

d= allowable error =0.05.

$n=Z^2 p (l-p)/d^2$.

$n= (1.96)^2 x0.105x (1-0.105)/ 0.05^2$

$=144$

Therefore, 150 samples were examined

Administration of questionnaire

The structured questionnaire was administered; information on demographic and risk factors, such as sex, age and swimming in ponds were obtained from the participants with the help of their school teachers.

Collection of Samples

Each respondent was provided with a 25ml wide-mouth, clean, dry and screw capped plastic specimen containers (bottles) for urine collection. The participants were advised to collect only terminal urine, at around 9:00 am - 2:00 pm, after physical exercise in combination with fluid intake. This corresponded to the period of peak time when urinary schistosome eggs are released (Anosike*et al.*, 2001). The samples were transported immediately to the laboratory in the department of microbiology, Ahmadu Bello University, Zaria, and analyzed within two hours after collection.Formalin (10%) was added to the samples to preserve the normal physiology of the eggs/ova.

Urinalysis for Haematoria and Proteinuria

Urinalysis was carried out to check for the presence of haematuria and proteinuria in the urine samples;this test was carried out using strips (Medi-test combi-9). Each strip was briefly dipped into the sample, stirred and then removed, allowed to wait for about 60 seconds before reading the colour change and then comparing with the colour scale on the container and the results were recorded accordingly.

Urinalysis for *Shistosoma haematobium* Eggs

About 10ml of urine samples were poured each into a test tube, and set to two thousand five hundred revolutions per minute (2500rpm) for five minutes. After the centrifugation, the tubes were removed from the centrifuge machine and the supernatants were discarded, leaving only the deposits at the bottom of the tubes. Unto a clean grease-free slide, a drop of the sediments was dropped and covered with a cover slip gently without the formation of air bubbles. The slides were examined using bright field microscope for eggs of *S. haematobium* using x10 and then x40 objective lenses.

RESULTS

The overall prevalence of urinary schistosomiasis in Zangon ShanuZaria was (5.3%) as shown in Table 1. School 'A' has a prevalence of 4.0% while school 'B' has a prevalence of 6.7%, however there is no significant difference between the two schools as *P-value >0.05*. Also, there was no significant statistical association between age (*p=0.146*),sex (*p=0.127*)and urinary schistosomiasis (Table 2).Among the risk factors, only swimming was found to have a significant association (*p=0.003)* with urinary schistosomiasis(Table 3).Haematuria, Proteinuria and Painful urination were all found to have a significant association with urinary (*P-value = 0.000*) schistosomiasis(Table 4).

Table 1: Prevalence of urinary schistosomiasis by school

School	No. examined	No. positive(%)	x2	P-Value
School A	75	3(4.0)	**1.507**[a]	**0.471**
School B	75	5(6.7)		
Total	150	8(5.3)		

x2 = chi-square, P-value>0.05

Table 2: prevalence of urinary schistosomiasis among the children by gender and age groups.

Sex	No. Examined	No. positive (%)	x2	P-value
Male	93	7(7.5)	**2.332**[a]	**0.127**
Female	57	1(1.8)		
Total	150	8(5.3)		
Age				
0-4	16	0(0.0)	**5.373**[a]	**0.146**
5-8	41	0(0.0)		
9-12	52	4(7.7)		
13-16	41	4(9.8)		
Total	150	8(5.3)		

x2 = chi-square, P-value>0.05

Table 3: prevalence of urinary schistosomiasisin association with some risk factors.

Variables	No. examined	No. positive (%)	x2	P-value
Do you swim				
Yes	43	6(14.0)	**8.872**[a]	**0.003**
No	107	2(1.9)		
Total	150	8(5.3)		
Water source				
Well	68	6(8.8)	**3.106**[a]	**0.212**
Borehole	74	2(2.7)		
Sachet water	8	0(0.0)		
Total	**150**	**8(5.3)**		

x2 represent chi-square.

Table 4:prevalence of urinary schistosomiasisin association with some signs and symptom.

Signs& symptom	No. examined	No. positive(%)	x2	P-value
Painful urination				
Yes	24	6(25.0)	**21.888**[a]	**0.000**
No	126	2(1.6)		
Total	150	8(5.3)		
Haematuria				
Yes	9	6(66.7)	**71.337**[a]	**0.000**
No	141	2(1.4)		
Total	150	8(5.3)		
Proteinuria				
Yes	48	8(16.7)	**17.958**[a]	**0.000**
No	102	0(0.0)		
Total	150	8(5.3)		

x2 represent chi- square, P-value is <0.05

DISCUSSION

The current prevalence (4.0%) is lower than 19.5% at Bomo village Sabon Gari, Zaria (Omenesa *et al.,* 2015). This may be due to improved awareness and effective treatment together with the fact that there is no lake in the study area as was reported found in Bomo village (Omenesa *et al.,* 2015).A higher prevalence was recorded among male pupils(7.5%) than the females (1.8%), with no significant statistical association between the two groups(P-value >0.05). The report is in agreement with the findings of Bishop and Akoh (2018), who reported a prevalence of 14.8% among the male pupils and 5.4%among female pupils in Zaria.

This could be due to socio-cultural and religious factors that expose the male to activities at the infested water bodies such as swimming, fishing, washing more than the females. Also the pattern of the prevalence increases with increase in the age of the pupils; 0% prevalence among the age groups 0-4years and 5-8years, 7.7% prevalence among 9-12years and 9.8% prevalence among 13-16years. The same pattern of prevalence was reported by Bishop and Akoh (2018); this is because older children often indiscriminately indulge in open water activities than younger ones. Swimming is the only risk factor found to be associated with urinary schistosomiasis. This is due to possibility of contact with cercaria-infested water bodies asschistosomes can penetrate intact skin during the contact (Omenesa*et al*.2015; Bishop and Akoh,2018).Bishop and Akoh, 2018).Dysuria,haematuria and proteinuria were recorded in 25.0% 66.7% and 16.7% respectively,with a significant statistical association with urinary schistosomiasis, which is in agreement with the report of Samuel*et al.,*(2018), who reported a prevalence of (68%) haematuria and (53%) proteinuria among the same subjects in Ilorin, Nigeria. The symptoms result from physical blockage, inflammation of the urinary tract, with consequent mechanical injury to the tract (Samuel et *al.,* 2018). These symptoms can therefore serve as markers for schistosomiasis as they are significantly associated with the pathology of the disease.

Conclusion

This research recorded an overall prevalence of (5.3%) for urinary schistosomiasis in ZangonShanu Zaria, (4.0%) prevalence for school A and (6.7%) prevalence for school B. The prevalence was higher in males (7.5%) thanin females (1.8%), and also higher in the age group 13-16 (9.7%) than the rest of the age groups, however, both age and sex ware not statistically significant in association with schistosomiasis. The three conditions examined that is dysuria, haematuria and proteinuria were all statistically significantly associated with scistasomiasis (P-value <0.05).

Recommendations

Based on the findings in this research it is recommended that:

1) There is need for urinary schistosomiasis control program in Zangon Shanu Zaria, this is to educate the pupils on the risk factors that predispose them to urinary schistosomiasis as swimming, washing or fishing in infested water bodies
2) Diagnosis, treatment and management of the environment and control of the intermediate host
3) Also the use of urine dip-stick as a pre-diagnostic test for the detection of haematuria and proteinuria is encouraged as the two conditions are significant markers for urinary schistosomiasis.

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