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Prevalence of *Schistosoma haematobium* among Qur'anic School Pupils in Zaria, Kaduna State

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Abstract
Urinary schistosomiasis is a major public health problem particularly in developing countries and is associated with high morbidity. The study aimed at determining the prevalence of urinary schistosomiasis among Qur'anic school pupils in Zaria, Kaduna State. One hundred and fifty-five (155) urine samples were collected from Qur'anic school pupils in Zaria. The samples were immediately transported to the laboratory of the Department of Microbiology, Ahmadu Bello University (A.B.U), Zaria and processed using sedimentation technique. The ova of Schistosoma haematobium were detected in fifty-eight (58) samples giving a prevalence of 37.4%. The infection was highest in age group 10-12 years with 41.9%, followed by those in age range 13-15years (41.0%) while the least was observed among pupils between the ages of7-9years (27.5%). Risk factors observed to be associated with schistosomiasis include; swimming in river or dam, fishing and place of laundry. The infection was associated with clinical signs and symptoms including abdominal pain, haematuria, painful and frequent urination. Regular community-based treatment should be conducted using anti-helminthic drugs to reduce urinary schistosomiasis.
Key words: *Prevalence, Schistosoma haematobium, Qur'anic school pupils, Zaria, Kaduna State*

INTRODUCTION

Urinary Schistosomiasis is a parasitic disease caused by the blood trematode, *Schistosoma haematobium*. It is one of the most common parasitic diseases in the world (Okpala *et al.*, 2004) second only to malaria in human impact among tropical diseases and third after malaria and intestinal helminthiasis in global parasitism (Alam and Okwori, 2012; Okwori *et al.*, 2014). Approximately 779 million people are at risk of infection with 249 million persons being infected worldwide (Nwachukwu *et al.*, 2018). The disease is common in tropical and sub-tropical countries affectingabout 200 million people (Nmorsi *et al.*, 2006). It is prevalent in developing countries of Africa, Middle East, South America and South East Asia where more than 600 million people are at risk (Ruelas *et al.*, 2006).

Schistosoma was first isolated by a German physician, Theodore Bilharz in 1851 from the human blood vessels and the disease was initially referred to as Bilharzia or Snail Fever but renamed Schistosomiasis afterwards (Orihel and Ash, 1995). *Schistosoma haematobium*, the causative agent of urinary Schistosomiasis is the most prevalent species of *Schistosoma* in Africa with *Bulinus* species of snails as the intermediate host. People in close contact with water bodies such as fishermen and farmers are at higher risk because of their constant exposure to the snails (Nwachukwu *et al.*, 2018).

Nigeria is one of Africa's most severely affected countries with estimated 101.3 million people at risk of the infection while 25.8 million individuals are already infected (Chitsulo *et al.*, 2000). It is a neglected parasitic disease of childhood that is endemic in Nigeria (Adeyebaand Ojeaga, 2002). Urinary Schistosomiasis affects individuals in developing countries most especiallychildren who contract the disease during recreational activities in snail-infested water bodies (Bello and Edungbola, 2002). Factors such as frequency of occurrence of the intermediate host, unprotected exposure to water bodies, some cultural practices and poor hygiene are associated with urinary schistosomiasis (Ugbomoiko, 2000; Agi and Okafor, 2005).

In Zaria, prevalence of 19.5%, 10.5%, 5.33% and 20% have been obtained by Omenesa *et al.* (2015), Bishop and Akoh (2017), Sulaiman *et al.* (2018) and Adamu *et al.* (2019) for urinary shistosomiasis. While infection rates of 25.11% (Kanwai *et al.*, 2011) and 12.3% (Bishop *et al.*, 2016) have been reported in other parts of Kaduna state. Since urinary shcistosomiasis has been reported to be common among school-aged children and highly associated with poor hygienic practices, there is need to determine its burden among pupils of Qur'anic schools. Qur'anic school pupils in Samaru, Zaria, Kaduna State. The specific objectives of the study were

The study therefore aimed to determine the prevalence of urinary schistosomiasis among

to; detect the ova of *Schistosoma haematobium* in urine samples of the pupils using sedimentation technique and determine some socio-demographic as well as risk factors associated with urinary schistosomiasis using structured questionnaire.

MATERIALS AND METHODS

Study Area

The research was conducted in Zaria, Kaduna State, Nigeria. The subjects were Qur'anic school pupils in Palladan and Dogoniche, Samaru, Zaria. Zaria is a Local Government Area in Northern part of Kaduna State and is located at latitude 11°3'0"N to 11°9'0"N and longitude 7°37'30"E to 7°45'0"E (Abbas and Arigbede, 2012). Itis characterized by slow moving rivers and seasonal ponds which harbourthe intermediate hosts. The predominant occupation in the study area is farming, which includes both seasonal and irrigation farming.

Study design

The research is a community-based, cross-sectional, descriptive study aimed at male children between the ages of 5-15 years attending selected Qur'anic schools in Zaria, Kaduna State Nigeria. The study was conducted for a period of three (3) months between July and September, 2018.

Ethical consideration

Permission to conduct the research was obtained from the Qur'anic school teachers and the consent of the pupils was sought before collecting samples.

Determination of sample size

A previous prevalence of 10.5% (Bishop and Akoh, 2017) for urinary schistosomiasis in Zaria was used to determine the sample size. The formula (Naing *et al.*, 2006) below was used.

$$N = \frac{Z^2 \times P(1-P)}{d^2}$$

Where:

N = Number of samples to be collected

P =Prevalence

Z = Confidence level at 95% (standard value of 1.96)

d= Margin of error at 5% (standard value of 0.05)

Therefore;

$$N = \frac{(1.96^2) \times 0.105(1-0.105)}{0.05 \times 0.05}$$

$$= 144.41$$

Therefore 155 samples were collected

Questionnaire administration

A structured questionnaire was administered to the pupils to determine some socio-demographic, clinical signs/symptoms and risk factors associated with urinary schistosomiasis.

Sample Collection

One hundred and fifty-five urine samples were collected from Qur'anic school pupils in the selected schools in clean wide-mouthed screw capped containers as recommended by Cheesbrough (2006). Pupils were directed on how to obtain the urine prior to sample collection. The samples were immediately transported to Bacteriology and Parasitology Laboratory of Department of Microbiology, A.B.U. Zaria, for analysis.

Sample Analysis

The urine samples were processed using sedimentation technique as described by Cheesebrough (2006). Ten millilitres (10mls) each, of the urine sample was transferred to a clean test tube and centrifuged at 3000rpm for 5 minutes. After centrifugation, the supernatant was discarded and a Pasteur pipette was used to collect the sediment. A drop of the sediment was placed on a clean glass slide after which a cover slip was placed over it. The preparation was observed microscopically using X10 and X40 objectives for the characteristic ova of *Schistosoma haematobium* with terminal spine as described by Cheesebrough (2006).

Data Analysis

Statistical analysis was done using SPSS version 20.0. Chi-square was used at 95% confidence interval to test for significant difference between the variables. P-value less than 0.05 was considered as statistically significant.

RESULTS

A prevalence of 37.4% was obtained for urinary schistosomiasis among pupils attending Qur'anic schools in Palladan and Dogoniche, Zaria, Kaduna state, Nigeria (Fig 1). In relation to age, the highest prevalence was among pupils within the age range 10-12 years (41.9%), while the lowest was among those in the age group 7-9 years (27.5%).There was no statistically significant difference in the occurrence of urinary schistosomiasis between the age groups (p=0.409) (Table 2). The relationship between urinary schistosomiasis was assessed with risk factors and signs/symptoms. The highest infection was observed among those who; wash clothes in the dam (100%), use river as their water source (71.4%), engage in swimming in dam or river (55.8%), indulge in fishing (37.5%). However, statistically significant difference was observed between those who swim and those who do not, as well as those whose place of laundry differ with p-value of 0.000 and 0.005 respectively (Table 2). The following signs and symptoms were observed among pupils who were positive for *Schistosoma haematobium*; brown-cloudy

urine (100%), visible haematuria (61.4%), (48.4%) and abdominal pain (40.95%) (Table 3).
painful urination (49.0%), frequent urination

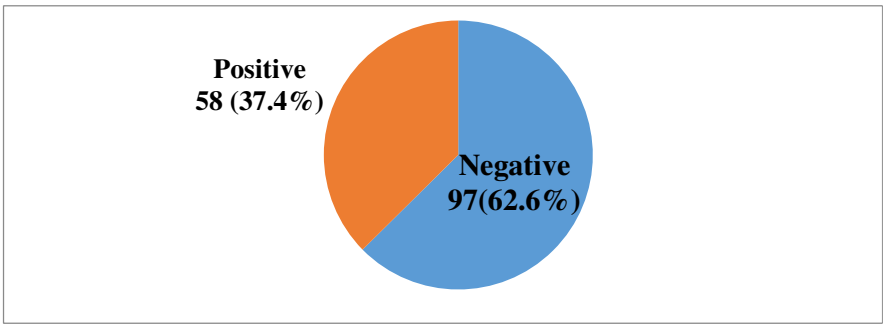

Fig 1: Overall prevalence of *Schistosoma haematobium* among Qur'anic school pupils in Samaru, Zaria

Table 1: Prevalence of Urinary Schistosomiasis among Qur'anic School Pupils in relation to age

Age (yrs)	No. analysed	No./% Positive	Statistics
4-6	14	5(35.7)	x2= 3.979, p= 0.409
7-9	40	11(27.5)	
10-12	62	26(41.9)	
13-15	39	16(41.0)	
Total	155	58(37.4)	

Table 2: Prevalence of Urinary Schistosomiasis among Qur'anic School pupils in relation to risk factors

Risk factor	No. examined	No./% Positive	Statistics
Swimming in dam or river			
Yes	86	48(55.8)	χ^2= 27.915, p=0.000
No	69	10(14.5)	
Place of laundry			
Home	106	32(30.2)	χ^2=10.493, p=0.005
Dam	3	3(100)	
River/stream	46	23(50)	
Fishing			
Yes	32	12(37.5)	χ^2=0.000, p=0.992
No	123	46(37.4)	
Water source			
Tap	33	10(30.3)	χ^2=4.915, p=0.178
Borehole	10	5(50)	
Well	105	38(36.2)	
River	7	5(71.4)	

Table 3: Prevalence of Urinary Schistosomiasis among Qur'anic School pupils with respect to clinical signs and symptoms

Sign/symptom	No. analysed	No./% positive	Statistics
Abdominal pain			
Yes	88	36(40.9)	χ^2=1.050, p=0.304
No	67	22(32.8)	
Visible haematuria			
Yes	70	43(61.4)	χ^2=31.422, p=0.000
No	85	15(17.6)	
Painful urination			
Yes	96	47(49)	χ^2=14.340, p=0.000
No	59	11(18.6)	

Frequent urination			
Yes	64	31(48.4)	χ^2=5.651, p=0.017
No	91	27(29.7)	
Urine colour			χ^2=9.875, p=0.020
Brown-cloudy	1	1(100)	
Milky-white	21	2(9.5)	
Red-cloudy	10	5(50)	
Yellow-orange	23	50(40.7)	

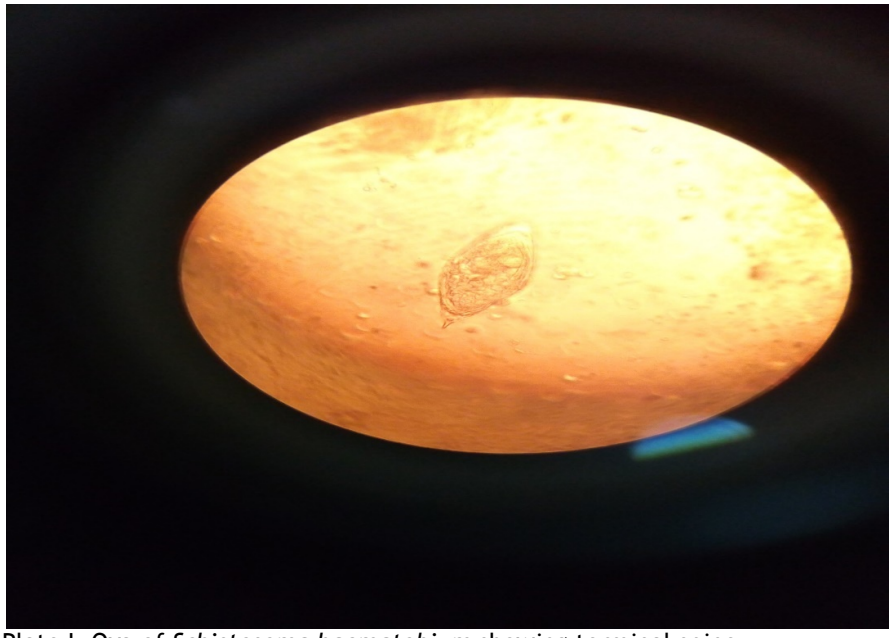

Plate I. Ova of *Schistosoma haematobium* showing terminal spine

DISCUSSION

From the study conducted, a prevalence of 37.4% was obtained for urinary schistosomiasis among Qur'anic school pupils in Palladan and Dogon Iche, Zaria, Kaduna State, Nigeria. The infection rate is high but not surprising as the study population lack good sanitary conditions, basic amenities and access to portable water. These factors could predispose them to urinary schistosomiasis. The relatively high prevalence obtained could also be as a result of the period the study was conducted, which was rainy season, as it is the time were the intermediate hosts (snails) are most abundant. It is also a period where the dried-up or almost dried-up rivers or streams are filled with water thereby making water activities at its utmost level. High water contact activities in snail-infested ponds, low level of literacy, and indiscriminate disposal of human sewage and lack of basic amenitiesare factors attributed to urinary schistosomiasis (WHO, 2007).

Our findings is contrary to a similar research by Omenesa *et al.*(2016) who reported a prevalence of 19.5% among pupils attending two primary schools in Bomo village, Zaria. The variation in the results could be due to differences in study time and study population. Our result is lower than 53% but higher than 3.97% reported by Moses *et al.* (2015) and Nwachukwu *et al.* (2018) in Ebonyi and Keffi respectively. The differences in the prevalence could be as a result of variation in study area.

The infection was higher among children belonging to age group 10-12 years (41.9%) which may be due to their frequent exposure to water bodies because they may have some freedom to indulge in water activities such as swimming, fishing and washing clothes. This disagrees with the findings of Moses *et al.* (2015) and Nwachukwu *et al.* (2018) who reported children in age group 5-8 years and 14-16 years having the highest infection respectively. This may be as a result of variation in cultural practices of the different areas which may grant children access to water bodies at different stages of their life.

Based on the findings of the study, swimming highly predisposes the pupils to the infection among all the water contact activities that they

indulge in. This is in agreement with the findings of Sulaiman *et al*. (2018) who reported those who swim having the highest infection rate with 14%.Also haematuria was the most common sign observed among the infected children, which is in correlation with the reports of Adamu *et al*. (2019) which states haematuria being the predominant sign among the study subjects with 57.9%.

CONCLUSION

A Prevalence of 37.4% was obtained in the study for urinary schistosomiasis among pupils attending Qur'anic schools in Zaria. Pupils within the age-group 10-12 years had the highest infection. Engagement in water activities such as fishing, swimming were risk factors observed to be associated with *S. haematobium* infection. Abdominal pain, visible haematuria, painful and frequent urination weresigns/symptoms associated with urinary schistosomiasis among the pupils.

RECOMMENDATIONS

Based on the study, there is need for appropriate intervention to combat the disease particularly among the study population. Public health awareness should be made on the disease, how it is contracted as well as how to prevent it.

REFERENCES

Abbas, I.I. and Arigbede, Y.A. (2012).Green area mapping of Ahmadu Bello University main campus, Zaria, Nigeria.*Journal of Geography and Regional Planning*, 5(10):287-292.

Adamu, A.M., Dzikwi, A.A., Akefe, O.I., Alimi, Y.A., Adikwu, A.A., Idoko, S.I., Kore, M., Okita, A.O., Yikawe, S.S., Bello, S.G., Lamai, R.S. and Kolo, R.L. (2019).Epidemiology of urinary schistosomiasis among secondary school students in Kaduna State, Nigeria.*Journal of Community Medicine and Health Education*, 9:650.

Adeyeba, O.A. and Ojeaga, S.G.T. (2002).Urinary schistosomiasis and concomitant urinary tract pathogens among school children in Metropolitan Ibadan, Nigeria.*Journal of Biomedical Research*, 5:103-107.

Agi, P.I. and Okafor, E.J. (2005).The Epidemiology of *Schistosomahaematobium*in Odau community in Niger Delta Area of Nigeria.*Journal of Applied Science and Environmental Management*,9:37-43.

Alam, K. and Okwori, A.E.J. (2012).Schistosomiasis:A case series with review of literature.*The International Journal of Infectious Disease*, 7(10):580-588.

Bello, A.B. and Edungbola, L.D. (2002).Common parasite disease in childhood in Nigeria: incidence and intensity of infection: *Tropical Parasitology*, 3:9-11.

Bishop, H.G., Inabo, H.I. and Ella E.E. (2016). Prevalence and intensity of urinary schistosomiasis and their effects on packed cell volume of pupils in Jaba L.G.A, Nigeria. *Edorium Journal of Microbiology*, 2:13-26.

Bishop, H.G. and Akoh, R.I. (2017).Risk factors, symptoms and effects of urinary schistosomiasis on anthropometric indices of school children in Zaria, Kaduna State, Nigeria.*Open Access Journal of Science*, 2(1):61-65.

Cheesbrough, M. (2006).*District Laboratory Practice in Tropical Countries*.Part 1.United Kingdom: Cambridge University Press, Pp. 236-239.

Chitsulo, L., Engels, D., Montresor, A. and Savioli, L. (2000).The global status of schistosomiasis and its control. *Acta Tropical*, 77:41-51.

Kanwai, S., Ndams, I.S., Kogi, E., Gyem, Z.G.and Hena, J.S. (2011). Urinary schistosomiasis infection in DumbinDutse, Igabi Local Government Area, Kaduna State, Nigeria, *Science World Journal*, 6(3).

Moses, E., Victor, O., kpaku, G., Zira, G. and Joseph, D. (2015).Prevalence of urinary schistosomiasis among primary school children in a Northern Nigerian population *International Journal of Advanced Research*, 3(11):511-519.

Naing, L., Winn, T. and Rusli, B.N. (2006). Practical issues in calculating sample size for prevalence studies. *Archives of Orofacial Sciences*, 1:9-14.

Nmorsi O.P.G., Ukwandu N.C.D.,Ogoinja, S., Blackie, H.O.T. and Odike M.A.C. (2006): Urinary tract pathology in some *Schistosomahaematobium* infected Nigerians. *African Journal of* Biotechnology, 6(2):123-127.

Nwachukwu P.C., Ohaeri C.C., Ukpai, O.M., Irole-eze, O.P. and Amaechi, Prevalence of E.C.(2018). *schistosomahaematobium* infection

among school-aged in Afikpo North Local Government Area, Ebonyi State, Nigeria. *Sri Lankan Journal of Biology*, 3(2):1-8.

Okpala, H.O., Agwu, E., Agba, M.I., Chimezie, O.R., Nwobu, G.O., and Ohihoin, A.A. (2004).A survey of the prevalence of schistosomiasis among pupils in Apata and Laranto areas in Jos, Plateau State. *Journal of HealthAllied*Sciences, 3(1):1

Okwori, A.E.J., Sidi, M., Ngwai, Y.B., Obiekezie, S.O., Makut, M.D., Chollom, S.C., Okeke, I.O. and Adikwu, T.I (2014).Prevalence of schistosomiasis among primary school children in Gadabuke district, Toto LGA, North Central Nigeria.*British Microbiology Research Journal*,4(3):255-261.

Omenesa, H.O., Bishop, H.G. and Raji, H.M. (2015).Prevalence of urinary schistosomiasis among pupils attending primary schools in Bomo village, Zaria-Nigeria. *International Journal of Research in Engineering and Science*, 3(5):14-19.

Orihel, T.C. and Ash, L.R. (1995).*Parasite in Human Tissues*.American Society of Clinical Pathology press, Chicago Pp. 311-312.

Ruelas, D., Karentz, S.D. and Sultivan, J.T. (2006). Lethal and Sub-lethal effects of UVB on Juvenile *Biomphalariaglabrata* (Mollusca: Pulmonata). *Journal of Invertebrate Pathology*, 93:192-200.

Sulaiman, M.A., Musa Hassan Muhammad, Hussaini, I.M., Bobzom, B.S. and Ibrahim, A. (2018). Prevalence of urinary schistosomiasis among children attending some selected primary schools in Zangon Shanu Zaria. *UMYU Journal of Microbiology Research*, 3(1).

Ugbomoiko, U.S. (2000). The prevalence, incidence and distribution of human urinary schistosomiasis in Edo State Nigeria.*Nigeria Journal of Parasitology,* 21:3-14.

World Health Organisation (2007).Schistosomiasis. Fact Sheet No 115. Geneva. http://www.who.int/entitymediacentre/factsheets/fs115/en