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Comparative analysis of urinary schistosomiasis among primary school children and rural farmers in Obollo-Eke, Enugu State, Nigeria: Implications for control

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ABSTRACT

Objective: To determine the prevalence, sex-age related intensity of urinary schistosomiasis and to compare such parameters among rural school children and rural farmers in selected communities in Obollo-Eke located in Southeast, Nigeria. **Methods:** A cross-sectional survey involving 1 337 school children and farmers was conducted in Obollo-Eke community between September 2006 and July 2007. Demographic data of subjects was collected using a questionnaire prepared for this purpose. Urine samples were collected and examined for haematuria and ova of *Schistosoma haematobium* (*S. haematobium*) using Medi-test Combi 9 and sedimentation technique respectively. **Results:** The prevalence of urinary schistosomiasis based on microscopic examination of the urine sediment for the ova of *S. haematobium* was 17.5% while the prevalence of haematuria was 15.6%. Infection intensity varied from light to heavy. In general, the prevalence was higher among males (20.8%) than females (14.6%; $P>0.05$) and was slightly higher among primary school children (18.0%; $n=762$) than farmers (16.9%; $n=575$; $P>0.05$).The age-specific prevalence of schistosomiasis among the study subjects ranged from 8.3% to 21.2% in 0-5 years and 11-15 years age groups respectively. **Conclusions:** Haematuria and mean egg/10 mL urine ($r = 0.95$; $P<0.01$) showed that both procedures are reliable for the diagnosis of the disease and can be used to ascertain the prevalence of the disease in any community. The comparative analysis of urinary bilharziasis among primary school children and rural farmers demonstrated that the infection is moderately high in these two risk population groups at Obollo-Eke. A robust intervention strategy is clearly needed.

1. Introduction

Urinary schistosomiasis caused by fluke worm *Schistosoma haematobium (S. haematobium)* is one of the neglected tropical diseases associated with serious health problems and morbidities[1]. The adult parasites live within the perivesical venous plexus and the females produce eggs which clog the venous plexus thereby hampering the flow of blood. This bursts the veins, allowing blood and eggs to enter the urinary bladder, resulting in the characteristic symptom, haematuria. Upon contact with water, the egg releases the miracidium. It seeks for the intermediate host, freshwater snails and after penetrating and passing some developmental cycles, it starts leaving the snail as cercariae. Cercaria penetrates the skin of human, migrates in the blood via the lungs to the liver and transform into young worms which eventually reside in associated

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Schistosomiasis infects about 250 million persons worldwide, and along with malaria, are considered the major parasitic diseases afflicting humans[3,4]. Urinary schistosomiasis is endemic in many sub-Saharan African countries where suitable habitats for *Bulinus* snails, the intermediate hosts of *S. haematobium*, are abundant[5]. The disease, like other neglected diseases, is endemic in poor and marginalized communities[6,7]. Therefore, urinary schistosomiasis is typically a disease of the poor who live in conditions that favour transmission and have no access to proper healthcare or effective preventive measures.

In Nigeria, a previous study confirmed that both *Schistosoma mansoni* (*S. mansoni*) and *S. haematobium* are endemic with the latter being more widespread[8]. It is evident that urinary schistosomiasis is endemic in most parts of Enugu State[9]. It has been widely reported that morbidity and mortality due to schistosomiasis among children of school age are higher compared to other groups[10]. In addition, these children also have reduced cognitive ability, poor physical fitness and do not attend school regularly[11-13].

The habits of a population play a large role in the transmission of urinary schistosomiasis. Infected individuals contaminate their water supply with their urine due to poor knowledge about the disease transmission, poor living standards or insufficient attention to hygiene, a custom which favours transmission of schistosomiasis. Furthermore, people in developing countries such as Nigeria have poor healthcare facilities which are needed for proper control of the disease. In such communities, self-medications with antihelminthic drugs are common but they are often misused. One of the consequences of such self-medication and antihelminthic drug misuse includes suppression of the egg laying capacity of schistosomes and other worms[1]. The total effect could result in erroneous diagnoses of cases with commonly employed diagnostic tools such as microscopic examination of urine samples and reagent strip test for haematuria. In such circumstances, there is usually high rate of subclinical, chronic and few acute infections. Such phenomena have the potential to superimpose the real health problems of the community especially in cases of schistosomiasis and related parasitic diseases with a consequent oversight by health policy makers.

Currently in Nigeria, most of the studies conducted so far involved school children since it is believed that the disease mainly affect children[14-16]. Therefore, only few studies have been conducted to investigate urinary schistosomiasis among farmers[17]. Despite the existence of very favourable conditions for the transmission of urinary schistosomiasis in Obollo-Eke community, no study has been conducted to determine the prevalence of the infection among the inhabitants. This study was therefore conducted to determine the prevalence of urinary schistosomiasis among school children and farmers in selected rural communities in Obollo-Eke, Southeast Nigeria.

2. Materials and methods

2.1. Study area and population

The study area, Obollo-Eke is a rural town in Udenu Local Government Area of Enugu State, in Southeast Nigeria. It is situated at 6 ° 9′ North and 7 ° 6′ East with an average altitude of 249 meter above the sea level. The area is a typical rural settlement intersected by several fresh water habitats, some of which are man-made pools, streams and rivers. Members of this community depend largely on the available streams, rivers, wells and rainwater to meet their water needs. The location of their farmlands is such that the farmers would have to cross some of the rivers to and fro the farms. The primary schools in the community are scattered in the villages and because of the interception of streams among these villages, the school children usually recreate in these waters during and after school hours. The schools enrolled for the study were Central School, Premier Primary School, Odobibo, Ogwu Primary School and Okparigbo Primary School. Farmers included in the study were also from the same villages. The population of Obollo-Eke is estimated to be about 15 000 of which 47.1% are males and 52.9% are females.

2.2. Pre-survey procedures

Pre-survey visit to the villages in the study area was made during which consultations and discussions were held with heads of health clinics, patent medicine dealers, village heads and primary school teachers who assisted in mobilizing the people for the study. We also created public awareness through the major religious group leaders who made announcements in their various churches prior to the date of the actual exercise. The community leaders intimated the villagers of our proposed visit. At the time of actual study exercise, we had the co-operation of all the persons concerned in our survey.

2.3. Data and specimen collection

Demographic data were obtained from all study subjects. The class teachers assisted in collecting demographic data from school children in the local dialect (Igbo), while data from farmers were obtained during house to house visit in the field using the same procedure. Urine samples were collected from primary school children and farmers. The urine specimen from each study participant was collected in a pre-labeled wide mouthed plastic bottle (30 mL) between the hours of 10:00 am and 2:00 pm. Women on their monthly menstrual period were recorded differently and excluded from visible haematuria counts. The urine samples were protected from direct sunlight by putting them in black cellophane bags to prevent the ova of *S. haematobium* from hatching.

2.4. Determination of haematuria

Fresh urine samples collected from target individuals

were observed macroscopically for visible haematuria and microhaematuria was investigated using Medi-test Combi 9 (Machery-Nagel, Germany) reagent strips as described by the manufacturer. Briefly, the strip was dipped into 5 mL urine sample placed in a clean test tube from the original urine collected in universal bottles. The result was classified according to the corresponding colour shades and values for haematuria: 0 (negative), 5 - 10 erythrocyte/ μL (ery/ μL) (low), 50 ery/ μL (moderate/medium), and ≥250 ery/ μL (high). A positive control for microhaematuria was set by adding one drop of blood into 100 mL of sterile distilled water while the negative control was sterile deionized water.

2.5. Parasitological investigation

Urine sample and the ova of *S. haematobium* therein were disinfected and preserved respectively at collection site by adding two drops (approximately 0.1 mL of 1% v/v Sodium hypochlorite (household bleach) to 20 mL of specimen. At the laboratory, each sample was examined for schistosome eggs using a modified method of sedimentation by gravity[8,18]. Briefly, sedimentation by gravity involved retaining 10 mL sub-sample in the pre-labeled 30 mL universal sterillin-bottle with a conical bottom. The bottles were allowed to stand for 4 h to enable the eggs of the parasite to settle at the groove of the conical bottle and followed by centrifugation for 2 min at 1 500 revolutions per minute (rpm). The supernatant was withdrawn with 10 mL syringe affixed to a 21 gauge needle. The sediment left in the groove was mixed and diluted to known volume if concentrated. The sediment was transferred to a clean glass slide, covered with cover slip and examined for terminal spined eggs of *S. haematobium* with ×10 and ×40 objectives of the microscope and the eggs were counted. The examination and egg count was repeated on another portion of the sample and the mean expressed as eggs/10 mL of urine.

2.6. Data analysis

All demographic data were coded before data entry, and all data were entered and analyzed using SPSS version 15.0 for windows. Frequencies and proportions were calculated for the descriptive analysis of the data. Descriptive statistics were used to calculate the prevalence of urinary schistosomiasis and Pearson *Chi*-square test was used to assess the associations between the demographic characteristics of the study subjects and the findings of the test samples. Pearson correlation coefficient (r) was used to test the correlation between haematuria and microscopic examination outcome of urine specimens. Student *t* test was also used to compare the means of prevalence's and intensity of infection between the different study groups. Differences and associations were considered significant at a P value of < 0.05.

2.7. Ethical issues

All those who participated in the study gave informed consent before they were enrolled. The consent of the school children was explicitly obtained after the school head teacher had explained the project to the pupils. They were allowed a day to discuss and obtain permission of their parents and on arriving to school on the sample collection day, the class teacher helped to confirm their consent.

3. Results

3.1. Demographic characteristics of study subjects

A total of 1 337 persons were examined between September 2006 and July 2007 in Obollo-Eke, Udenu Local Government Area of Enugu State, Nigeria. Out of this number, 762 (57.0%) were primary school children while the remaining, 575 (43.0%) were farmers. The ages of study subjects ranged from 4 to 68 years with a mean (SD) and median ages of 28 (17) and 19 years respectively. The demographic characteristics of study subjects is given in Table 1.

3.2. Prevalence of urinary schistosomiasis

The overall prevalence of urinary schistosomiasis among the study subjects was 17.5% (n = 1 337). Among those who were positive for *S. haematobium* ova, the intensity of infection varied from 42.2 to 101.1 per 10 mL of urine with a geometric mean (SD) and median values of 62.4 (19.9) and 67 per 10 mL of urine (Table 2).

The prevalence observed was of similar magnitude in all of the four villages. In general, the prevalence of the infection was higher among males (20.8%) than females (14.6%; P>0.05). The distribution of schistosomiasis in the villages was such that the highest rate of infected males were found in Amutenyi (28.6%) followed by Ogwu (20.8%). Females were the highest infected in Odobido (18.4%) with the least being 14.8% in Okparigbo. The pervasiveness of urinary bilharziasis in each of the study village is given in Table 3.

3.3. Primary school children

The prevalence of urinary schistosomiasis among primary school children was 18.0%. In the schools examined, the prevalence appeared similar in the four primary schools. However, there was a significant difference (P = 0.01) in the infection rate among male (23.2%) and female (13.5%) school children. The prevalence of *S. haematobium* infection among primary school children in Obollo-Eke is shown in Table 4.

In the primary schools investigated, the highest rate of schistosomiasis infected males (34.4%) was obtained at Central school and the least (17.3%) at Okparigbo primary school. Amongst the female school children, 17.7% were infected at Okparigbo primary school and the least (10.1%) was at Central school.

3.4. Farmers

The prevalence of schistosomiasis among farmers was 16.9%. The infection rate varied from 12.3% to 18.9% in Okparigbo and Ogwu villages respectively. The rate of infection was slightly higher in male farmers (17.7%) than female farmers (16.0%). The detail of prevalence among farmers is shown in Table 3.

The highest prevalence (21.4%) of urinary schistosomiasis was detected among male farmers from Ogwu village while the least (12.3%) prevalence was among farmers from Okparigbo village. As for female farmers, the highest (20.8%) prevalence was observed in farmers from Odobido village whereas the least prevalence (12.3%) was in farmers from Ogwu village.

3.5. Age-sex specific prevalence

The age specific prevalence of schistosomiasis among the study subjects varied from 8.3% to 21.2% in 0-5 years and 11-15 years age groups respectively. The age groups, 0-5 and > 46 years showed least prevalence. The highest sex-age related prevalence in males was seen among those within the age group of 11-15 (28.7%) and adults within 31-35 years (22.2%). Among female study participants, the elderly (> 46) were the least infected (8.1%) while age group 36-40 were the most infected (20.4%).

3.6. Intensity of urinary schistosomiasis

The intensity of urinary schistosomiasis was determined by the mean egg count per 10 mL of urine, and classified as light infection (< 50 egg/10 mL); heavy infection ($\geqslant$ 50 egg/10 mL) or visible haematuria. Most of the study participants who were positive for schistosomiasis had high

Table 1
Demographic characteristics of study subjects (*n*, %).

Paramaters	Characteristics	Male	Female	Total
Age (yrs)	0-5	24 (1.8)	36 (2.7)	60 (4.5)
	6-10	161 (12.0)	157 (11.7)	318 (23.7)
	11-15	136 (10.0)	170 (12.7)	306 (22.9)
	16-20	32 (2.5)	45 (3.4)	78 (5.9)
	21-25	30 (2.2)	51 (3.8)	81 (6.0)
	26-30	36 (2.7)	42 (3.2)	78 (5.9)
	31-35	99 (7.4)	64 (4.8)	163 (12.2)
	36-40	51 (3.8)	49 (3.7)	100 (7.5)
	41-45	45 (3.4)	50 (3.7)	95 (7.1)
	> 46	21 (1.6)	37 (2.8)	58 (5.9)
Category	School children	354 (26.5)	408 (30.5)	762 (57.0)
	Farmers	282 (21.1)	293 (21.9)	575 (43.0)
Villages (farmers)	Amutenyi	61 (4.6)	66 (4.9)	127 (9.5)
	Odobido	66 (4.9)	72 (5.4)	138 (10.3)
	Ogwu	98 (7.3)	82 (6.1)	180 (13.4)
	Okparigbo	57 (4.3)	73 (5.5)	130 (9.8)
Primary school (children)	Central School	93 (7.0)	168 (12.5)	261 (19.5)
	Premier School	86 (6.4)	74 (5.5)	160 (11.9)
	Ogwu School	94 (7.0)	104 (7.8)	198 (14.8)
	Okparigbo School	81 (6.1)	62 (4.6)	143 (10.7)

n = Actual number of subjects

Table 2
Sex-age related intensity of schistosomiasis by egg count/10 mL of urine, macrohaematuria and microhaematuria in Obollo-Eke, Enugu State, Nigeria.

Age	Males				Females			
	Examined	Mean egg	Macro(*n*, %)	Micro (*n*, %)	Examined	Mean egg	Macro (*n*, %)	Micro (*n*, %)
0-5	24	48.0	1 (4.2)	1 (4.2)	36	67.0	1 (2.7)	1 (2.8)
6-10	161	71.7	14 (8.2)	17 (10.6)	157	63.2	9 (5.7)	18 (11.5)
11-15	136	96.4	17 (12.5)	22 (16.2)	170	101.1	11 (6.5)	16 (9.4)
16-20	33	88.0	0 (0.0)	2 (6.1)	45	46.4	1 (2.2)	2 (4.4)
21-25	30	60.4	2 (6.7)	1 (3.3)	51	47.5	0 (0.0)	3 (5.9)
26-30	36	47.3	2 (5.6)	2 (5.6)	42	89.2	1 (2.4)	2 (4.8)
31-35	99	79.9	7 (7.1)	15 (15.2)	64	72.3	6 (9.4)	7 (10.9)
36-40	51	92.0	4 (7.8)	7 (13.7)	49	55.0	3 (6.1)	4 (8.2)
41-45	45	46.2	1 (2.2)	4 (8.9)	50	42.2	1 (2.0)	3 (6.0)
> 46	21	43.0	0 (0.0)	1 (4.8)	37	47.0	0 (0.0)	1 (2.7)
Total	636	672.9	48 (7.5)	72 (11.3)	701	630.9	33 (4.7)	57 (8.1)

Mean egg = Mean egg/10 mL urine; Macro = macrohaematuria; Micro = microhaematuria.

Table 3
Prevalence of schistosomiasis in fection in Obollo-Eke communities.

Villages studied	Urinarg infection			Infection among farmers		
	Males	Females	Total	Males	Females	Total
Amutenyi	28.6 (44/154)	11.5 (27/234)	18.3 (71/388)	19.7 (12/61)	15.2 (10/66)	17.3 (22/127)
Odobido	17.8 (27/152)	18.4 (27/146)	18.1 (54/298)	15.2 (10/66)	20.8 (15/72)	18.1(25/138)
Ogwu	20.8 (40/192)	15.0 (28/186)	18.0 (68/378)	21.4 (21/98)	15.9 (13/82)	18.9 (34/180)
Okparigbo	15.2 (21/138)	14.8 (20/135)	15.0 (41/273)	12.3 (7/57)	12.3 (9/73)	12.3 (16/130)
Total	20.8 (132/636)	14.6 (102/701)	17.5 (234/1337)	17.7 (50/282)	16.0 (47/293)	16.9 (97/575)

Table 4
Prevalence of *S. haematobium* infection among primary schoolchildren in Obollo-Eke, Enugu State, Nigeria.

Primary schools	Male pupils		Female pupils		Total	
	Examined	Infected (*n*, %)	Examined	Infected (*n*, %)	Total	Infected (*n*, %)
Central school	93	32 (34.4)	168	17 (10.1)	261	49 (18.8)
Premier school	86	17 (19.7)	74	12 (16.2)	160	29 (18.1)
Ogwu school	94	19 (20.2)	104	15 (14.4)	198	34 (17.2)
Okparigbo school	81	14 (17.3)	62	11 (17.7)	143	25 (17.5)
Total	354	82 (23.2)	408	55 (13.5)	762	137 (18.0)

intensity of infection (>50 eggs/10 mL) with 50% of infected persons having more than 67 eggs per 10 mL of urine sample (Table 2). The highest intensity of infection with *S. haematobium* (101.1 eggs/10 mL of urine) was among female primary school children while the least intensity of infection (42.2 eggs/10 mL of urine) was detected among female farmers of age group 41-45. Among male study participants, the highest intensity of infection (97 eggs/10 mL) was seen among school children of age group 11-15 while the least intensity of infection (43 eggs/10 mL) was observed among the elderly persons (> 46 years). There was no significant differences (P>0.05) in the intensity of infection between the male (geometric mean 67.3 eggs/10 mL) and female (geometric mean 65.2 eggs/10 mL) study participants.

3.7. Haematuria

Previous studies showed correlation between haematuria and parasitological prevalence rate of urinary schistosomiasis. In our study, the overall prevalence of haematuria among the investigated persons was 15.7%. The highest prevalence (28.7%) of haematuria was observed among primary school children and the lowest rate (7.5%) of haematuria was seen among farmers. Out of the total haematuria detected, 81 (38.6%) persons had macrohaematuria whereas the remaining 129 (61.4%) individuals were positive for microhaematuria. Macrohaematuria was more prevalent (7.5%) in male subjects than their females counterparts (4.7%) with a border line significance (P = 0.046). A similar trend was observed for microhaematuria.

3.8. Correlation of haematuria and microscopic detection of ova of S. haematobium

Microscopic examination of the urine sediments showed that 17.5% of subjects were positive for ova of *S. haematobium* while the test for haematuria yielded a prevalence of 15.6%. In the test for haematuria, 81(38.6%) persons were positive for macrohaematuria (visible haematuria) while 129 (61.4%) subjects were positive for microhaematuria. The two diagnostic methods for urinary schistosomiasis using microscopic examination of urine sediment and haematuria (combination of macrohaematuria and microhaematuria) showed strong positive correlation (r = 0.95; P < 0.01) when compared to the microscopic diagnosis for urinary bilharziasis (Figure 1).

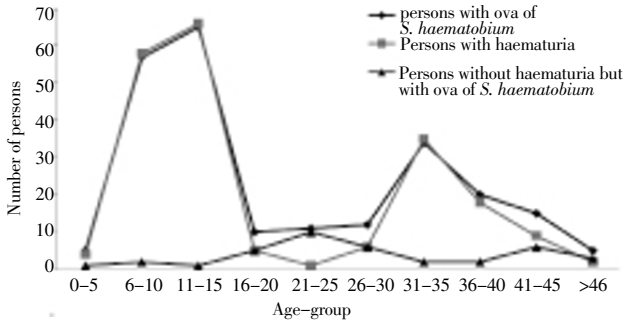

Figure 1. Comparison between microscopic examination of urine sediment and haematuria in the detection of urinary schistosomiasis.

4. Discussion

There are remarkable pervasiveness and distribution of urinary schistosomiasis in Nigeria due to the differences in geographical and socio-demographic characteristics of the different localities in the population. In order to identify the endemic areas and communities at higher risk and to lay down priorities towards the formulation of intervention strategies, it is essential to carry out comparative parasitological and epidemiological studies on the prevalence of parasitic infection in different parts of Nigeria. This study was therefore conducted to determine the prevalence, sex-age related intensity of urinary schistosomiasis and to compare such parameters among rural school children and rural farmers in selected communities in Obollo-Eke located in Southeast, Nigeria.

Several studies were previously undertaken in an attempt to determine the prevalence of schistosomiasis in different states of the country; consequently various prevalence of

the infection ranging from low to high rates were reported. According to our findings, the current prevalence of urinary schistosomiasis in Obollo-Eke is 17.5%. To the best of our knowledge, there have been no previous studies on the prevalence of schistosomiasis in the area. The prevalence (17.5%) is low when compared to the rates reported in other parts of Nigeria. Ogwumike *et al*, reported Aninri LGA (45.5%) as the place with the highest percentage of urinary schistosomiasis in Enugu State[9]. Similarly, a prevalence of 42.3% was reported in Abia state, Southeast Nigeria[17]. More so, other studies reported prevalence of urinary bilharziasis that is comparable or even lower than our findings. For example, the prevalence rates in some parts of Borno and Ebonyi States were 24.3% and 21.5% respectively[17, 19]. Moreover, very low over all prevalence rates (4.5% and 11.3%) were reported in Abini community in Cross River and Ohaji/Egbema in Imo State respectively[20]. The observed differences in the magnitude of infection may be due to geographical and socioeconomic reasons. Notwithstanding other factors that influence the prevalence of urinary schistosomiasis, the age of study subjects may have also played a vital role in our findings. We studied subjects whose age ranged from 4 to 68 years.

We found that greater number of male farmers had the disease when compared to their female counterparts, though with astatistically non significant ($P>0.05$) value. Sarkinfada *et al*., 2009, reported similar findings in the Danjarima community in Kano, Nigeria[21]. The gender of study participants could influence the prevalence of schistosomiasis due to variation in behavioural patterns of such persons regarding water use and contact. In Obollo-Eke communities, more males than females are predisposed to the infection due to regular and longer contact with the breeding site of the disease vectors through farming and swimming. The females are more restrained by socio-cultural practices from spending equal times at similar sites. The infection rate among school children and farmers in Obollo-Eke community is of comparable magnitude even though it is slightly higher in primary school children. This is contrary to previous reports from endemic areas where urinary schistosomiasis was found to be remarkably higher in school children than in adults[22]. The possible explanation might be that adults living in Obollo-Eke also have frequent contact with water bodies that harbour the disease vector as they cross rivers and streams on their way to and fro their farmlands. Besides, they usually make brief stopovers in the waters to take their bath and wash soiled clothes and farm tools.

The high prevalence of infection among male school children seen in Obollo-Eke is similar to reports from other parts of Nigeria[14-16], Tanzania[23], rural KwaZulu-Natal/South Africa[24] and in Malawi[25]. These studies showed that there was no significant difference in the prevalence of parasites infection between male and female school children ($P> 0.05$) nonetheless it was slightly higher in male pupils. However, in our study we observed significant differences in prevalence rate of urinary schistosomiasis between male and female primary school children. The observed rate of infection among male school children in our study could be explained by the differences in local, cultural and social habits in the study area and other communities in Nigeria and elsewhere. Boys are more outgoing and adventurous in nature and they tend to play away from their homes than their female counterparts. Cardinal among other reason for the high value is the higher tendency among males to swim, play and engage in other activities in the river and other water bodies, besides the domestic chores of washing and fetching water which exposes both sexes to infection.

In the study we observed that the highest intensity of infection was among primary school children. Previous studies reported that in endemic, untreated populations, the prevalence and intensity of urinary schistosomiasis is usually higher in children than in adults, giving rise to typically convex age-infection profiles[26-28]. Our findings are also in agreement, in particular with the commonness of high intensity of the infection among school children. The situation in the primary school children and farmers calls for quick school and community based intervention program, owing to similar recommendations for such programmes.

The standard for the detection of cases or identification of communities for treatment of infection with *S. haematobium* is usually based on microscopic examination of urine for eggs of schistosome. In line with the observations of other authors[29,30] and the current findings in our study, we advocate the use of haematuria as a diagnostic tool in the detection of the infection. It is a simple and cheap alternative for identifying communities in need of treatment. Some authors had previously proposed that urine reagent strip would in the near future be the best rapid diagnostic test method for *S. haematobium*[31]. Our findings are in conformity with previous reports indicating a strong positive correlation between haematuria and the microscopic detection of eggs for infection with *S. haematobium*. We are of the view that haematuria could be employed as diagnostic tool to generate reliable and accurate data on the prevalence of *S. haematobium* infection in any segment of the community, school children and adults especially in resource poor settings.

It is a common practice for people living in remote and rural areas, with poor knowledge on hygiene, to contaminate available water bodies with their excreta. This act in turn provide chances for schistosomes to reach their intermediate hosts and to develop to infective stage. In rural communities where the major occupation is farming and the farmlands are located across the water sources, adults as well as children are exposed to such water bodies that harbour intermediates and infective stages of the parasites. In Obollo-Eke, farmers cross rivers and streams to get to their farmland. Although these adults may have developed some sort of immunity to the disease, daily exposure to infested water would result in acquiring new infections which may cause worse outcomes. In order to halt transmission of the parasite in such community, treatment regimen as well as other control programmes such as awareness campaign should also target adults in such scenario.

In conclusion, the prevalence of urinary schistosomiasis is moderately high and quietly stealing the vitality of population in Obollo-Eke. This situation in the two risk groups: primary school children and farmers calls for quick school and community based intervention programme. A comparison of the diagnostic methods of schistosomiasis using haematuria and count of mean egg/10 mL urine showed that both procedures can reliably provide data on the prevalence of the disease in any community.

Conflict of interest statement

All authors have declared that they have no competing interest.

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