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Prevalence Of Urinary Schistosomiasis Among Secondary School Students In Ibadan, Nigeria

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Abstract

The objectives of the study are to quantify the burden of urinary schistosomiasis among junior students in a secondary school and to assess factors that may contribute to the prevalence of the disease among the student populace.

Junior students in a secondary school located within 10 minutes walking distance to University College Hospital (UCH), Ibadan were studied. The study was a descriptive cross-sectional study, involving class teachers as interviewers.

A total of 592 students participated with a prevalence of 12.2% obtained by urine microscopy. The disease significantly affected more males (16.1%) than females (7.4%) ($p<0.05$). Also infections were found more in those in the age group 15 years and above (15.0%) compared to those in the age group 10-14 years (10.6%). High water contact prevalence of 62.5% was found and there were significant associations between all the reported water contact activities by the students and the presence of schistosome eggs in the urine ($p<0.05$).

The study provided a supporting evidence of the endemicity of schistosomiasis especially among school children in our environment. The inclusion of health education package aimed at changing behavior of school children from adverse water contact practices was recommended.

Keywords: Prevalence, urinary schistosomiasis, secondary school students**.**

Introduction

Vesical schistosomiasis has been reported in about 200 million people in 74 countries of Latin America, Asia and Africa. About 10% of 20 million infected persons have severe clinical morbidity or disability and a yearly mortality of 20,000 deaths.[1] About 90% of the global prevalence of the disease is found in Africa.[2] Urinary Schistosomiasis occurs in the North, West, Central and East Africa. [2]

In Nigeria, the prevalence survey carried out in 18 out of 21 States of the Federation in 1989 by the National Schistosomiasis Control Programme showed that the disease was endemic in all the 18 States.[3] The report also showed that treatment in general health services was not readily available, and the high cost of praziquantel used in Nigerian Control Programme has been the main obstacle to implementation and sustenance of the control programme. The reported prevalences of the disease in recent studies varied, but has remained high generally[4-8]. Prevalences of 22.4% among post-primary and 12% among primary school children were found in Ibadan.[4] Children aged 11 to 15 years old were the most vulnerable.

The impact of urinary schistosomiasis on the growth and development in children of school age has also been reported.[3] The disease is associated with low weight for height in both children and adults. It is associated with anaemia and probably causes or aggravates anaemia in the presence of low dietary iron, hookworm infection or malaria. It inhibits growth in children, and also predisposes to school absenteeism and poor performance. [3]

The study was embarked upon based on the observation that some students treated at the endemic disease clinic of the University College Hospital were from a nearby school, Oba Akinbiyi High School II Mokola, located at not more than 10 minutes walking distance to the hospital. The presence of Dandaru Stream a tributary of Ogunpa River, which passes through the school as part of its course, constitutes an exposure source to the students. The objectives were to quantify the burden of the disease among the student population and to assess factors contributing to its endemicity. The findings were useful in recommending appropriate interventions for effective control.

Materials and Methods

The study was cross- sectional in design. Students aged 11 to 20 years in the Junior Secondary classes (J.S.S.) II and III were selected from the secondary school, Oba Akinbiyi High School II Mokola, Ibadan. This age category was considered as the study population because it was reported to have constituted the group with the highest prevalence of disease.[4] The students have also spent at least one year in the school.

Information was collected from each student by trained school class teachers with an interview schedule, which was validated by pre-testing in a neighboring school before commencement of the study in the first two weeks of

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October 2001. The interview schedule sought information on bio-demographic characteristics, subjective (unqualified) haematuria and subjective terminal haematuria as screening methods. The bio-demographic data obtained included the age, sex, religion and place of residence. Subjective haematuria was defined as a positive response to the question "do you currently pass blood or have passed blood in your urine in the last 3 months?" while subjective terminal haematuria was defined as the affirmative response to another question "does the blood come with the last few drops of urine?" as a follow up to a positive response to subjective haematuria. Further information was obtained on the duration of haematuria, treatment received for haematuria and water contact activities. Urine specimens were collected into transparent 20mls urine bottles, between 12.30pm and 1.30pm by each study participant during the school's lunch break and labeled. The specimens were immediately transported to the University College Hospital microbiology laboratory for microscopic examination.

Qualitative urine sedimentation technique was employed for microscopic examination of the urine specimens. The process involved centrifugation of urine specimens using urine centrifuge. Thereafter, one to two drops of sediments were placed on a glass slide with Pasteur pipette, covered with a cover slip and examined for schistosome's eggs under high power fields of x40 and x100 objective lenses.

Approval for this study was obtained from the Joint University of Ibadan and University College Hospital Ethical Committee. In addition, informed consent of the School Principal, class teachers, Parents-Teachers Association (PTA), and the entire study population was sought and obtained. Confidentially of information on each study participants was ensured. All infected students were treated with praziquantel tablets at a single oral dose of 40mg per kg body weight, which were provided as support by the National Schistosomiasis Control Programme of Nigeria. In addition a health talk on schistosomiasis and its control was conducted for the entire population of students at the end of the study.

Data were checked for consistency. Analysis was done with the use of Statistical Package for Social Sciences (SPSS) version 10.0-computer software package. Missing values due to non-response or invalid recordings were treated by pair wise deletion (i.e. subject eliminated from the analysis of variables where no data are available). Prevalence of schistosomiasis among study participants by screening and diagnostic methods was estimated and their correlations assessed using contingency coefficients for attributable data. Contingency coefficient between 0 and 0.19 was taken as poor correlation, 0.20 to 0.39 as fair correlation, 0.40 to 0.59 as moderate correlation, 0.60 to 0.79 as substantial correlation and 0.80 to 1.00 as almost perfect correlation .[9] Relationship between independent and outcome variables were explored, and associations were tested using chi - square test.

Results

Socio –demographic characteristics

A total of 592 Junior Secondary School (JSS) students were interviewed. Three hundred and seventy four (63.2%) were in JSS class II, while 218 (36.8%) were in JSS class III.

Table 1 shows the age, sex and religion distributions of the study participants. Three hundred and seventy nine (64.0%) of them were in the age range 10-14 years. The minimum age was 11 years while the maximum was 20 years. Also, 323 (54.6%) of the students were males while 269 (45.4%) were females. Four hundred and twenty six (71.9%) of the students reside within 30 minutes walking distance from the school premises.

Prevalence

The prevalence of schistosomiasis using unqualified haematuria as a screening method was 11% (Table 2, no 1). Forty-three students (11.5%) of class two and 23 (10.6%) of class three students were positive for this symptom ($p>0.05$). More males 47 (14.6%) reported blood in their urine than females 19 (7.1%) [$p = 0.04$]. Thirty-one students (14.6%) in higher age group 15 years and above reported blood in urine while 35(9.2%) among aged 10 – 14 years reported same ($p = 0.014$).

The prevalence of schistosomiasis using terminal haematuria as a screening method was 7.8% (Table2 no 2). There is no statistically significant difference between the prevalence of 9.1% obtained for those in class two and that of 5.5% obtained for those in class three ($p = 0.128$). The prevalence of terminal haematuria among males (12.1%) is significantly higher than the prevalence among females (2.6%) $p < 0.05$. Also the prevalence of terminal haematuria among those in the age group 15 years and above (10.8%) is significantly higher than those in the age group 10 to 14 years (6.1%) $p < 0.05$.

The overall prevalence of schistosomiasis by urine microscopy was 12.2 % among the study population (table 2 no 3). The difference in prevalence observed among students in the two classes, (10.2% versus 15.6%) is statistically significant, $p = 0.05$. As shown in the table, more males 52 (16.1%) were affected with the disease than females 20 (7.4%), $p = 0.001$. The prevalence of schisto-

somiasis is significantly higher in the age group 15 years and above (15.0%) than the age group 10-14 years (10.6%), p=0.003.

The prevalence of unqualified (11.1%) and terminal (7.8%) haematuriae are moderately correlated with prevalence of schistosomiasis by urine microscopy (12.2%) with, contingency coefficient of 0.4 in each case.

Table 3 shows that 370 (62.5%) of the students engaged in water contact activities. All the reported water contact activities were significantly associated with schistosomal infection, except for wading and "others" which included catching crabs, and drinking , washing of feet and fetching water from flowing stream (p=0.07).

The average duration of involvement in these activities was 727 days (24.2 months), with a minimum of one day and maximum of 4380 days (12.2years). The average duration of involvement in water contact activities by the students who had schistosome eggs in their urine was 750 days (25.0 months) and those without, 619 days (20.6 months), p=0.474.

The reported water contact activities were significantly higher in boys than in girls. Swimming (p=0.004) and bathing (p=0.016) in flowing stream or river were significantly more often engaged in by students in the age group 15 years and above.

Discussion

The prevalence rate of 12.2% obtained by urine microscopy in this study is close to the overall prevalence rate of 17.4% obtained among primary and post-primary school children in Ibadan [4] in 1999. These findings however suggest that the prevalence of schistosomiasis has remained high especially among post primary school children in our environment.

More males (16.1%) were found to be significantly affected by the disease than females (7.4%) in this study. This is consistent with an earlier report by workers in Ibadan[4] where the prevalence and intensity of infection were significantly higher in boys than in girls. This however differs from the report from Umueze-Amam[10] in Anambra State where an overall prevalence rate of 26% showed no significant sex difference. The likely factor responsible for this variation may be the differential water contact pattern between males and females in this study. Also, the peak age group prevalence in this study is 15-19 years. This differs from the peak age group prevalence of 10-14 years previously described. [2, 10, 11]. More studies are required to confirm the pattern observed in this study especially when it was also found that there was no significant difference in the mean ages of those with schistosome eggs in their urine and those without.

The water contact pattern observed in this study in similar to that obtained in Oyan reservoir also in Southwest Nigeria[12]. Water contact activities identified especially among the school age group in both studies were domestic or recreational in nature with washing of clothes in flowing stream or river (38.0%) most frequently measured, followed by bathing (36.3%), wading (22.8%) and swimming (19.4%) in this present study. Age and sex related pattern however showed marked differences in both studies, females had more water contact than males, and the overall level of exposure peaked in the 10-14 years age group in the Oyan study in contrast to this study. The presence of flowing river, River Dandaru within the school premises and in the area where more than two-thirds of the students (71.9%) reside might have influenced the high water contact rate observed in this study.

The prevalence of schistosomiasis by terminal haematuria 7.8% and unqualified haematuria of 11.1% were found to be significantly fairly correlated with the presence of schistosome eggs in urine (contingency coefficient of 0.369 and 0.378 respectively), $p<0.05$. This finding is at variance with that obtained in Ethiopia[13] in a study to assess the usefulness of questionnaires directed at school children and routed through teachers for identification of communities at risk for urinary schistosomiasis. The study found that there was no significant correlation between the prevalence of 4.1% by unqualified haematuria and the prevalence of 21.9% by reagent strips and by extension urine microscopic prevalence of 2.7%. The authors however suggested that the low prevalence of the condition in the study population might be responsible for the lack of correlation.

In conclusion, the prevalence of 12.2% of schistosomiasis found by microscopy in this study with evident sex and age group differences provided a supporting evidence of the endemicity of this condition in Ibadan. The significant correlations between the prevalence of schistosomaisis found by unqualified haematuria (11.1%), terminal haematuria (7.8%), and the prevalence by microscopy suggest that any of these screening methods could be reliably used in control programmes employing selective chemotherapy as part of the strategy, depending on resource availability. The findings that high water contact rate of 62.5% was found among the students interviewed, and that water contact of domestic or recreational activities were commoner than those of

Table 1: Age and Sex distribution of respondents by class in school.

Characteristics	Category	Class two n=374(1005)	Class Three n=218 (100%)	Total n=592(100%)
Age grouping	10-14 15-19 20 >	275(73.5%) 99(26.5%) 0(0%)	104(47.7%) 113(51.8%) 1(0.5%)	379(64.0%) 212(35.8%) 1(0.2%)
Sex	Male Female	195(52.1%) 179(47.9%)	128(58.7%) 90(41.3%)	323(54.6%) 269(45.4%)

Table 2: Prevalence of Schistosomiasis by Screening Methods, Class Sex, and Age group.

Screening Methods	Class(%)		Sex(%)		Age group(%)		Overall Prevalence (%)
	II	III	Male	Female	10-14	15>	
Unqualified haematuria	43(11.5)	23(10.6)	47(14.6)	19(7.1)	35(9.2)	31(14.6)	66(11.1)
	P=0.724		P=0.04		P=0.014		
Terminal haematuria	34(9.1)	12(5.5)	39(12.1)	7(2.6)	23(6.1)	23(10.8)	46(7.8)
	P=0.128		P=0.000		P=0.000		
Microscopy	38(10.2)	34(15.6)	52(16.1)	20(7.4)	40(10.6)	32(15.0)	72(12.2)
	P=0.05		P=0.001		P=0.003		

Table 3: Pattern of involvement in water contact activities by sex among study participants.

Water Contact activities	No/Percentage of Males(%)	No/Percentage of Females(%)	No/Proportion of students(%)	P values
Ever engaged in water contact activity	238(73.7)	132(49.1)	370(62.5)	0.006
Fishing	32(9.9)	1(0.4)	33(5.6)	0.03
Bathing	140(43.3)	75(27.9)	215(36.3)	0.01
Washing	158(48.9)	67(24.9)	225(38.0)	0.000
Swimming	106(32.8)	9(3.3)	115(19.4)	0.000
Other including wading	127(39.3)	8(3.0)	135(22.8)	0.07

economic nature suggest the need to include health education package aimed at changing behavior of school children from adverse water contact practices.

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