PREVALENCE OF URINARY *SCHITOSOMIASIS* AMONG PRIMARY SCHOOL CHILDREN IN ODENYI, BASSA LOCAL GOVERNMENT AREA, KOGI STATE, NIGERIA

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A. G. Agieni[1]*, Otalu O. Jnr [2], P. A. Omebije[1], G. A. Obande[3], C. A. Omatola[1] and O. O. Alo[1]
[1]Department of Microbiology, Kogi State University, Anyigba, Nigeria
[2]Department of Veterinary Public Health & Preventive Medicine, Ahmadu Bello University, Zaria, Kaduna State, Nigeria
[3]Department of Microbiology, Federal University, Lafia, Nasarawa State, Nigeria
*Corresponding author: agieniashemgodwin@gmail.com

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Abstract: This study was conducted to assess the prevalence of *Schitosoma haematobium* among primary school children in Odenyi, Bassa Local Government Area, Kogi State, Nigeria. A total of 113 urine samples were collected aseptically in sterile universal bottles and analyzed microscopically for *schitosoma haematobium* eggs. The study showed an overall prevalence of 43.3% with a higher prevalence among the males (45.1%) than females (41.1%) although not statistically significant (P>0.05). Among the water contacts activities examined in the study, swimming (80.0%), farming (66.7%) and washing in the stream (62.5%) posed higher risks of infection, respectively.

Keywords: *Schitosoma haematobium*, prevalence, risk, children, activities, Odenyi

Introduction

Urinary schitosomiasis is a parasitic infection caused by a trematode of the genus schitosoma. *Schitosoma haematobium* (*S. haematobium*) has been implicated as the cause of the disease among the five known species of schitosomes; *S. haematobium*, *S. mansoni*, *S. japanicum*, *S. intercalatum* and *S. mekongi* (Arora & Arora, 2008; WHO, 2002). Urinary shitosomiasis is usually characterized by clinical manifestations such as the presence of blood in urine (haematuria) and is associated in many cases with painful sensation on the urinogenital organ while urinating or after urinating. These clinical manifestations occur when the parasite establishes and deposits eggs in the venous plexus, thereby restricting blood flow and also eliciting granulomatous inflammation, ulceration and pseudo-polyposis of the ureteral wall, which results in haematuria and dysuria (Gryseels *et al.*, 2006).

Although the disease is preventable and treatable with available therapeutic agents such as praziquantel, metrozonate and oxaminiquine (Ologunde *et al.*, 2012), if the infection is not detected and treated, over some years complications such as squamous cells carcinoma of the urinary bladder, uroliteriasis, ascending urinary tract infection, urethral stricture with subsequent hydronephrosis and renal failure may occur (Gryseels *et al.*, 2006). Thus, untreated *schitosomiasis* accounts for 56% of the known cases of calcification in the bladder, otherwise known as bladder stone (Joseph *et al.*, 2010). Hence, *schitosomiasis* is a significant health challenge in many parts of the world, with varying epidemic proportions across 76 Countries (Houmsou *et al.*, 2012). Approximately 600 million people are exposed to *schitosomiasis* on daily bases as a result of their activities related to water and poor sanitary habits, availability of infected snail intermediate host and introduction of irrigation techniques. These factors have been contributed to the risks that encourage the spread of the disease (Okwuosa, 1982; Luka *et al.*, 2005).

From some studies conducted on *schitosomiasis* in Nigeria among school aged children and adults, varying degree of prevalence has been reported ranging from 11.8 – 79% depending on the location and risk factors (Ozumba *et al.*, 1989; Ekejindu *et al.*, 1999), while a prevalence of 18.7% was once observed among school aged children in Kogi State Nigeria (Ejima and Odaibo, 2010).

In view of the public health significance of this infection, this study was designed to determine the prevalence of urinary *schitosomiasis* among primary school pupils in Odenyi, Bassa Local Government Area of Kogi State, Nigeria.

Materials and Methods

Study area/population

The study was conducted in Odenyi, Bassa Local Government Area of Kogi State, which is one of the 21 Local Government Areas of Kogi State, Nigeria. Odenyi is located in the eastern part of the State bounded by the River Benue. The inhabitants are predominantly farmers, fisher-men, and traders. The sources of water for domestic and agricultural uses are streams and hand-dug wells. One hundred and thirteen (113) primary school pupils not below 3years and not older than 14years, who gave their consent were recruited into the study.

Collection of samples and laboratory analysis

Urine samples were collected between November and December, 2015 from the pupils of LGEA Primary School, Odenyi, Bassa Local Government Area of Kogi State, between 10am and 2.00pm, using clean wide mouth labelled specimen bottles. Each pupil was guided on how to pass their urine samples into the bottles. The urine samples were kept in black polythene bag to avoid the egg hatching into miracidal form and were transported to Microbiology Laboratory of Kogi State University, Anyigba for analysis at different occasions.

Microscopic examination of urine samples

The urine samples were screened for the presence of eggs using wet preparation method and concentration technique (Monica, 2004; Risikat and Ayoade, 2012).

The procedures for the urine examination were as follows:

1. The urine specimens were thoroughly agitated, 10 ml of each sample taken, centrifuge at x685 for 5 min;
2. The supernatant was discarded and the whole sediment was transferred to a clean slide and covered with cover glass;
3. The entire sediment was examined under the microscope using x10 and x 40 objective lenses with the condenser iris closed sufficiently to give good contrast; *Schistosoma haematobium* ova appeared as golden yellow and elliptical in shape with a terminal spine (Soulsby, 1982; Cheesbrough, 2006).

Results and Discussion

A total of one hundred and thirteen (113) urine samples were examined, Table 1 shows the prevalence of *Schitosoma haematobium* with respect to gender and class. Out of the 62

male samples examined, 28(45.1%) were infected by *Schistosoma haematobium* while 21 (41.1%) of 51 female samples analyzed were positive for the presence of *S. haematobium*. With respect to class, the highest prevalence rate 57.9% was recorded in Primary Six, followed by 50.0% in Primary 5, with the least prevalence of 29.4% in primary 1. No statistically significant difference was observed in the prevalence recorded with respect to gender (x2=3.165, p>0.05), and class (x^2=1.572, p>0.05), respectively.

Table 1: Sex Prevalence of *Schistosoma haematobium* in Odenyi, Bassa Local Government Primary School, Kogi State, Nigeria

Class	MALE			FEMALE			TOTAL	
	No. Examined	No. Infected	% Infected	No. Examined	No. Infected	% Infected	No. Infected	% Infected
Primary 1	9	3	33.3	8	2	25.0	5	29.4
Primary 2	12	5	41.7	8	2	25.0	7	35.0
Primary 3	7	2	28.6	10	5	50.0	7	41.2
Primary 4	11	5	45.5	9	4	44.4	9	45.0
Primary 5	10	6	60.0	10	4	40.0	10	50.0
Primary 6	13	7	53.8	6	4	66.7	11	57.9
Total	62	28	45.1	51	21	41.1	49	43.3

P-value = 0.6745

Table 2: Age Prevalence of *Schistosoma haematobium* in Odenyi, Bassa Local Government Primary School, Kogi State, Nigeria

Age Groups	No. Examined	No. Infected	% Infected	Number not Infected	% not Infected
3-5	17	5	29.4	12	70.6
6 – 8	20	7	35.0	13	65.0
9 – 11	37	16	43.2	21	56.8
12 – 14	39	21	53.8	18	46.2
Total	**113**	**49**	**43.3**	**64**	**56.7**

P-value=0.3003

Table 2, shows the prevalence of *S. haematobium* with respect to age. It reveals that age group 12–14 years had the highest infection rate of 53.8%, with the least recorded among ages 3 – 5 (29.4). There was no observed significant difference in infection among the age groups (x^2 = 3.662, p>0.05).

Table 3 shows the prevalence of *S. haematobium in* relation to water contact activities the highest. The prevalence rate of 80.0% was observed among pupils that frequently swim in the stream water with the lowest prevalence of 35.0% being among pupils that drink water from the stream.

Table 3: Prevalence according to water contact activity of *Schistosoma haematobium* in Odenyi, Bassa Local Government Primary School, Kogi State, Nigeria

Activity	No. examined	No. positive	Prevalence
swimming	60	21	80.0
Fishing	7	3	42.9
drinking	10	8	35.0
washing	8	5	62.5
farming	18	12	66.7
Total	**113**	**49**	**43.3**

Urinary *schitosomiasis* among school children depicts potential threat to public health in the affected area. Since they urinate more indiscriminately even in and around community source of water, they may likely contribute to the dissemination of the disease. On the other hand, infected children loss a lot of blood and suffer retardation in growth and educational performance (Olalubi and Olukunle, 2013).

The prevalence (43.3%) of *S. haematobium* as reported in this study may suggest that the organism is circulating within the population. A Similar prevalence 33.2% (305/920) was reported among school-age children in communities along an irrigation rural Northern Ghana (Anto *et al.,* 2013). In contrast, Nworie *et al.* (2012) reported a prevalence of 9.8% among school age children in Afikpo North Local Government Area of Ebonyi State. The low prevalence as recorded in their study may not be unconnected with the fact that they surveyed an urban area with better social amenities and improved personal hygiene. The finding that males harbor more *S. haematobium* (45.1%) than females (41.1%) though not statistically significant, buttresses the point that the life style and water contact activities (length of exposure to the stream for recreation, fishing and farming) around the major source of water may be key to the transmission of the infection.

However, this is in contrast to the study conducted by Olalubi and Olukunle (2013) which showed that the female pupils were more infected than the males. In their study population, the females had more water contacts during washing of clothes and dishes, routine fetching of water for domestic use, bathing and cleaning.

The higher prevalence observed between ages 9-11 (43.2%) and 12-14 (53.8%) years may be linked to their stage in human development given that they are less confined to their parents and at the same time associate more with their peer group. Egwuyenga *et al.* (1994) also observed that the prevalence of urinary *schitosomiasis* was higher between ages 10-14 years

The prevalence of *S. haematobium* with respect to water contact activities suggests that swimming pose the greatest risk to infection (80%), followed by farming along the river bank (66.7%). This may be as a result of the fact that the snail intermediate hosts thrive more in ponds, streams or slow flowing rivers. Thus, those who associate with these water bodies for drinking, domestic purposes, fishing, swimming and farming are more at risk of exposure to the infection (Damen et al. 2006; Akinboye *et al*., 2011).

Conclusion

This study has shown that *schistosomias* is a serious public health challenge in Odenyi community in Bassa Local Government Area of Kogi State. This is not unconnected with the reliance of the community on the river ITEME for drinking, cooking, recreation, laundry, agricultural practices and other domestic purposes. There is an urgent need for

health and hygiene education, as well as the provision of portable water in the area and its environs. It is also important to engage in preventive and control measures as well as treatment for those infected with the aim of eradicating the spread of urinary *schitosomiasis* and the attendant complications associated with long time infection with *Schistosoma haematobium.*

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Conflict of Interest
Authors have declared that there is no conflict of interest reported in this work.

References

Akinboye DO, Ajisebutu JU, Fawole O, Agbolade OM, Akinboye OM, Amosu AM, Atulomah NOS, Awodele O, Oduola O, Owodunni BM, Rebecca SN, Falade M & Emem O 2011. Urinary Schistosomiasis: Water contact frequency and infectivity among secondary school students in Ibadan, Nigeria. *Nig. J. Parasitol.,* 32(1): 129-134.

Anto F, Asoala V, Adjuik M, Anyorigiya T, Oduro A, Akazili J, Akweongo P, Ayivor P, Bimi L & Hodgson A 2013. Water contact activities and prevalence of *Schistosomiasis* infection among school-age children in communities along an irrigation scheme in rural northern Ghana. *J. Bacteriol. Parasitol*., 4: 4.

Arora DR & Arora B 2008. Medical parasitology, second edition, CBS Publishers: New Delhi Bangalore India, pp. 140-144.

Cheesbrough M 2006. District Laboratory Practice in Tropical Countries, Part 2. Cambridge University Press, Cambridge, UK, pp. 323-341.

Damen JG, Banwat EB, Egah DZ & Shabi ME 2006. *Schistosomiasis* among students in a local government area of Kaduna State in Northern Nigeria. *Highland Med. J*., 4(1): 33 – 37.

Egwuyenga OA, Nmori P & Omokaiye O 1994. Schistosomiasis in Bauchi Nigeria. *Nig. J. Parasitol*. 15: 35-41.

Ejima IAA & Odaibo AB 2010. Urinary schistosomiasis in the Niger-Benue basin of Kogi State Nigeria. *Int. J. Trop. Med.,* 5: 73-80.

Ekejindu IM, Onyali IO, Ozumba NA & Ibe CC 1999. Prevalence and intensity of urinary *Schistosomiasis* in Agulu, Anambra State, Nigeria, and the impact of health education on knowledge and practices in relation to disease transmission. Niger. *J. Parasitol*., 20:71-76.

Gryseels B, Polman K, Clerinix J & Kestens L 2006. Human Schistosomiasis. *Lancet.,* 368(9541): 1106 – 1118.

Houmsou RS, Amuta EU & Sar TT 2012. Profile of an epidemiological study of urinary schistosomiasis in two local government areas of Benue state, Nigeria. *Int. J. Med. and Biomed. Res.*, 1(1): 39-48.

Joseph M.B, Gaji B, Muhammad T, Baba, MM & ThilzaI IB 2010. Incidence of schitosomiasis in primary school pupils with particularly reference to *S. haematobium* in Maiduguri. *Researcher,* 2(3): 31-36.

Luka SA, Ajogi I, Audu PA & Umoh JU 2005. Ecology of the intermediate snail hosts of schistosomiasis in Lere Local Government Area, Kaduna state, Nigeria. *J. Pest Disease and Vector Mgt.*, 6: 398-403.

Monica CD 2004. District Laboratory in Tropical Countries Part 1. Cambridge University Press UK, pp. 56-57.

Nworie O, Nya O, Anyim C, Okoli CS & Okonkwo EC 2012. Prevalence of urinary schitosomiasis among primary school children in Afikpo North local government area of Ebonyi state. *Annals of Biological Research*, 3(8):3894-3897.

Okoli EI & Odaibo AB 1999. Urinary Schistosomiasis among school children in Ibadan, an urban community in South-Western Nigeria. *Trop. Med. Int. Hlth*., 4: 308-315.

Okwuosa VN 1982. Studies on the ecology and distribution of schistosoma vectors and other snail fauna in southwestern states of Nigeria III: Relationship with aquatic plants. *Nig. J. Parasitol*., 3: 149-158.

Olalubi AO & Olukunle BF 2013. Prevalence and risk factors of *Schitosoma haematobium* infection among primary school children Igbokuta village, Ikorodu North Local government, Lagos State. *J. Nursing and Health Sci.*, 2(6): 62-68.

Ologunde CA, Olaoye AB, Olaifa OA & Oluwa OY 2012. Schitosomiasis in Ogbese-Ekiti, re-infection after successful treatment with Praziquantel. *Global J. Med. Res.*, 12(3): 1.

Ozumba NA, Christensen NO & Nwosu ABC 1989. Endemicity, focality and seasonality of transmission of human schistosomiasis in Amagunze Village, eastern Nigeria. Niger. *J. Helminthol*., 56: 105-111.

Risikat SA & Ayoade AA 2012. Correlation analysis between the prevalence of *Schistosoma haematobuim* and water conditions: a case study among the school pupils in South Western Nigeria. *IJRRAS*, 13(1): 160 - 165.

Soulsby EJL 1982. Helminths, Arthropods and Protozoa of Domesticated Animals (7th Edition, Bailliere Tindale, London, 806pp

Ugbomoiko US, Ofoezie IE, Okoye IC & Heukelbach J 2010. Factors associated with urinary schistosomiasis in two peri – urban communities in Southwestern Nigeria. *Annals of Trop. Med. and Parasitol.*, 104(5): 409-419.

WHO 2002. Prevention and control of schistosomiasis and soil-transmitted helminthiasis. *WHO Expert Committee*: *World Health Organ Tech. Rep. Ser.*, 912: 1–57.