JMBR: A Peer-review Journal of Biomedical Sciences
December 2016, Vol. 15 No. 2 pp 57-64

URINARY SCHISTOSOMIASIS AMONG PRIMARY AND JUNIOR SECONDARY SCHOOL CHILDREN IN UHUNMWODE LOCAL GOVERNMENT AREA OF EDO STATE.

Omoruyi, Z and Enoruwa, U. D

ABSTRACT
Urinary schistosomiasis is endemic in Nigeria and continues to pose public health challenges especially in inhabitants of rural areas. This study was conducted to determine the prevalence of urinary schistosomiasis among school children, and the effects of Socio-demographic Characteristics on the disease in Uhunmwonde LGA, Edo State, Nigeria. Approval was given by the Ethical Committee of Edo State Ministry of Education, Benin City. Informed consent was obtained from each participant prior to sample collection. The result showed that of the two hundred participants aged 5-20 years examined, 15(7.5%) were infected. The males 11(8.9%) and female 4(5.2%) are both of age groups 8-10 years 2(9.5%), 11-13 years 8(8.1%) followed by $\geq$14 years 5(6.2).The prevalence was high 10(27.0%) among participants that use river as source of water, but there was no significant relationship between the characteristics examined. This draws attention to the health hazards posed among children in the studied area. Therefore, Uhunmwonde LGA should be included in any urinary schistosomiasis control programme.

INTRODUCTION

Schistosomiasis is a wide spread parasitic infection caused by blood flukes of the genus Schistosoma and transmitted by specific fresh water snails[1]. Urinary schistosomiasis (bilharziasis) was discovered by German Pathologist Theodore Bilharz in 1851[2]. The disease caused by S. haematobium is water based parasitic disease transmitted by fresh water-snails of the genus Bulinus [3]. It is the most prevalent of the water-borne diseases, with a very great risk on the health of rural populations [4]. Schistosomiasis is common worldwide, causing 56% of known cases of calcifications in the bladder known as bladder stone. The disease affects more than 200 million people worldwide (8% of the world population) and as many as 500-600 million people have been exposed to schistosomiasis of all kinds, with the disease more common in Africa, Asia and South America [5].

The most serious complication of urinary schistosomiasis is the incidence of squamous cell carcinoma of the urinary bladder, urolithiasis, ascending urinary tract infections, urethral and ureteral stricture with subsequent hydronephrosis and renal failure [6]. In Nigeria, urinary schistosomiasis is known to have existed

KEYWORDS:: *Bilharziasis, Contact activities, Haematuria, Schistosoma haematobium, Socio-Demographic characteristics*

Omoruyi, Z and Enoruwa, U. D
Department of Medical Laboratory Science
School of Basic Medical Sciences
University of Benin

**Correspondence*

Dr. (Mrs) Z. Omoruyi
Department of Medical Laboratory Science, School of Basic Medical Sciences, University of Benin.
zainab.omoruyi@uniben.edu

from time immemorial and the low resource communities are mostly plagued by the disease. With approximately 20% of the population of sub-Saharan Africa, Nigeria was once the most highly affected country in Africa for schistosomiasis [7]. Young individuals are mostly infected with peak prevalence and intensity of infection in the age group 11-15 years [5]. Reports have established that both natural and artificial water bodies are transmission foci of the parasite [8]. Although, urinary schistosomiasis is endemic in Nigeria, it is usually a neglected common parasitic disease of childhood [9]. School children are particularly vulnerable to schistosomiasis because of their habit of playing in water, where they may contact the infection. They are the ideal target group to investigate the prevalence of schistosomiasis and the data collected from this age group can be used to assess not only whether schistosomiasis threatens the health of school children, but can also be used as reference for evaluating the need for community intervention [10]. It is in this light, that this study was carried out to determine the prevalence of urinary schistosomiasis in some selected Primary and Junior Secondary Schools around the communities. Since there has never been any comprehensive study on schistosomiasis in these communities, this will provide baseline data which would form the basis for a control programme in the area. The aim of the study is to determine the prevalence of urinary schistosomiasis and effect of socio-demographic characteristics of the disease in Uhunmwode LGA, Edo State, Nigeria.

MATERIALS AND METHODS

THE STUDY AREA

This study was carried out in Eyaen and Umagbae Communities in Uhunmwonde Local Government Area of Edo state. Uhunmwonde has an area of 2033Km2 with a population of 120,813 inhabitants. It lies between Longitude 06 04'E and 06 43'E and latitude 05 44'N and 07 34'N [11]. The main occupations of the inhabitants include trading and farming. There are rivers located within the LGA, which serve as source of water supply for both domestic and other purposes.

THE POPULATION

The study was conducted at Eyaen Primary and Junior Secondary, Umagbae Primary and Junior Secondary Schools in Uhunmwonde Local Government Area. The study was conducted with the Ethical approval of the Ministry of Basic Education, Edo State Government, followed by an informed consent obtained from all the participants. A total of 200 participants that consisted of 123 males and 77 females were recruited for this study. The age of participants ranged from 5 to 20 years. A structured questionnaire was administered to collect characteristics of potential risk factors of the children[12]. This questionnaire was given to each urine-providing participant to collect information on sex, age, source of water supply, water contact and contamination of water bodies.

URINE SAMPLE COLLECTION AND EXAMINATION

The mid-stream urine of each participant was collected in a plastic urine jar of 20ml with a number corresponding to the questionnaire. These urine samples were transported to the University of Benin Teaching Hospital, UBTH, in Benin City for further procession. Each urine sample was observed for any visible evidence of turbidity. Haematuria was determined and documented using the simple reagent strips (Heamastrix®, AMES laboratories). Microscopic examination of each urine sample for detection of S. haematobium eggs was performed using Centrifugation and Sedimentation techniques [13]. The

urine was centrifuged for 5 minutes at 3000 rpm and about 10ml of the sediment was examined for S. haematobium eggs with ×10 objective. The number of eggs per 10ml of urine counted, and the infection intensity was $\leq$ 20 eggs/10ml as defined by the World Health Organization [13].

Statistical analysis

Microsoft Excel 2007 and SPSS version 20.0 were used to perform data analyses. Frequency distribution tables, percentage prevalence of urinary schistosomiasis infections were estimated using standard formulae. Chi-square test was used to compare the differences in prevalence of infection between groups of children, sex and age groups as well as socio-demographic variables. .

RESULTS

A total of 200 urine samples from Primary and junior secondary school participants in Eyaen and Umagbae communities, both in Uhunmwode LGA were examined for the prevalence of S. haematobium infection. Out of which 123 being males and 77 females. Majority (99) were participants in the age group 11-13, followed by 80 of age group $\geq$ 14 years. The overall prevalence 8 (8.1%) was among participants of age group 11-13 years, while Umagbae Primary school had higher prevalence of 10.0%. The male participants were more infected 11 (8.9%) compared to the females 4 (5.2%). There was no significant relationship between the parameters (sex, age and location) associated with the prevalence of the infection (Table 1). The result also revealed 14 (7.0%) of the urine samples being positive for Haematuria (Table 2).

Majority of the participants with infection rate of 148(2.0%) acknowledge the use of Bore-hole water in their homes, followed by 37 participants that use River as their source of water with 27% infection (Table 3).

Similarly, the frequency of water activities was high (61.5%) among female participants that wash cloths, utensils etc (Table 4), while the frequency was high (57.9%) among male participants that wash arms and legs in the river (Table 5). In a separate analysis, most (5.7%) were of the Bini tribe from which 7.5% respectively acknowledge the use of Pit latrines and water system in their homes (Table 6).

DISCUSSION

The result of this study showed a prevalence rate of 7.5% of Urinary Schistosomiasis among the 200 School participants in Uhunmwonde LGA, Edo State. The result is lower than those reported in previous studies in the State, [14,15,16], with higher values of 65.0%, 32.6% and 21.4% respectively. The study showed that most of the urine samples with blood stains contained Schistosoma haematobium eggs, this is in line with observations of Adeyaba, Emejulu [17,18]. They noted that the result of analysis of visible haematuria shows that it is highly sensitive as a diagnostic tool but has a very low positive predictive value because of its low specificity in many of the studied areas. The total number of participants who tested positive for both haematuria and ova of S. haematobium was 9(64.3%) and infection in participants with negative haematuria was 6(3.2%). This is higher than that reported by Musa [19], who reported a value of 89(12.0%) out of a total of 744 (100%) subjects.

Uhunmwonde LGA is a rural community that depends on the river, wells, and bore hole for their water needs such as farming (irrigation), bathing and other domestic uses. The prevalence of 15(7.5%) was attributable to frequent water contact activities of participants that wash arms

Table 1: Sociodemographic characteristics of study participants

Variables	Categories	Number Examined	Number Infected (%)	P value	Significance
Sex	Male	123	11 (8.9)	0.327	Not significant
	Female	77	4 (5.2)		
Age in years	8-10	21	2 (9.5)	0.838	Not significant
	11-13	99	8 (8.1)		
	≥14	80	5 (6.2)		
Location	Eyaen Primary	50	3 (6)	0.851	Not significant
	Eyaen Junior Secondary	50	3 (6)		
	Umagbae Primary	50	5(10)		
	Umagbae Junior Secondary	50	4(8)		

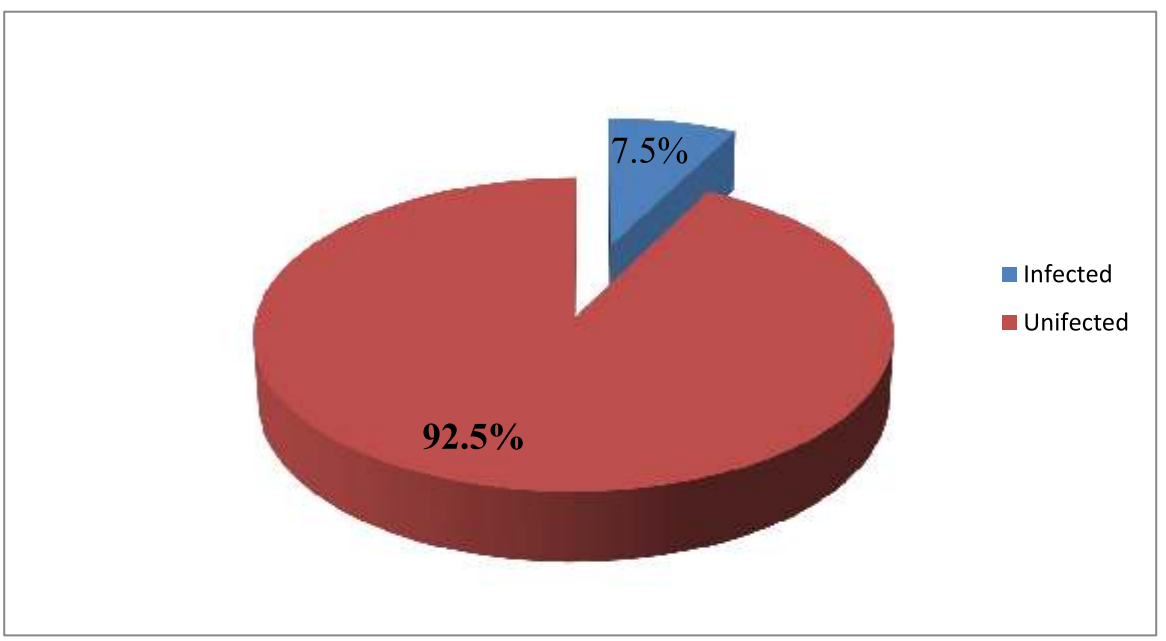

Fig 1: Prevalence of Urinary *Schistosomiasis in* Uhunmwonde LGA

Table 2: Prevalence of Urinary *Schistosomiasis* in relation to detectable Haematuria.

Haematuria	Number Examined	Number infected (%)	P – value
YES	14	9 (64.3%)	0.288
NO	186	6 (3.2%)	
TOTAL	15%	200	

Table 3: Prevalence of Urinary *Schistosomiasis* in relation to nature of water supply

Nature of water supply	Number Examined	Number Infected (%)	P – value
Bore-hole	148	3 (2%)	0.0001
Well	15	2 (13.3%)	
River	37	10 (27%)	

Table 4: Frequency of water contact Activities of Females at water bodies.

	Number of Activities by age group (years)				
Types of Activities	5-7	8-10	11-13	≥14	Total
Washing Clothes, Utensils etc.	0(0%)	5(19.25%)	5(19.25%)	16(61.5%)	26
Washing arms and legs	0(0%)	3(27.3)	6(54.5%)	2(18.2%)	11
Collecting water	0(0%)	4(22.2%)	8(44.4%)	6(33.3%)	18
Mixed (Bathing, Playing & Swimming)	0(0%)	7(31.8%)	12(54.5%)	3(13.6%)	22
Urinate in water Body	0(0%)	12(46.2%)	09(34.6%)	05(19.2%)	26

Table 5: Frequency of water contact Activities of Males at water bodies.

	Number of Activities by age group (years)				
Types of Activities					
	5-7	8-10	11-13	≥14	Total
Washing Clothes, Utensils etc.	0 (0%)	1(7.1%)	6 (42.9%	7 (50%)	14
Washing arms and legs	0 (0%)	0 (0%)	8 (42.1%)	11 (57.9%)	19
Collecting water	0 (0%)	0 (0%)	31(57.4)	23 (42.6%)	54
Mixed (Bathing, Playing and Swimming)	0 (0%)	1(2.8%)	23(63.9%)	12(33.3%)	36
Urinate in water Bodies	0 (0%)	3 (7.1%)	18(85.7)	21(50%)	42

Table 6: Biodata of participants used for analysis.

Biodata		Number examined	Number infected/(%)	P- value
Sex	Male	123	11 (8.7)	0.327
	Female	77	4 (5.2)	
Age group	8-10	21	2 (9.5)	0.838
	11-13	99	8 (8.1)	
	≥14	80	5 (6.2)	
Ethnicity	Bini	105	6 (5.7)	0.466
	Esan	62	5 (8.1)	
	Others	33	4 (12.1)	
Toilet type	Pit	53	4 (7.5)	0.988
	Water system	147	11 (7.5)	

and legs, clothes, utensils etc, in the river 10(27%) rate of infection. This observation is in line with that of other Authors, Agi, Pakuma [1.3], who conducted studies in Odua Community in Niger-Delta and in Lamurde LGA of Adamawa State respectively. Similarly, the highest prevalence value of Urinary Schistosomiasis was recorded in the age group 11-13 years, and this finding agress with several reports by Deribe, Ekpo [20,21]. The infection pattern showed typical peak prevalence in the early adolescence with males having a higher prevalence rate 11(8.9%) compared to the female 4(5.2%). This finding is consistent with results of similar studies in Schistosoma haematobium endemic areas by Gabar in Egypt [22]. High prevalence rate of S. haematobium infection has been reported by Pugh, Akogun and Anosike respectively, in endemic areas such as in; the North by [23], Adamawa by [24], Abia by [25]. There was no significant difference observed among the age of participants and the intensity of the infection. This also agrees with previous report by Ekpo [21], where the intensity of infection did not show any significant difference with the age of participants.

CONCLUSION

The low rate of prevalence of urinary schistosomiasis in the present study may be probably due to the previous administration of Praziquantel to the pupils and students in Uhunmwonde Local Government Area, initiated by the Uhunmwode Local government council. This study clearly shows that Schistosoma haematobium infection is still in the areas after the control program initiated years back. This finding can be correlated to the intimate interaction of the host snails and the surface waters in ponds, streams, rivers and irrigation system that boosted the transmission of Schistosomiasis.

RECOMMENDATION

To control and prevent the spread of this infection, the following measures could be employed. Health education should be intensified at least starting from homes and schools, provision of potable and adequate drinking water in form of pipe borne or borehole water, maintenance of proper sanitation to prevent water becoming contaminated with the infective organism, enlightening the community on the risks associated with indiscriminate habits of interacting with open water sources; ponds, streams, rivers etc and continuous provision of chemotherapeutic agents in all primary health centers for active treatment of this helminth disease.

REFERENCES

1. Agi, P.I. and Okafor, E.J. (2005). The epidemiology of Schistosoma haematobium in Odau community in the Niger Delta area of Nigeria. Journal of Applied Science and Environmental Management, 9(3): 37-43. Baba, N.M. (2005). Introduction to Research Process in Education. First edition, Midas Equitable Publishers, Pp.48.

2. Enersen, O.D. (2010). Theodore Maximillian Bilharz, retrieved on 23rd of April, 2010, from htt://www.whonamedit.com/doctor.cfm/2829.htm

3. Pukuma, M. S and Musa, S. P. (2007). Prevalence of urinary schistosomiasis among residents of Waduku in Lamurde Local Government area, Adamawa state Nigeria. Nigerian Journal of Parasitology, 28 (2): 65-68.

4. Robert T. L. and Cirillo J.R. (2002). Schistosomiasis bladder. Pub: instant access. 3: 22-30.

5. Biu, A. A., Nwosu, C. O. and Akuta, A. (2000). The incidence of human schistosomiasis in Maiduguri, northern Nigeria. Bioscience Res. Comm. 12(1): 9-11.

6. Amy, J. B. (2002). Schistosomiasis of the bladder. Medicine instant Access. 2: 133-148.

7. Njepuome, N. A., Hopkins, D. R., Richards, F. O., Anagbogu, I. N. and Pearce, P. O. (2009). Nigeria's war on terror: Fighting dracunculiasis, onchocerciasis, lymphatic filariasis and schistosomiasis at the grassroots. Am. J. Trop. Med. Hyg. 80: 691-698.

8. McManus, D. P., Gray, D. J., Ross, A. G., Williams, G. M. and He, H. B. (2011). Schistosomiasis research in the dongting lake region and its impact on local and national treatment and control in China. J. Trop. Dis. 5: 1053.

9. Adewumi, C. O., Furu, P., Christensen, N. O. and Olorunmola, F. (1991). Endemiciy, Seasonality and Focality of Transmission of Human Schistosomiasis in Three Communities in South-Western Nigeria. Trop. Med. Parasitol. 42(4): 332-334.

10. Engels, D., Chistsulo, L. and Montresors, A. (2002): The global epidemiology situation of schistosomiasis and new approaches in control and research. Acta Tropica. 82: 139 – 146.

11. Ministry of Land and Survey, Edo State (2006): Edo State Ministry of Land and Survey Annual Report

12. Kabatereine N.B., Brooker S., Tukahebwa E.M, Kazibwe F., Onapa A.W (2004). Epidemiology and Geography of Schistosoma mansoni in Uganda: Implications for planning control. Trop Med Int Health. 9: 372-380.

13. WHO (1991). Basic laboratory methods in medical parasitology, Geneva, Pp 33-36.

14. Nmorsi, O. P. G., Egwunyega, O. A., Ukwandu, N. C. D. and Nwokolo, N. Q. (2004). Diagnostic marker. Afri. J. Biotechnol. 4(2): 183-185.

15. Nmorsi, O. P. G., Egwunyenga, O. A. and Okolo, O. E. (2001a): Schistosoma haematobium infections in two rural communities in Edo State, Nigeria. SouthEast Asia. J. Trop. Med. Pub Health. 32(3): 570-574.

16. Nmorsi, O. P. G., Egwunyenga, O. A. and Bajomo D. O. (2001b): A survey of Urinary Schistosomiasis and Trichomoniasis in a rural community in Edo State. Nigeria. Acta Medica et Biologica. 49(1): 25-29.

17. Adeyeba, O. A. and Ojeaga, S. G. (2002). Urinary Schistosomiasis and Concomitant urinary tract pathogens among school children in Ibadan, Nigeria. Afri. J. Biom. Res. 5: 103-107.

18. Emejulu, C. A., Alabaroye, F. F., Ezenwaji, H. M. G. and Okafor, F. C. (1994). Investigation into the prevalence of urinary schistosomiasis in Agulu lake area of Anambra State, Nigeria. J. Helminth. 68: 119 – 123.

19. Musa, B. J., Benjamin, G., Muhammad, T., Baba, M. M. and Thilza, I. B. (2010). Incidence of schistosomiasis in primary school pupils with particular reference to S. haematobium in Maiduguri. Nigerian Journal of Basic and Applied Science. 2(3): 31-36.

20. Deribe K, Eldaw A, Hadziabduli S, Kailie E, Omer MD, Mohammed AE, Jamshed T, Mohammed EA, Mergani A, Ali GA, Babikir K, Adem A, Hashim F. High prevalence of urinary schistosomiasis in two communities in South Darfur: implication for interventions. Parasit Vectors. 2011;4:14.

21. Ekpo UF, Laja-Deile A, Oluwole AS, O Sam-Wobo S, Mafiana CF. Urinary schistosomiasis among preschool children in a rural community near Abeokuta, Nigeria. Parasit Vectors. 2010;3:58

22. Gabar, S., Tarek, A., Hammad, Anwar, O., Eglal, S. Mahmoud, A. et al., (2000). Epidemiology of Schistosomiasis in Egypt: Minyo Governorate. Am. J. Trop. Med. and Hyg. 62(2): 65– 75.

23. Pugh, R. H., Bell D. R and Gilles H. M (1980). Malumfashi Endemic Diseases Research Project XY: The potential medical Importance of Bilharzia in Northern Nigeria – A suggested rapid, cheap and effective solution to control of Schistosoma haematobium infection. Annal of Tropical Medicine and parasitology, vol 74: 588-613.

24. Akogun, O. B. and Obadiah, S. (1994). History of haematuria among school Age children for Rapid community diagnosis of Urinary Schistosomiasis in Nig. J. Parasitol. Nig. 17: 11-15.

25. Anosike, J. C., Okafor, F. C. and Onwuliri, C. O. E. (1992). Urinary schistosomiasis in Toro Local Government Area of Bauchi State, Nigeria. Helminthologia, 29: 177-179.