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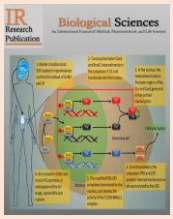

Prevalence of Urinary Schistosomiasis among pupils attending KUST Wudil Staff School, Kano State, Nigeria

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ABSTRACT

Urinary schistosomiasis otherwise known as urogenital schistomiasis, caused by *Schistosoma haematobium* is a vector-borne disease transmitted by snails (bollinus spp.). This study assessed the prevalence of urinary schistosomiasis among pupils of KUST, Wudil staff school in Wudil Local Government of Kano State. A total of 150 urine samples were collected from the pupils between 10:00 a.m. to 2:00 p.m. Each pupil was given a clean, dry, universal bottle to urinate in with emphasis on the last drop. The urine samples collected were then transported aseptically to the laboratory for analysis. Centrifugation technique was employed to sediment the urine samples and microscopy was used to examine the sediment for ova of *S. haematobium*. The results showed that 113 of the pupils were positive, representing 75.33% and 37 of the pupils were negative, representing 24.67%. A high incidence of the infection was discovered in boys 89 (59.33%) and much lower incidence was observed in girls 24 (16.00%). The highest prevalence was observed among age group 13-14 years (33.33%) while the least prevalence was discovered in age group 9-10 years (17.33%). It was observed that 107 (71.33%) of the pupils had contact with water bodies while 43 (28.67%) never had contact with water bodies. It was also discovered that the infection was highest among pupils who had contact with river (65.33%) and very much lower in those who never had contact with river (10%). The finding of this study discovered that urinary schistosomiasis is prevalent in the study area. On this background, authorities in Wudil local government should devise effective control and prevention strategies for the infection in order to reduce the burden of the disease on the affected pupils.

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Introduction

Schistosomiasis is a neglected tropical disease caused by blood flukes (trematode parasites) belonging to the genus Schistosoma. It is a vector-borne disease transmitted by several species of freshwater snails and is associated with two main clinical forms: intestinal schistosomiasis and urinary

(or urogenital) schistosomiasis. The species responsible for intestinal schistosomiasis in humans are six: *S. mansoni*, transmitted by Biomphalaria spp. snails; *S. japonicum*, transmitted by Oncomelania spp. snails; *S. mekongi*, transmitted by Neotricula spp. snails; *S. malayensis* transmitted by Robertsiella spp.; *S. guineensis* and the related *S. intercalatum*, transmitted by Bulinus spp. [1].

Urinary schistosomiasis is a disease caused by infection of people with the parasitic worm *Schistosoma haematobium*. These worms live in blood vessels around the infected person's bladder and the worm releases eggs which are released in the person's urine. If the urine is passed into ponds or lakes, the eggs can hatch and infect people who are washing or swimming there. Infection can cause blood in the urine and if left untreated can eventually lead to anemia, malnutrition, kidney failure, or bladder cancer. Urinary schistosomiasis is diagnosed by looking for worm eggs in the urine. The disease occurs mainly in school-aged children and young adults in sub-Saharan Africa. The drug currently recommended for treatment is praziquantel, which can be given as a single dose, but other drugs such as metrifonate, artesunate, and mefloquine have also been evaluated [2].

Schistosoma haematobium is widely spread mainly in riverine areas and communities around impoundment of river (dam) [3]. The planorbid snail Bulinus spp. is the intermediate host in the transmission of vesical schistosomiasis. The distribution of the disease is focal and its effects are more common in rural areas in the tropics where the population uses natural fresh water for their domestic water supply, recreational activities, and agricultural production. Hence, disease transmission is contingent on the presence of infected water, the primary snail host, and contact with the human population [4]. Extreme poverty, lack of knowledge of the risks, and inadequacy or total lack of public health facilities along with the unsanitary conditions in which millions of people live their daily lives, especially in the rural areas of developing tropical countries, are all factors contributing to the risk of infection [5].

Urinary schistosomiasis leads to a variety of clinical manifestations as hematuria; the presence of blood cells in urine. Other associated features are dysuria and suprapubic pain. In sub-Saharan Africa, *S. haematobium* infection is estimated to cause 70, 32, 18, and 10 million cases of hematuria, dysuria, bladder-wall pathology and major hydronephrosis respectively [6]. Schistosome infections are usually at their peak in late childhood to early adulthood. In some parts of Africa, the onset of hematuria due to urinary schistosomiasis is very common in adolescent boys, and due to a lack of knowledge, it is seen as a normal phenomenon in some communities [7].

A decision to carry out a research on the prevalence of Urinary Schistosomiasis among pupils attending KUST, Wudil staff school was moved by the fact that Wudil town is blessed with a river, which is one of the sources of water for the inhabitants of the town. Having known that the intermediate host of *S. haematobium*, known as bollinus lives mostly in freshwater; it is essential to assess the distribution of Urinary Schitosomiasis in Wudil. Studies by [8] and [9] have suggested that school-age children are particularly vulnerable to schistosomiasis due to their frequent water contact. On this background, our study group was pupils attending KUST, Wudil staff school. This study aimed to determine the prevalence of Urinary schistosomiasis among pupils attending KUST Wudil, staff school.

Materials and method

Study Area

The research was conducted at Wudil local government area of Kano state, which is located in the East Central Area of Kano State, and the central area of Kano Region between longitude 8˚45'E, as well as between latitude 11˚37'N and latitude 11˚56'N. It shares its western boundary with Warawa LGA to the northwest and Dawakin Kudu LGA to the southwest. It is bounded to the south and southeast by Garko LGA and on the east by Albasu LGA (southeast), Gaya (east), and Ajingi, northeast, and north.

Study Group

The study population consists of primary school pupils of age between 9-14 years attending Kano University of Science and Technology Wudil Staff School.

Ethical Approval

Prior to the embarkment of the research, ethical approval was sought from the Ethical committee, Ministry of Health Kano state with approval number NHREC/17/03/2018. The Head master and parents association of the school gave their consent for the study.

Study Type

This was a descriptive cross-sectional study. A systematic random sampling technique was employed to collect urine samples in the study.

Sample Collection

The study was carried out during the month of October, 2021 to November, 2021. A sum of one hundred and fifty (150) school children participated in the study. Urine samples were collected between 10:00 am to 02:00 pm. Sterile universal containers labeled with numbers were given to the pupils for urine collection with emphasis on the last drop. All precautions were taken to ensure that the contamination was avoided. The questionnaire was also used to confirm whether the pupils visited the river sites for either swimming or fetching water.

Urinalysis

The urine samples collected were transported in ice packs to the laboratory for analysis. The centrifugation and sedimentation technique as described by [10] was employed for the separation of the urine sample.10 mls of urine was centrifuged at 1,500 rpm for 5 minutes, the supernatant was discarded to leave the sediment which was transferred to the center of a clean grease-free glass slide, and a cover slide was also used to cover. The slide was mounted on a compound microscope and was examined by x10 objective lens to identify the *Schistosoma heamatobuim* ova/eggs which were characterized by the possession of a terminal spine using an atlas as a guide. The eggs were counted and recorded as egg/10ml of urine.

Statistical analysis

The data collected was subjected to a chi-square test to evaluate the association of frequency of infection with gender, age, and water contact activity. P values less than 0.05 were considered significant. This was done using Statistical Package for Social Sciences (SPSS) software version 16.0.

Results

Prevalence of urinary schistosomiasis among the study group

Of the 150 urine samples collected and examined as depicted in Table 1, 113 (75.33%) were found to be infected with *Schistosoma haematobium* while the remaining 37 (24.66%) were negative.

Prevalence of urinary schistosomiasis among the study group based on their Gender

A total of ninety-nine (99) boys and fiftee-one (51) girls were recruited for the study. As depicted in Table 1, the prevalence of infection was higher in boys 89 (59.33%) than in girls 24 (16%). Statistical analysis showed that there was no association between the occurrence of infection and gender (The chi-square statistic was 1.1233. The p-value was .289206 at $p < .05$).

Prevalence of *S. haematobium* Infection Based On Pupils Age Group

It is evident from Figure 1 that pupils within the range of age 13–14 years had the highest infection rate of 33.33%, followed by those whose ages fall within the range of 11-12 years with an infection rate of 24.67% while pupils aged 9-10 years had the least infection rate of 17.33%. Statistical analysis revealed that there was an association between the occurrence of infection and age group ($\chi 2$ = 13.0948: df = 3; p-value = .001434 at $p < .05$).

Prevalence of *S. haematobium* Infection in Relation to Water Contact

The prevalence of *S. haematobium* based on water contact is presented in Table 2. It could be seen that the infection was highest among pupils who had contact with the river (65.33%) and very much lower in those who never had contact with the river (10%). The chi-square statistic showed that the result was significant at $p < .05$. (X^2= 53.0771; p-value = < .00001).

Discussion

Previous studies show that urinary schistosomiasis is widely distributed in Nigeria [11-15] and suggest a linear relationship between infection and individuals' water contact activities in northern Nigeria [16, 17]. The prevalence of urinary schistosomiasis among school children continues to be a major public health concern in tropical countries especially in Nigeria [18]. The finding of this study revealed that urinary schistosomiasis is also prevalent in the study area.

The prevalence of 75.33% observed among pupils attending KUST, Wudil staff school is in agreement with what was discovered by [19] among Quranic school pupils (Khalwas) in Sudan; where the prevalence of urinary schistosomiasis was (71%). This is however higher than the percentages reported in Benue State, Nigeria (46.6%) by [20] and the one carried out by [21] in the South Western part of Nigeria, where 62.3% were found to be infected with urinary schistosomiasis.

The finding of the present study shows that boys were more infected (59.33%) with urinary schistosomiasis than females (16%). The higher prevalence among boys could be attributed to the fact that boys had more contact with water than girls

Table 1. Gender distribution of *S. haematobium* infection among the study group.

Test result		Boys	Girls	Total	Test result
Positive		89 (59.33%)	24 (16.0%)	113 (75.33%)	positive
Negative		10 (6.66%)	27 (18%)	37 (24.66%)	negative
Total		99	51	150	total

Table 2. *S. haematobium* infection based on pupils age group.

Test Result	9-10 Years	11-12 Years	13-14 Years	Total
Positive	26 (17.33%)	37 (24.67%)	50 (33.33%)	113 (75.33%)
Negative	20 (13.33%)	09 (6.0%)	08 (5.33%)	37 (24.66%)
Total	46	46	58	150

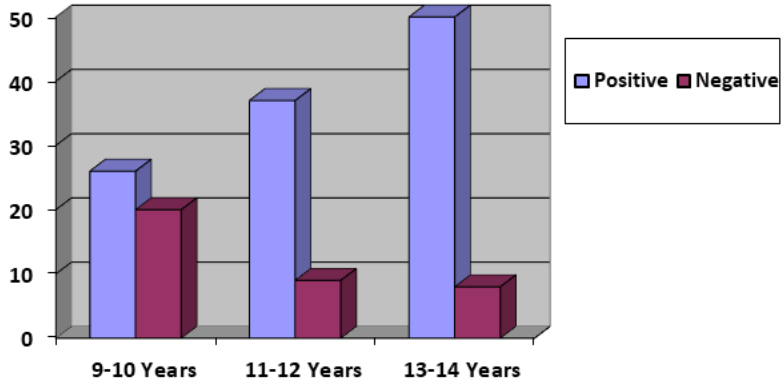

Figure 1: Prevalence of urinary schistosomiasis based on age group.

Table 3. *S. haematobium* infection based on Contact with River

Test Result	Free (%)	Involved (%)	Total	Test Result
Positive	15 (10.0%)	98 (65.33%)	113 (75.33%)	Positive
Negative	28 (18.67%)	09 (6.0%)	37 (24.67%)	Negative
Total	43	107	150	Total

in the study area due to swimming and fishing activities. This finding agrees with researches conducted in Kano state, Nigeria by [18] and [17]. However, the result of this study disagrees with that of [22], where the prevalence of infection was higher among females (31%) than males (28.1%).

The highest prevalence of urinary schistosomiasis was observed among age group 13-14 years (33.33%). This is also in conformity with that of Minjibir et al., 2020; in which the age group 12-14 years was more prevalent in the study with an occurrence rate of 3.4% and [23] who reported the highest prevalence of 65.8% among the age group 10-14 years in Plateau State, Nigeria. However, a study Carried out by [24] in a rural community near Abeokuta, Nigeria shows that even preschool children also harbor infection (58.1%) with urinary schistosomiasis. This attests to the fact that there was no association between age and the infection.

Conclusion

The result of the current study reports a higher prevalence of urinary schistosomiasis (75.3%) among the study population of pupils attending KUST, Wudil, Staff school. The study confirms a strong association between urinary schistosomiasis and children's contact with the river and age group in the study area. As a result, authorities in the Wudil local government should devise effective control and prevention strategies for the infection in order to reduce the burden of the disease on the affected pupils.

Contribution of authors

A.A. and J.A. designed the study. A.A collected the data for the study and J.A. supervised the data collection. T.K.M. and S.N. analyzed the data and interpreted the result. T.K.M., S.N. and S.S.B. prepared the manuscript; S.S.B reviewed the manuscript. All authors read and endorsed the final manuscript.

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Conflict of Interest

None

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