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Prevalence and intensity of urinary schistosomiasis in Ogun state, Southwest, Nigeria

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Schistosomiasis is an environmentally-mediated disease that depend on the presence of suitable habitats for snails, which serve as intermediate hosts for the causative parasites. Research has shown that the disease is endemic in Osun state and remains unabated. Until now, there has never been any mapping of the disease in the State. This study will serve as a reliable baseline data for intervention planning in the State. School children were randomly selected and examined for schistosomiasis infection at Community Primary School, Eggua, Yewa North Local Government Area of Ogun State, Nigeria. Urine samples were collected in wide mouthed plastic container and were examined for schistosome eggs, using sedimentation by gravity method of the 121 pupils examined. 62 (51.2%) were tested positive for *Schistosoma haematobium* ova, the highest prevalence (53.9%) was recorded in age group 11-15 years. Also the heaviest intensity of infection (11.8%) based on the egg count per 10ml of urine was found in this age group, while 0-5 years had no infection. Males had higher infection rate (54.2%) than females (49.3%), which however was not statistically significant (P<0.05). Hence, considering the high prevalence of urinary schistosomiasis in the study community, there is a need for health education, provision of alternative sources of water, Mass Drug Administration and freshwater snail control in the area.

Key words: Urinary schistosomiasis, prevalence, intensity, eggua.

INTRODUCTION

Schistosomiasis, also known as Bilharzias, was first described in 1851 by Theodor Bilharz, after whom the disease was initially named after (WHO, 2002). It is perhaps the most important disease associated with man-made lakes and irrigation projects in tropical countries (WHO, 2013).Inadequate sanitation and contact with contaminated water bodies function in disease transmission. It is a disease caused by several species of the fluke worm of genus *Schistosoma*. The World Health Organisation (WHO identified schistosomiasis as one of the six most serious public health problems in developing countries. It affects more than 200 million persons in a

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population of 600 million in 74 countries (WHO, 2013).

Urinary Schistosomiasis is water borne trematode parasitic disease that affects 200 million people and poses a threat to 600 million in more than 76 countries including Nigeria, the disease is caused by a trematode of the genus *Schistosoma*. Among those infected, 120 million are asymptomatic and 20 million have severe clinical disease. Mortality was estimated at more than 250,000 deaths per year, making it the most deadly neglected tropical disease (NTD) (Chitsulo et al., 2002). According to the Global Burden of Disease (GBD), Schistosomiasis caused the loss of 1.7 million disability-adjusted life years (DALYs) worldwide in 2001, of which 82% (1.4 million DALYs) were from sub-Saharan Africa (SSA) alone. In 2002, WHO reported that Schistosomiasis caused one quarter of the tropical disease cluster burden (WHO, 2002).

The free swimming infective larval cercariae burrow into human skin when it comes into contact with contaminated water. The parasite is found in the venous plexus draining the urinary bladder of humans (WHO, 2013). The schistosomes are parasite of the blood stream of warm blooded vertebrates, the only digenetic trematode to occupy such habitat (The Carter Center, 2008). During infection, the parasite deposits terminal spinned eggs which clogs the venous plexus, impeding blood flow which eventually bursts the veins allowing blood and eggs to enter into urinary bladder.

Socioeconomically, Schistosomiasis is next to malaria among all water diseases and has grave public health implications (Sam-Wobo et al., 2009). The aim and objective of this study was to obtain epidemiological data on the prevalence and intensity of the infection among school children in community primary school, Eggua so that subsequent measures could be used for the control of Schistosomiasis in the study area.

A survey carried out in the South Western region of Nigeria by Ekpo and Mafiana (2004) on 192 schools in Ogun state to determine the epidemiological status of urinary Schistosomiasis in the state reveals that the overall prevalence of self-reported blood in urine and urinary Schistosomiasis were 10.00% (SD= 13.84) and 7.6% (SD= 12.85) respectively. The correlation coefficient between children's response to reported blood in urine and urinary Schistosomiasis was significantly positive ($r=0.789$. $p<0.01$). This prevalence ranges from 0.31-100.0 for the reported blood in urine and 0.81 to 100.0 for reported urinary Schistosomiasis respectively. Yewa North had the highest mean prevalence of 25.07 and 18.52% for both reported blood in urine and urinary Schistosomiasis respectively; while Ikene Local Government Area had the lowest mean prevalence 1.46% and 1.25% for both reported blood in urine and urinary Schistosomiasis respectively.

In the case of reported urinary Schistosomiasis, 674 (61.7%) schools reported infection, Yewa North had the highest number of infected schools with 82 (90.1%) and 81 (89.0%) of schools reported infection for both blood in urine and urinary Schistosomiasis respectively. Sam-Wobo et al. (2009) in a study carried out at Ibaro Oyan and Abule Titun communities revealed that four hundred and fifty respondents were examined for urinary Schistosomiasis. Using laboratory examination of urine samples and structured questionnaires, prevalence was 86.0% Ibaro Oyan and 88.0% Abule Titun. Male were more infected (89% Ibaro Oyan and 96% Abule Titun) than females (82% Ibaro Oyan and 74% Abule Titun). Report also shows that most respondents (97.4 and 99.6% respectively) from Ibaro Oyan and Abule Titun rely heavily on the Ibaro Oyan dam as their source of water and are also aware that the infection is due to their water contact practices with the dam.

MATERIALS AND METHODS

The study was carried out in Yewa North Local Government Area (L.G.A.) (formerly Egbado North) which lies between latitude 7°15N and longitudes 3°3E in a deciduous/ derived savannah zone of Ogun state. The Local Government Area has the largest land area in the state, it has a land size of 2,087 km^2. The 2006 population projection of the State Demographic indicators showed that the population size was 181,826. The major occupations of the inhabitants are farming and trading, while others are Fishermen, Artisans, Driver, Civil Servant, Bricklayers and Clergy.

Ethical approval

Full approval was given by the UI/UCH institutional ethical review committee before the commencement of the study. In addition, approval was obtained from the State Universal Basic Education Board (SUBEB) of Ogun State to carry out the research work and collect urine sample. From SUBEB, a letter was forwarded to the Education Secretary of Yewa North Local Government Education Authority from where an introduction letter was forwarded to the head teachers of the school involved, informing them of the research work and samples to be collected. The head teachers in turn informed the parents who gave their consent to their child's/children's participation in the study.

Sample collection/laboratory analysis

Urine samples were collected in wide mouthed plastic container and 10 ml aliquots was examined for schistosome eggs, using sedimentation by gravity method.

RESULTS

Out of 152 pupils enrolled for this study, only 121 urine samples were successfully collected from the pupils, age ranging from 5 to 17 (Table 1).

Prevalence of infection

Out of 121 pupils examined, 62(51.2%) were infected.

Table 1. Distribution of pupils in the study population.

Age Group (years)	Number examined	Overall percentage (%)
0-5	1	0.8
6-10	40	33.1
11-15	76	62.8
16-20	4	3.3
Total	121	100

Table 2. Prevalence of *Schistosoma haematobium* by sex in the study population.

Sex	Number examined	Number infected	Prevalence within the sex (%)
Male	48	26	54.2
Female	73	36	49.3
Total	121	62	51.2

Table 3. Prevalence of *S. haematobium* ova by age among the study population.

Age group (years)	Number screened	Number infected	Prevalence (%)
0-5	1	0.0%	0.0
6-10	40	19	47.5
11-15	76	41	53.9
16-20	4	2	50.0
Total	121	62	51.2%

Table 4. Prevalence of urinary Schistosomiasis by parents occupation in the study population.

Parents Occupation	Number examined	Number infected	Prevalence (%)
Apprentice	1	1	100
Artisan	15	7	46.7
Bricklayer	1	0	0.0
Civil Servant	12	6	50.0
Clergy	4	2	50.0
Doctor	1	0	0.0
Driver	10	4	40.0
Farming	51	27	52.9
Fishing	1	1.0	100
Photographer	1	1/0	100
Trader	24	13)	54.2
Total	121	62	51.2

Out of 62 that tested positive, 26 (41.9%) were males while 36 (58.1%) were females.

Prevalence of *S. haematobium* ova by sex at community primary School, Eggua, in Yewa North LGA

Twenty six out of 48 male students tested, were found to be infected while 36 of the 73 females in the study group were infected as shown in Table 2. Considering prevalence within the sex, prevalence in male 26 (54.2%) is higher than that of the female 36 (49.3%) with no significant difference between both sexes (p=0.601).

Prevalence of *S. haematobium* ova by age group in the study population

A total of 62 pupils were tested positive for *S. haematobium* egg. The prevalence was found to be highest among the pupils of age group 11-15 years (53.9%), followed by age group 16-20 years (50%), then 6-10 years (47.5%), lastly, 0-5 years (0%), with no significant difference among the age groups (p=0.682). This is shown in Table 3.

Prevalence of *S. haematobium* ova by occupation of the parents of subjects in the study population

Out of 62 pupils that tested positive for *S. haematobium* egg, 1 pupil with 100% prevalence has parent with fishing occupation, apprentice and photographer while pupils with parents that are clergy and civil servants were just 2 and 6 respectively, with prevalence of 50%. Pupils with parents that are farmers were the most infected group 27 (43.5%) with prevalence of 52.9%, pupils with parents that are traders are 54.2% (13) and pupils with parents that are Drivers have the lowest prevalence 40% (4). This is shown in Table 4.

Intensity of urinary Schistosomiasis by age group in the study population

Table 5 shows the intensity of urinary Schistosomiasis across age groups. It shows that the intensity ranges from light to heavy based on the number of egg count. Age group 11 to 15 (11.8%) shows highest level of heavy intensity, follow by 6 to 10 (5.0%); other age groups show none. Moderate intensity of infection was detected in all age group except in age group 0 to 5. Light intensity was also detected only in age group 6 to 10 and 11 to15.

Intensity of *S. haematobium* infection in relation to sex based on number of egg count in the study population

Table 6 shows that light to moderate and heavy intensity

Table 5. intensity of *S. haematobium* infection in relation to Age Group Based on the no. of egg count in the study population.

Age (years)	Number examined	Number infected	Light intensity	Moderate intensity	Heavy intensity
0-5	1	0	-	-	-
6-10	40	19	10	7	2
11-15	76)	41	21	11	9
16-20	4	2	-	2	-
Total	121	62	31	20	11

Key: light (1-9 eggs/10 ml urine), moderate (10-49 eggs/10 ml urine), heavy (≥50 eggs/10 ml urine) intensity.

Table 6. Intensity of *S. haematobium* infection in relation to sex based on no. of egg count in the study population.

Age (years)	Number examined	Number infected	Light intensity	Moderate intensity	Heavy intensity
Male	48	26	15	9	2
Female	73	36	16	11	9
Total	121	62	31	20	11

Key: light (1-9 eggs/10 ml urine), moderate (10-49 eggs/10 ml urine), heavy (≥50 eggs/10 ml urine) intensity.

of infection occurred in the study population, with females (36) having higher severity of infection at all level than males (26).

Factors associated with prevalence of *S. haematobium*

All factors or variables (age, sex of the subject and occupation of the parent) associated with the prevalence of infection were entered into multiple regression model (using the same software). There is correlation between all these variables. Age of the subject has the highest beta coefficient (0.072).

DISCUSSION

The prevalence of urinary Schistosomiasis found in this study (52.1%) is higher than the one reported by Ekpo and Mafiana (2004), (18.52%), when they reported that Yewa North has the highest prevalence level of 57.1% found among school children in Ijoun community in Yewa North Local Government (Oso, 2010).

More females (58.1%) were infected than male (41.9%), and this may be due to higher number of females that were in the study population. Prevalence of infection is higher in male than in female, with no statistical significant difference (x^2=0.601, p<0.05). This is also the same with some reported cases of higher prevalence of infection in male in some endemic areas (Oladejo and Ofoezie, 2006; Ugbomoiko, et al., 2010). As noted by Ugbomoiko et al. (2010), the apparent male bias in prevalence rate may be due to the predominantly male participation in farming contaminated water which aids or facilitate the transmission of the disease. These practices are very common in the study area because of the level of the civilization and availability of portable water. Streams in the study area are the only source of water. Also, males have more contact with these streams because female pupils like those in primary 5 and 6 always try to prove their maturity and refuse to participate in the recreation activities after the school hour but they still wade through the streams while going home, farm or bath in them early in the morning before going to school. Males through their vigorous activities and act of playfulness are always bathing and swimming for fun.

Urinary Schistosomiasis is one of the most endemic diseases in Nigeria. The prevalence of this disease, like many other endemic diseases, is affected by socio-cultural characteristics of the area; hence the obvious difference in the distribution of the disease in different parts of the country Gryseels,2006 ;Oladejo et al 2011a; Oladejo and Ofoezie, 2006; Ugbomoiko et al., 2010). Even within the same geographical area, such differences are bound to exist between the different age groups.

The highest prevalence (53.9%) observed in the age group 11 to15 shows that this age group has a high exposure rate and this is similar to the reports of other previous studies from other previous studies from other parts of the country (Ogbonna and Okoronko, 2000; Oladejo and Ofoezie, 2006; Ugbomoiko et al., 2010). This is followed by pupils in age group 16 to 20.

Considering the occupation of the subjects' parents, this study revealed that pupils whose parents are farmers were most infected (27, 43.5%); and this may be due to

the frequent contact of the pupils with the stream while going to farms with their parents. It then means that parent occupation is also an important factor to be considered when study is carried out on this infection in any part of the country. For instance, the highest heavy intensity was found in pupils whose parents were farmers; which may be attributed to increase in worm burden and high fecundity rate of the parasite.

Heavy intensity of infection was higher in females (9) than in males (2); this may be due to the fact that more females were involved in the study or that females were mostly involved in those activities known to favor infection as a result of their gender assigned responsibilities.

Conclusion

It is suggested that any program of urinary Schistosomiasis control in Yewa North should include the present study area. Such control program should include provision of good and reliable sources of water for these communities, as this has constituted a lot of damages to the communities. Besides the closest and available water source happened to be infected, the people have no choice rather than to go for such, expect for the health conscious inhabitants which are very few. There was a high prevalence of urinary schistosomiasis in the study communities. There is a need for health education, provision of alternative sources of water, Mass Drug Administration and freshwater snail control in the study communities.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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