Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2173

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **3 (6):** 59-64 (2015)

International Journal of Pure & Applied Bioscience

Research Article

OPEN ACCESS

Urinary Schistosomiasis Associated with Bacteriuria Among School Aged Pupils in Ipogun Ondo State, Nigeria

Dada*, E. O.

Microbiology Department, Federal University of Technology, Akure, Ondo State, Nigeria

*Corresponding Author E-mail: dadaoluyemi5@gmail.com

ABSTRACT

This study on urinary schistosomiasis associated with bacteriuria among school age pupils in Ipogun, Ifedore Local Government area of Ondo state was carried out from May to July 2014. Terminal urine samples were examined for the presence of ova of Schistosoma haematobium and bacteria using standard techniques. Of the 310 urine samples examined, 120 were contained with the ova of Schistosoma haematobium with an overall prevalence of 38.7%. Of the 310 urine samples examined, 73 contained bacteria with an overall prevalence of 23.5%. Prevalence related to age and sex was found to be insignificant (P> 0.05). There was significant differences between bacteriuria and urinary schistosomiasis (P<0.05), of the 73 infected with bacteriuria, 42 tested positive for ova of Schistosoma haematobium represnting a prevalence of 57.5%.Five bacteria (Staphylococcus aereus, Staphylococcus saprophyticus, Escherichia coli, Proteus mirabilis and Klebsiella specie) were isolated and of these, Staphylococcus aereus occurred more frequently than others. The study shows the health implications of association of bacteriuria in urinary schistosomiasis in the study area.

Key words: *Urinary, Bacteriuria, Schistosomiasis, School, Pupils.*

INTRODUCTION

Schistosoma haematobium, (*S. haematobium*) the causative agent of urinary schistosomiasis is a digenetic trematode flatworm.It is a water base disease which is endemic in rural areas where there is a lack of potable water[10]. It is a chronic and debilitating disease and it is one of the neglected tropical diseases related to health problem and morbidities[20].

Schistosomiasis is among the most parasitic infections in the world, second to malaria with respect to socio-economic and public health importance, especially in rural areas of developing countries[7,11].

Schistosoma haematobium inhabitthe venous plexus that drains the urinary bladder of man. The mature worm, deposit terminal spined eggs which clog the venous plexus thus impeding blood flow. This causes the veins to burst then blood and eggs enter the urinary bladder, giving rise to the characteristic symptom of blood in urine or haematuria. In sub-Saharan Africa alone it is estimated that 70 million individuals experience haematuria, 32 million with difficulty in urinating (dysuria), 18 million with bladder-wall pathology, and 10 million with major hydronephrosis from infection caused by *Schistosoma haematobium*. Mortality rate due to non-functioning kidney (from *S. haematobium*) and haematemesis has been put at 150,000 per year[2].

Cite this article: Dada, E.O., Urinary Schistosomiasis Associated with Bacteriuria Among School Aged Pupils in Ipogun Ondo State, Nigeria, *Int. J. Pure App. Biosci.* **3(6):** 59-64 (2015). doi: http://dx.doi.org/10.18782/2320-7051.2173

Like other neglected tropical diseases, urinary schistosomiasis is endemic in poor and marginalized communities[14].Nigeria is highly endemic for urinary schistosomiasis with estimated 101.28 million persons at risk and 25.83 million people infected. Accordingly the estimates for morbidity and mortality in affected populations are high with school age children usually presenting with the highest prevalence[2]. In affected children, this disease has greatly reduced the cognitive ability, physical fitness and caused increased irregularities in school participation and attendance[12]. Oniya *et al*[18], reported that schistosomiasis remains one of the major health problems among school aged children in Ipogun.

Bacteriuria is the presence of significant bacteria count in urine which precedes asymptomatic urinary tract infection (UTI) and characterized by dysuria, frequency in urination pain and fever[9]. Urinary tract infection is any infection of a part of the urinary tract and it occurs in all age groups and it is the most common bacterial infection in humans, community and hospital settings[1]. Urinary tract disease is a specific trait of infection with *Schistosoma haematobium*, which affects the entire genitourinary tract[12]. Bacterial infections are often recurrent and important complications of the inactive stage of urinary schistosomiasis, which may be instrumental in precipitating renal failure[8]. Mostafa *et al*[15], opined that it seems possible that agricultural workers and others who are regularly exposed to contaminated water are occasionally and simultaneously infected with both the schist some parasite and pathogenic bacteria. UTI occurs occur four times more frequently in females than males and may affect 10% of people during childhood.

MATERIALS AND METHODS

Study Area

This study was carried out in Ipogun, (7° 19'N, 5°5'E), a town in Ifedore local government area of Ondo state, south west, Nigeria. The primary source of water for agriculture and most domestic activities is the 'Aponmu' river, flowing through the town; the river serves as the contact site of the parasite. The inhabitants are mainly farmers who use water from the river in carrying out their daily and recreational activities including bathing and washing. Other sources of water in the town are, "Asala River and Odo-lona-oko".

Male and female school pupils whose age ranged between five and twenty years old participated in the study.

Informed Concept and Ethical Approval

Approval was obtained from Area Education office, Igbara-Oke, Ifedore Local Government. Oral informed consent was obtained from the community head and parents of participants. Participation was said to be voluntary and were all assured that utmost confidentiality will be maintained as names will not use on any sample but identification numbers.

Urine Collection

The study was carried out from May to June; 2015. Information on socio-economic, demographic, risk factors and clinical presentations was collected from every participant in the study using standardized questionnaires. Urine samples were collected between 10:00 am and 02:00 pm which is the peak period for shedding of eggs according to Cheesbrough[4]. A 20ml clean catch, terminal urine sample was collected in mouthed leak-proof numbered universal containers by the participants who were previously instructed with illustration aids. Each sample was cross-matched with the number on each questionnaire. Samples were packed in a well closed bucket containingice blocks and taken to the Microbiology Research Laboratory of The Federal University of Technology, Akure for analysis.

Parasitological Examination of Urine

This urine were divided into 2 fractions and labeled A and B. Fraction A of each of the urine samples were investigated for the presence of *Schistosoma haematobium ova.* These were analyzed using the centrifugation method as described by Chugh *et al*[5]. The urine samples were centrifuged at 500 rpm for 10 minutes after which the supernatant was discarded and the sediment was re-suspended by gently tapping the bottle. A drop of the re-suspended sediment was placed on a clean grease free slide, covered with a cover slip and examined under the microscope using X40 objective.

Microbiology Analysis of Urine Samples

Fraction B of each samples were subjected to a commercially prepared reagent strip "combi 9" (Lot No 04200746) to check for the haematuria, proteiuria and nitrite by dipping the strips into each urine sample and the colour change was matched with the standard colours by placing the strip at the side of the reagent strip's container.

Thereafter this fraction was cultured on CLED agar plates using streaking method as described by Cheesbrough[4]. The streaked plates were then inverted and incubated at 37^{o}C for 24 hours. After 24 hours the distinct colonies obtained were Gram stained, characterized and sub culture on a fresh plate and incubated at 37^{o}C for 24 hours. All bacterial isolates obtained were then identified using the standard method described by Cowan and Steel[6].

RESULTS

Table 1 shows age and gender related prevalence of urinary schistosomiasis in the study area. Out of the 310 pupils examined, 120 of them were infected representing an overall prevalence of 38.7%. Although prevalence was high in males (44.0%) than females (36.6%) respectively there was no significant difference (P>0.05) between sex and urinary schistosomiasis. Infection cut across all ages except in age group 17-20 years where there was no infection. High prevalence of 65.3% was observed in age group 13-16 years followed by 36.4% in age group 9-12years and 25.8% in age group 5-8 years. Prevalence related to age and urinary schistosomiasis was significance (P <0.05).

Haematuria related to the prevalence of urinary schistosomiasis (Table 2), show that out of 105 pupils having haematuric urine, 101 of them had ova of *Schistosoma haematobium* representing a prevalence of 96.2% and 3.8%haematuric urine has no ova of *Schistosoma haematobium.* Also 9.3% of pupils who have ova of *Schistosoma haematobium* are not haematuric. Haematuria was found to be significant (P< 0.05) to urinary schistosomiasis.

Table 3: Show the age and gender related prevalence of bacteriuria in the study area. Bacteriuria was high in females (27.8%) than in males (19.9%) but was insignificantly different (p>0.05) between males and females. Bacteriuria was common in all age groups except in the 17-20 years old. The prevalence of 28.5% was recorded for age group 13-16 years, followed by 24.2% in age group 5-8 years and 22.2% in 9-12 years old. There was no significant difference (P> 0.005) between age groups and bacteriuria. Prevalence of bacteriuria in relation to urinary schistosomiasis (Table 4) show that of the 73bacteriuria cases,only42 cases (57.5%) has ova of *Schistosoma haematobium* in their urine and only 42.5% has bacteriuria with no ova of *Schistosoma haematobium.* There was significant difference between schistosomiasis and bacteriuria (P< (0.05).

Table 5 shows the occurrence of bacteria isolates in the urine samples. Out of the five bacteria isolates, *Staphylococcus aereus* has the highest prevalence of 46.6%, followed by *Escherichia coli* (24.6%), *Staphylococcus saprophyticus* (12.3%), *Klebsiella specie* (9.6%) and *Proteus mirabilis* with 6.8%.

Table 1: Age and Gender Related To Prevalence of Urinary Schistosomiasis

	Male			**Female**			**Total**		
Age grp(yrs)	Number examined	Number infected	Infection rate (%)	Number examined	Number infected	Infection rate (%)	Number examined	Number infected	Infection rate (%)
5-8	26	9	34.6	36	7	19.4	62	16	25.8
9-12	102	37	36.3	96	35	36.5	198	72	36.4
13-16	37	27	73.0	12	5	41.7	49	32	65.3
17-20	1	0	0.0	0	0	0	1	1	0.0
Total	**166**	**73**	**44**	**144**	**47**	**36.6**	**310**	**120**	**38.7**

Table 2: Prevalence of Urinary Schistosomiasis Related Tohaematuria

	Haematuric samples & infection rate (%)	**Non Haematuric samples & infection rate (%)**
Presence of ova	101 (96.2)	19 (9.3)
Absence of ova	4 (3.8)	186 (90.7)
Total	**105 (100)**	**205 (100)**

N (Total number of pupils examined) =310

Table 3: Prevalence of Bacteriuria in the Study Area in Relation Toage and Gender

	Male			**Female**			**Total**		
Age grp (yrs)	Number examined	Number infected	Infection rate (%)	Number examined	Number infected	Infection rate (%)	Number examined	Number infected	Infection rate (%)
5-8	26	4	15.3	36	11	30.6	62	15	24.2
9-12	102	20	19.6	96	24	25	198	44	22.2
13-16	37	9	24.0	12	5	4.7	49	14	28.5
17-20	1	0	0	0	0	0	1	0	0.0
Total	**166**	**33**	**19.9**	**144**	**40**	**27.8**	**310**	**73**	**23.5**

Table 4: Bacteriuriaassociated with Urinary Schistosomiasis

	Urinary schistosomiasis cases	**Non urinary schistosomiasis cases**	**Total**
Presence of bacteriuria	42(57.5)	31(42.5)	**73(100)**
Absence of urinary bacteriuria	78(32.9)	159(67)	**237(100)**
Total	**120(38.7)**	**190(61.3)**	**310(100)**

Table 5: Distribution of Bacterial Isolates in the Urine Samples

ISOLATES	**OCCURRENCE**	**% of Occurrence**
S. saprophyticus	9	12.3
S. aereus	34	46.6
E. coli	18	24.6
Proteus mirabilis	5	6.8
Klebsiella spp.	7	9.6
TOTAL	**73**	**100**

DISCUSSION

Prevalence of schistosomiasis observed in this study agrees with 34.1% and 31.3% of Okechukwu[16] and Casmir[3] in the eastern and north central parts of Nigeria. This prevalence is in contrast to that of Oniya *et al*[19]., who after treatment with praziquentel reported 18% prevalence inthe same study area. This difference may probably, be as a result of repeated exposure to infection by the pupils or the appearance of new cases in the same community after two years.

Gender and age related prevalence ofinfectionthat was not significant may be an indication that both gender and all ages are being equally exposed to infection through contact with water bodies. This corroborates the finding of Agbolade *et al*[1]., in Nigeria that *Schistosoma haematobium* infection is not gender-specific.

High prevalence among the age groups 13-16 years could probably be attributed to the reason of Ugbomoiko *et al*[21]., that children in this age group are more adventurousand are therefore more likely to have more regular contact with water bodies

High prevalence of haematuria in urinary infected cases is expected and this may be due to the spine of the eggs which pierce through the bladder wall in other to gain entrance into the lumen. This agrees with Oniya *et al*[19].,who opined that haematuriais a significant tool in the prognosis of schistosomiasis.

In this study, the presence of *Schistosoma haematobium* ova was significantly associated with the prevalence of bacteriuria. This result compares with Okechukwu[16], who stated that concomitant bacteria urinary tract infection in children where ordinarily UTI is known to be low could be attributed to urinary schistosomiasis. The prevalence of bacteriuria related to sex and age in 5-16 year old urinary schistosomiasis could probably be that UTI have no sex preference at this agerange. This could also be due to reason adduced by Laughlin *et al*[13]., that children of this age range frequently engagement in activities that expose them to bacteria of the genital tracts such as swimming.

The five bacteria specie encountered in this study and that *E. coli* being the most common of them all is consistent with the finding of Laughlin *et al*[13].,while assessing bacteriuria in urinary schistosomiasis cases in Egypt.

Oniya and Jeje[18] in a study on the assessment on edemicity and efficacy of prazinquatel in Ipogun had recorded a prevalence of 18.0%. Therefore this presentstudy carried out two years after Oniya and Jeje[18], recorded a prevalence of 38.7% cases of urinary schistosomiasin Ipogun. It can be concluded, that the schistosomiasis is not onlystill prevalent in Ipogun but new cases must have probably emerged. This study also show that a combination of haematuria and bacteriuria still remain relevant forcommunity diagnosis of urinary schistosomias. By this finding, there is need for further studies on co-morbidity in children with urinary schistosomiasis in the study area and results obtained will not only addknowledge to the complications and control of the disease.

REFERENCES

1. Agbolade, O.M., Akinboye, D.O. andAwolaja, A., Intestinal helminthiasis and urinary schistosomiasis in some villages of Ijebu North, Ogun State, Nigeria.*Africa JournalBiotechnology,* **3:** 206-209 (2000).
2. Bottieau, E., Clerinx, J. and De Vega, M.R., Imported Katayama fever: clinical and biological features at presentation and during treatment. *JournalInfect.,* **52:** 339–45 (2006).
3. Casmir, I.C., Bernard, M. and Nkiruka, F., Urinary Schistosomiasis and Concomitant Bacteriuria In The Federal Capital Territory Abuja Nigeria,*New York Science Journal, **2*****(2):*** 554-200 (2009).
4. Cheesbrough, M., District laboratory practice in tropical countries part II second editionCambridge University Press. Pp 56-70 (2000).
5. Chugh, K.S., Harries, A.D., Dahniya, M.H., Nwosu, A.C., Gashau, A., Thomas, J., Thaliza, T.D., Hogger, S., Ajewski, Z. and Onwuchekwa, A.C.,Urinary Schistosomiasis in Maiduguri, North East Nigeria. *Annals of Tropical Medicine and Parasitology,***80(6):** 593-599 (1986).
6. Cowan, S.T. and Steel, K.J., Manual for the identification of medical bacteria 3rd Edition, Cambridge University Press.Pp.45 -114 (1993).

7. Engels, D., Chistsulo, L., Montresor, A. and Savioli, L., The global epidemiology situation of schistosomiasis and new approaches to control and research. *Acta Trop,* **82:** 139–146 (2002).
8. Farid, Z., Schistosome with Terminal-spined Eggs: Pathological and Clinical Aspect in Jordan. *Human Schistosomiasis, Wallingford CAB International,* **9(3):** 159-193 (1993).
9. Frank-Peterside, N. and Wokoma, E.C., Prevalence of assymtomatic bacteriuria in students of University of Port Harcourt secondary school.*Journal of Applied Science and Environmental Management,* **(13)2:** 55-58 (2009).
10. Gryseels, B., Polman, K., Clerinx, J. and Kestens, L., Human schistosomiasis. *Lancet,* **368:** 1106–1118 (2006).
11. King, C.H.,Toward the elimination of schistosomiasis. *New Engl J Med.*, **360:** 106–109 (2009).
12. King, C.H., Parasites and poverty: The case of schistosomiasis. *Acta Tropica,* **113:** 95-104 (2010).
13. Laughlin, L.W., Farid, Z., Mansour, N., Edman, D.C. and Higashi, I., Bacteriuria in Urinary Schistosomiasis in Egypt, a Prevalence Survey. International *Tropical Medicine Journal,* **27(5):** 91(2008).
14. Mbah, M. and Useh, M.F., The relationship between urinary schistosomiasis and the prevailing socio-economic factors of a rural community in Cameroon. *Niger J Parasitol*., **29:** 5-10 (2008).
15. Mostafa, M.H., Shenita, S.A. and O'connur, P.J., Relationship between schistosomiasis and bladder Cancer. *Clinical Microbiology Reviews,* 12(1): 978-11 (1999)
16. Okechukwu Paulinusossai, bacteria in primary school children with urinary schistosomiasis in rural communities in Enugu state, Nigeria. Masters in Public Health A.B.U. Pp 26- 35 (2012).
17. Oluyemi, E.D., Fred, C.A. and Opeyemi, Z.L., Bacteriuria among primary and secondary school pupils in Akure-North Local Gorvernment Area of Ondo State, Nigeria. *Acta Clinical Croatica.*, **51:** 379-385 (2012).
18. Oniya, M.O. and Jeje., Urinary schistosomiasis: Efficacy of praziquantel and association of blood grouping in the disease epidemiology. *International journal for biotechnology and microbiology,* **1:**31-35(2010).
19. Oniya, M.O., Ishola M.A. andJayeoba, O.D., Schistosomiasis in Ipogun: Update Assessment on Endemicity and Efficacy of Praziquentel in Chemotherapy *International Journal of Tropical Disease & Health,* **3(1):** 37-44(2013).
20. Rollinson, D., A wake up call for urinary schistosomiasis: reconciling research effort with public health importance. *Parasitol.*,**136:** 1593-1610 (2009).
21. Ugbomoiko, U.S., Ofoezie, I.E., Okoye, L.C. and Heukelbach, J., Factors associated with urinary schistosomiasis in two peri-urban communities in south-western Nigeria: *Annals of Tropical Medicine & Parasitology,***104(5):** 409-419 (2010).