



Prevalence of Urinary Schistosomiasis among primary school children in three rural communities of Kano State, Nigeria

^{1*} Duwa, R. S., ² Sanusi, A., ³ Ogbunachara, C and ⁴ Okiemute, F.

^{1,3} Department of Biological sciences,
Nigeria Police Academy Wudil, Kano State Nigeria

^{2,4} Department of Forensic science,
Nigeria Police Academy Wudil, Kano State Nigeria

*Correspondent author: Duwa, R.S

Abstract

This study was carried out among pupils of three primary schools in Dawakin Kudu Local Government Area of Kano State, Nigeria between May and July, 2018. Three hundred and twenty (320) pupils were examined for the presence of schistosome eggs in urine. Out of the 320 pupils examined only 34 (10.6%) were found to be infected with *S haematobium*. Males have higher prevalence of 26 (12.1%) compared to females 8(7.6%). The age group 8-10 years has the highest infection rate 13 (15.85%) while the age group 5-7 the least with 1(4.6%). Although sample sizes were not equal, among the communities Fallau with 65 has the highest infection rate with a prevalence of 11(16.9%), Gano with 135 has 14 (10.4%) followed by Danbagina, 120 with a prevalence of 9(7.5%). All infections were light (<50eggs/10ml of urine). There was a significant difference in infection among the different villages examined $\chi^2= 8.94$, $df = 2$, $p<0.05$. Statistically there was also a significant difference in infection among the different age groups $\chi^2= 2.9356$, $df = 3$, $p<0.05$. It was concluded that *S. haematobium* is present in these study areas and unless health education on the mode of transmission of the disease, provision of safe and adequate water supply and sanitation which will help in curtailing the infection is provided, there is the likelihood of a rise in infection rate. This is the first time this type of study was carried out in these study areas.

Key words: Urinary schistosomiasis, Kano state, Prevalence, School children, Wudil River



Introduction

Urinary and intestinal *Schistosomiasis* becomes a major public health problem and was rated second to malaria in terms of socio-economic and public health impact as the most devastating parasitic disease in tropical countries (CDC, 2004). While at least 258 million requires preventive treatment for *schistosomiasis* in 2014 more than 61.6 million people were treated for *schistosomiasis* in 2014 (WHO, 2016). Urinary *Schistosomiasis* affects people in developing countries particularly children who acquire the disease during recreational activities in snail-infested water (Bello *et al.*, 2002). Transmission can take place in almost any type of habitat, from large lakes or rivers to small seasonal ponds or streams (WHO, 2002), through contact with contaminated water while performing daily chores such as washing, laundry, fetching water and herding animals. With each passing year a child's risk of infection increases peaking between the ages of 10 and 20 (Kabaterine, *et al.*, 2004). It has recently been estimated that school-aged children experience a considerable burden of *schistosomiasis* which may have both immediate and long-term consequences on their health, growth and education (Ekpo *et al.*, 2011, Houmsou *et al.*, 2012). In Sub-saharan Africa *S haematobium* infection is estimated to cause 70,32, 18 and 10 million cases of haematuria, dysuria, bladder wall pathology and major hydronephrosis respectively (Ven der Werf *et al.*, 2003). The prominence of infection is attributed to poor environmental sanitation and inadequate access to safe tap water; these conditions lead to continued exposure to the infective stages of the parasite and thus high rates of re-infection (Catherine *et al.*, 2003; Akinboye *et al.*, 2011).

Nigeria is one of Africa's most severely affected countries with an estimated 101.28 million people at risk of the infection while 25.83 million are already infected (Chitsulo *et al.*, 2000) but it has been unsystematically reported and large areas remain where the disease status is unknown (Anosike *et al.*, 2001). In Nigeria *schistosomiasis* is endemic in 34 of the 36 states and Abuja (Steinman, 2006; Opara *et al.*, 2007). Urinary schistosomiasis is widespread in both rural and urban communities in Nigeria with prevalence ranging between 2% and 90% and the vast majority of cases occurring among the poor and marginalised. Since *schistosomiasis* was found to have severe effects on cognitive, physical and intellectual growth as well as nutritional deficiencies among school aged children this study aimed to investigate the presence of urinary *schistosomiasis* among primary school children in

Fallau, Danbagina and Gano primary schools. The results could be used to improve planning, implementation, monitoring and evaluation of Urinary *Schistosomiasis* interventions in the area.

Material and methods

Study Area

This study was conducted in Falau, Gano 2 and Danbagina primary schools in Dawakin kudu Local Government Area of Kano state, Nigeria. Dawakin Kudu Local Government Area has an area of 384 km². It is located between latitude 11.811° N and longitude 8.78° E and bordered to the north-west by Madobi and Kumbotso local government areas, to the north-east by Warawa Local Government Area, to the south-east by Wudil Local Government Area, to the south by Bunkure Local Government Area, and to the south-west by Kura Local Government Area.

These three schools are few kilometers to Gano town and about 10km from the fishing community of Panchan. The Falau primary school is located few meters away from Falau pond, the school mainly separated from the pond by road to Fallau village. Gano and Danbagina are very close to a part of Wudil River. The occupation of the people of these three villages are mainly farming and fishing, their main crops are sweet potato, maize, millet, rice, groundnut, sugar cane and beans.

Study design

Permission to conduct the study was obtained from the Education Secretary (ES) State Universal Primary Education Board (SUPEB). The selected schools were visited before sample collection, the school authorities, teachers, and children were briefed on the purpose and benefit of the study. All those who participated in the study gave informed consent before they were enrolled. They were also allowed time to discuss and obtain permission of their parents.

Questionnaire Design

Questionnaire was used to collect information such as age, sex, symptoms, treatment, name (codes given), level of awareness and water contact activities such as swimming, fishing, playing/bathing, irrigation, and rice farming etc. in lakes, rivers, ponds or rain fed pools. During administration of questionnaire, the children were interviewed individually during which the class teachers assisted in the interpretation (from English to the local language (Hausa) and filled the questionnaire for those of them that cannot do it by themselves.

Each child was then provided with a pre-

labelled, wide-mouthed, screw capped 20ml plastic container for the collection of mid-day urine sample between 11am-1pm. The sealed sample containers containing the urine were placed inside the storage flask containing ice packs. The samples were immediately transported to the laboratory in Biological sciences Department, Nigeria Police Academy, Wudil, Kano for analysis.

Macroscopic examination

The urine samples collected were carefully examined for haematuria.

Parasitological examination of urine

10ml of urine was centrifuged at 5000 rpm for 5 minutes to concentrate the eggs of the schistosome. After centrifugation, the upper layer (the supernatant) was discarded, the sediment left was deposited gradually by drops using a Pasteur pipette on a clean grease-free glass slide and carefully covered with a cover slip. The slide was then mounted on a light microscope and examined using ax40 objective for the eggs of *S haematobium* characterized with a terminal spine (Ekpo *et al.*, 2011).

Data Analysis

The data obtained were statistically analyzed using Chi square-test with a p-value of 0.05 and simple percentage to obtain prevalence.

Results

The result of this study was presented in tables and indicates that Urinary schistosomiasis is present in all the schools screened from the three villages. Of the 320 samples examined an overall prevalence of 34 (10.6%) was recorded. Fallau recorded the highest prevalence with 11(16.92%) followed by Gano II, 14 (10.37%) while Danbagina recorded the least 9(7.5%). The age group with the highest prevalence is 8-10, 13 (15.85%) and that with the least infection was the 5-7, 1 (4.55%) age group. Males have higher prevalence 26(12.1%) compared to females, 8(7.7%). Females within the age range 5-7 were not infected. Statistically, there was a significant difference in infection among the different villages from which the pupils came from ($\chi^2=8.94$, d.f= 2, p-value < 0.05), there was also a significant difference in infection among the different age groups examined, $\chi^2= 2.9356$, df = 3, p<0.05.

Table 1: Prevalence of urinary schistosomiasis according to sex in the study area

| Sampling Site | Male | | Female | | Total | | Intensity (%) | |
|---------------|--------------|--------------------|--------------|--------------------|--------------|--------------------|--------------------------------|---------------------------------|
| | No. Examined | No. and % infected | No. Examined | No. and % infected | No. Examined | No. and % infected | Light intensity (<50eggs/10ml) | Heavy intensity (<50 eggs/10ml) |
| Gano 2 | 96 | 12(12.5) | 39 | 2(5.1) | 135 | 14(10.37) | 14(28) | 0 |
| Fallau | 29 | 7(24.13) | 36 | 4(11.1) | 65 | 11(16.92) | 11(22) | 0 |
| Danbagina | 90 | 7(7.8) | 30 | 2(6.7) | 120 | 9(7.5) | 9(18) | 0 |
| Total | 215 | 26(12.1) | 105 | 8(7.7) | 320 | 34(10.63) | 34(10.63) | 0 |

($\chi^2=8.94$, d.f=2, p-value > 0.05)

Table 2: Prevalence of *S. haematobium* infection with respect to age

| Age group (Years) | No. Examined | No. and % infected | No. Examined | Intensity (%) | |
|-------------------|--------------|--------------------|--------------|---|--|
| | | | | Light intensity (<50eggs/10ml of urine) | Heavy intensity (<50 eggs/10ml of urine) |
| 5 – 7 | 22 | 1(4.55) | 1(4.55) | 0 | 0 |
| 8 – 10 | 82 | 13(5.85) | 13(5.85) | 0 | 0 |
| 11 – 13 | 156 | 15(9.61) | 15(9.61) | 0 | 0 |
| 14 > | 60 | 5(6.66) | 5(6.66) | 0 | 0 |
| Total | 320 | 34(10.63) | 10.63 | 0 | 0 |

($\chi^2= 2.9356$, df = 3, P<0.05)

Discussion

The observed prevalence of urinary schistosomiasis in the study area was very low, 34 (10.6%) compared to findings from elsewhere in the state and Nigeria as a whole that have predisposing factors for the disease. This prevalence is lower than 37.1% reported by Hemabo and Omudu (2015) in Benue state;

Ukatuet *al.* (2015) in Kebbi state and 12.7% by Sam –Wobo *et al.* (2015) in Ogun state. Danbagina and Fallau are very close to Wudil River and Fallau is very close to Ungurgu pond (the pond is just about two minutes' walk to the school). Gano primary school was also located very close to the pond where constant water contact activities are taking place. An overall prevalence of 10.6%

justifies the need for further epidemiological studies in the area. The prevalence rate observed in this study is lower than obtained in previous studies in other parts of Kano state like in Wasai, in Minjibir Local Government Area (Duwa, *et al.*, 2009) but higher than what Dawakiet *al.*, (2015) reported from five Local Government Areas collectively in the state. The low prevalence constitutes a public health problem as it could rise unless curtailed early and this also may not reflect the true rate of infection in the area. The level of infectivity of the pupils showed that males recorded higher infection when compared to females. This observation agrees with other reports made earlier, such as that of Sam-woboet *al.*, (2015) that males are more infected with *S.haematobium* because males are more involved in water contact activities. In this study children above the age of 14 years had less cases of the infection. Nworie (2012) opined that the decline of prevalence among older children in some population is due to a decreased contact with infested water and the possible development of concomitant immunity common to schistosomiasis. Development of immunity may be the best explanation here as older children are found to be highly involved in fishing in the fishing communities of Kano state. The fact that different new species of the intermediate host (*Bulinus*) are emerging seems to worsen the situation (Duwa, 2018).

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