IJAAR PUBLISHING®

Open Access Journal of Science Research | ISSN: 3027-1185
Vol. 3, Issue 2 (2025) | www.ijaar.org

Current Status of Urinary Schistosomiasis Among Children in Parts of Edo State, Nigeria.

***[1]Okafor-Elenwo E. J. and [2]Akinya-Obi C. E.**

Department of Biological Sciences, College of Natural and Applied Sciences, Igbinedion University Okada.

***Correspondence*: ebereokafor@iuokada.edu.ng**

ABSTRACT

Schistosomiasis is a helminthic, snail mediated parasitic infection, which remains a major public health concern in poor developing nations of the world. The infection status/ prevalence in children of ages 6 to 14 years were examined in five communities (Egboha, Iguomo, Ogbese, Okada and Olumove) in Ovia North East Area of Edo State Nigeria. Urine samples from two hundred and fifty (250) children, who participated in this study were examined microscopically and biochemically. Microscopic examination of the fresh urine samples revealed the presence of Schistosoma haematobium eggs and the biochemical tests detected urinary blood (hematuria), protein (proteinuria) and pus cells (pyuria). Overall prevalence of urinary schistosomiasis infection (33.6%) was obtained with 84 positive urine samples out of 250 candidate specimens. Age- related prevalence (41.7%) peaked in the 9-11 years old, while the lowest (23.8 %) occurred in the younger children of ages 6-8 years old. Rate of excretion of the urinary indices were 23.8%, 46.4%, 11.9% and 23.8% for schistosome ova, pus cells, haematuria and proteinuria respectively. Age prevalence of egg excretion and pus cell peaked in the 9-11 years group. On the other hand, haematuria which was the lowest excreted urine parameter, peaked (50.0), in the 12-14 years age category, while the rate of proteinuria increased from 21% (6-8yrs) to 42% in the higher ages. Ogbese community had the peak proteinuria with the males and females having 37.5% and 41.6% respectively. For haematuria, Iguomo and Olumove had equal peaks of 40.0% each, while pus cells excretion rate peaked (31.8%) in the females from Iguomo community. Among the factors that influence infection with S. haematobium, fetching of water from contaminated streams was the highest at the rates of 46.4% and 53.6% for males and females respectively. For better control of schistosomiasis in endemic areas, drug treatment should be accompanied with the provision of portable water and other social amenities to reduce transmission.

Keywords: *Schistosoma haematobium*ova, Prevalence, School-age children, Haematuria, Proteinuria

Okafor-Elenwo, E. J. & Akinya-Obi, C. E. (2025). Current Status of Urinary Schistosomiasis Among Children in Parts of Edo State, Nigeria. *Open Access Journal of Science Research. 3*(2) 107-114. DOI: https://doi.org/10.5281/zenodo.18119640

Introduction

The infective agents of urinary schistosomiasis are transmitted to the human host by specific fresh water snails. Schistosomiasis has pestered the humans since the ancient times (Agi and Okafor, 2005; Olveda *et al.,* 2013; Nelwan, 2019). Urinary schistosomias is caused by *S. haematobium* is a major public health problem in sub-Saharan Africa, where it remains one of the most common and neglected tropical diseases –NTD (Olveda *et al.,* 2013; Nelwan, 2019). The infection often leads to excretion of eggs of the parasites via the urine, hematuria, dysuria and proteinuria (Okafor- Elenwo, and Elenwo, 2014; Okafor-Elenwo and Akinya-Obi, 2024). Other manifestations and pathology include, bladder wall pathology, hydronephrosis, renal failure, and an increased risk of squamous cell carcinoma of the bladder (Shiff *et al.,* 2006; Brindley and Hotez, 2013).

Similar to other endemic parasitic diseases, the transmission of schistosomiasis is sustained by poverty, inadequate sanitation, reliance on unsafe water sources, and limited access to effective control measures (Chun-lian*et al.,* 2019; Okafor-Elenwo *et al*., 2020a; Okafor-Elenwo and Izevbuwa, 2020b; Okafor – Elenwo and Eze, 2021). Nigeria is one of the most endemic countries in Africa, with several states, reporting high prevalence rates, especially in rural and peri-urban communities where water contact is frequent (Van der Werf *et al.,* 2003; Agi and Okafor, 2005; Chun-lian *et al.,* 2019). Despite government and non-governmental control efforts, including mass drug administration campaigns, schistosomiasis remains persistent in many localities due to environmental, socio-economic, and behavioral factors.

School-age children represent the group most affected by urinary schistosomiasis. Their frequent water contact during recreational and domestic activities makes them highly vulnerable to infection. Studies have shown that this group often carries the heaviest worm burden (WHO, 2022). Excessive malnutrition and losses of blood and protein through the urine, may lead to impaired growth, anemia, poor cognitive performance, and reduced school attendance (Ebere and Elenwo, 2007; Mazigo *et al.,* 2018; WHO, 2022). In endemic areas of Nigeria, prevalence rates among children have ranged from moderate to very high, reflecting persistent transmission despite periodic mass drug administration campaigns (Salawu & Odaibo, 2013).

In Edo State, particularly in Ovia North East Local Government Area, urinary schistosomiasis continues to pose a major public health challenge (Okafor- Elenwo and Elenwo, 2014; Okafor-Elenwo and Akinya-Obi, 2024). The situation is compounded by factors such as: reliance on streams and rivers for domestic purposes, poor compliance with control interventions, and limited community health awareness. However, while schistosomiasis has been widely studied in Nigeria and probably abandoned, there is still the need to follow up communities with clear indications of continued infections, to forestall major consequences due to high prevalences and intensities. This study highlights the infection status of urinary schistosomiasis among the selected children, as well as factors that promote its sustenance. The outcome of the investigations will be directed to relevant authorities for needful control strategies in the affected communities.

MATERIALS AND METHODS

Study sites and candidates

The study was conducted in five communities in Ovia North -East area of Edo state. These areEgboha, Iguomo, Ogbese, Okada and Olumove. Fifty (50) school-aged children, within the age range of 6 to 14 years were examined from each of the communities. Altogether, there were two hundred and fifty (250) candidates who voluntarily participated in this study.

Informed consents were drawn from the State Education Board and with the assistance of the school's management and teachers in each school, the study was well coordinated.

Urine Sample Collection and Analysis

Urine samples were collected in clean, 20ml universal containers between 10 am and 2 pm on each collection day. Each bottle was labelled for proper identification, before distributing them to the children. The samples were immediately taken to the Central Laboratory, housed in the College of Natural and Applied Sciences, Igbinedion University Okada, for analysis.

Ten milliliters (10ml) of urine from each bottle were centrifuged at 5000rpm for 5 minutes using a bucket centrifuge. The supernatant was discarded, and a drop of the resulting sediment was placed on a grease-free glass slide and covered with a cover slip for microscope examination. The preparation was examined under a light microscope (10x-40x) for the presence of terminal spine ova of *Schistosma heamatobium* and pus cells.

Biochemical analysis was also carried out on the fresh urine samples to ascertain the presence and level of urinary blood, protein, and pH using Medi-Test Combi-11 TMR (Machery-Hagel.

Ethical Consideration

Prior to the study, each of the communities was visited. Consultations and discussions were held with the Primary Health Care Physician of the Local Government Area and other authorities, such as the Local Government Education Secretary, Heads of Primary Health Care Centers, as well as Primary School Teachers, who assisted in mobilizing the pupils for the study. Parents of the pupils in this study were educated on the purpose and implications of the research, which they clearly understood. Informed consent was duly taken for this research.

RESULTS

Children selected in each age category were more than seventy in number but less than one hundred (table 1). Collectively, there were eighty- four of them infected, out of the total number of two hundred and fifty (250) examined for urinary schistosomiasis in the communities. This represents a total prevalence of 33.6%. Considering the specific age groups, the category with the highest number of participants (9-11) had the peak age-related prevalence (41.7%), while the lowest (23.8 %) occurred in the younger children of ages 6-8 years old.

Egg excretion was found in twenty individuals, at an average rate of 23.8 %. This equaled with that of proteinuria but lower than the rate of excretion of pus cells (46.4). Age prevalence of egg excretion and pus cell peaked in the 9-11 years group, Urinary blood excretion was highest (50.0%) in children within the ages 12-14 years. On the other hand, the rate of proteinuria increased from 21% (6-8yrs) to 42% in the higher age groups, table 1.

Overall, the females had higher rates of excretion of pus cells (17.6%) and proteinuria (9.6%), compared to their male counterparts. Conversely, there were equal rate of excretion ofhaematuria (4.0) in both sexes, table 2. Ogbese community had the peak proteinuria with the males and females having 37.5% and 41.6% respectively. For haematuria, Iguomo and Olumove had equal peaks of 40.0% each, while pus cells excretion rate peaked (31.8%) in the females from Iguomo community.

Altogether, children from Ogbese community had the highest overall prevalence of urine parameters (7.2%) compared to the others. The rates of urinary indicators in Iguomo, Olumove and Okada were below 6.0%, with Egboha having the lowest (3.2%) rate.

Factors that promote continuous infection with urinary schistosomiasis in the areas of study, were considered as: presence of snail intermediate host, infected ponds/streams, painful urination, and different methods of contact with infected waters. The most effective activity through which the parasitic schistosome species infect humans in the area, is fetching of water from infected streams/ponds. The rates of occurrence for the males and females were 46.4% and 53.6% respectively figure 2. Painful urination was the least of factors determining infection with *S. haematobium* in the area. Swimming in infected streams affected more males (26.4%) than females (16.4%), while washing in contaminated waters affected more females (23.2%) than their male (15.2%) counterparts.

Table 1. *S. haematobium* urinary indicators among the infected children in the study population

Age in yrs	Number of children Examined (%)	Number of children infected (%)	Percentage of urinary indices			
			Schistosome ova (%)	Pus cell (%)	Haematuria (%)	Proteinuria (%)
6-8	87 (34.8)	20 (23.8)	5 (25.0)	10 (25.6)	2 (20.0)	4 (21.1)
9-11	91 (36.4)	35 (41.7)	9 (45.0)	15 (38.5)	3 (30.0)	8 (42.1)
12-14	72 (28.8)	29 (34.5)	6 (30.0)	14 (35.9)	5 (50.0)	8 (42.1)
Total	**250**	**84(33.6)**	**20 (23.8)**	**39 (46.4)**	**10 (11.9)**	**20 (23.8)**

Table 2. Overall sex prevalence of the urine parameters in the study communities.

		N0. with Pus cells		N0. with Haematuria		N0. with proteinuria	
Communities	N0.Exam.	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
Egboha	25 each	1(5.9)	3 (13.6)	2 (40.0)	0 (0)	0 (0)	2 (16.7)
Iguomo	25 each	3(17.6)	7 (31.8)	0 (0)	2 (40.0)	0 (0)	2(16.7)
Ogbese	25 each	5(29.4)	3 (13.6)	1 (20.0)	1 (20.0)	3 (37.5)	5 (41.6)
Okada	25 each	3(17,6)	4 (18.2)	0 (0)	1 (20.0)	2 (25.0)	2 (16.7)
Olumove	25 each	5(29.4)	5 (22.7)	2 (40.0)	1 (20.0)	2 (25.0)	1 (8.3)
TOTAL **(250)**	1**25 each**	**17(13.6)**	**22 (17.6)**	**5(4.0)**	**5(4.0)**	8(6.4)	**12 (9.6)**

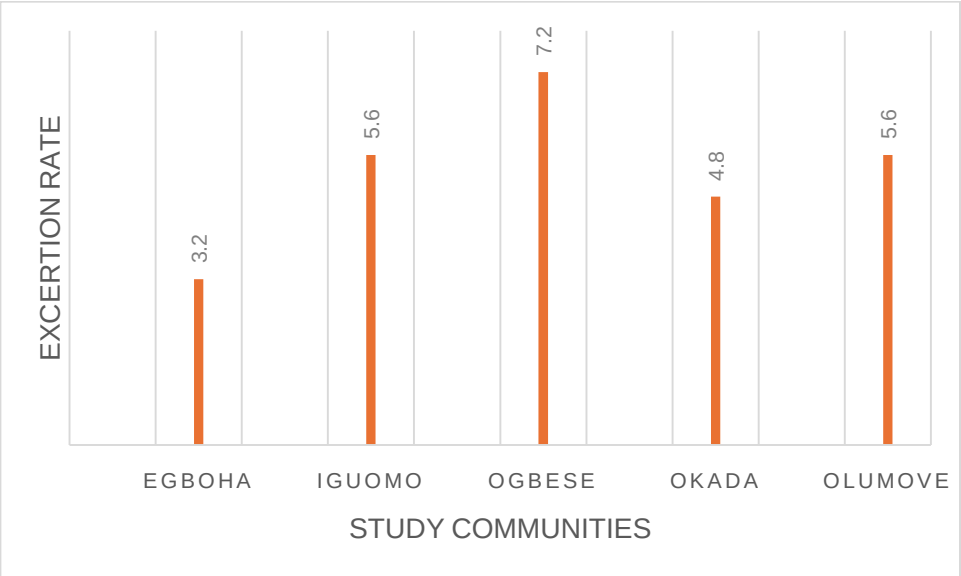


Figure 1. Comparison of the rate of excretion of the *Schistosome haematobium* indicators amongst the communities.

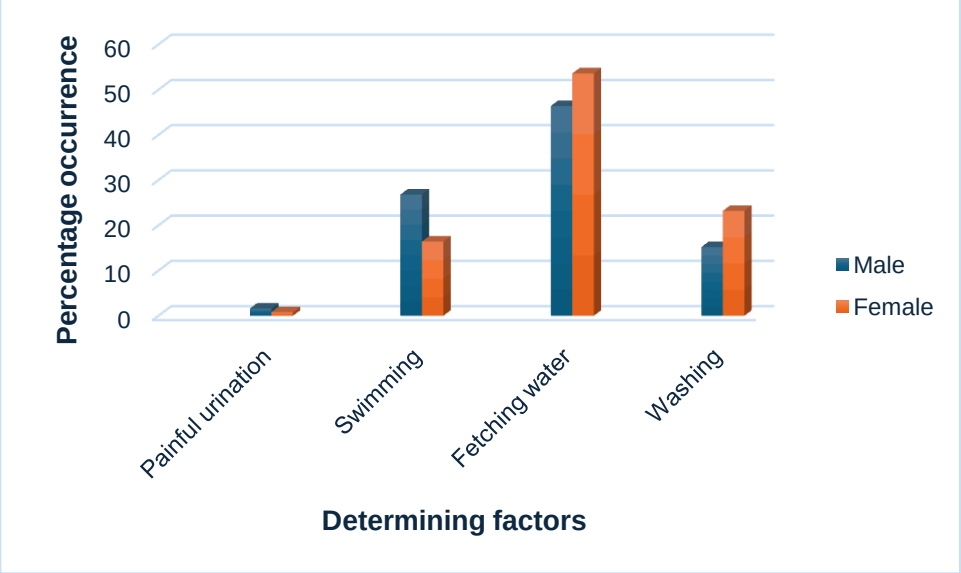


Figure 2. *Schistosoma haematobium* infection promoting factors in study areas.

DISCUSSION

The status of infection with schistosomiasis in some parts of Ovia north east in Edo state was examined in this study. The local people depend largely on natural ponds and streams for many activities bordering on, bathing /swimming, water fetching for domestic purpose, fishing and washing. These natural waters are the main transmission foci of *S. haematobium* in the communities and are distributed all over the places. The streams provide the needed water sources as well as serve as meeting point for the schistosome parasites, their intermediate host and the people (Agi and Okafor, 2005).

Transmission to humans also occurs in their various farms. These ensure that the people continue being infected and re-infected despite drug interventions strategy already started in many of the communities by Carter Center Foundation in the state (Okafor-Elenwo and Akinya-Obi, 2024). Individuals in their teens who are oftentimes engaged in water related activities that expose them to these infection sites run the risk of acquiring more infection and habouring more worms (Okafor and Elenwo, 2007)

The low prevalence of urinary schistosomiasis observed in these areas during the investigation could probably be due to the previous and repeated treatment of the infection in the communities by the joint effort of the Edo State government and the Carter Center Foundation. A high prevalence of 65.3% has been reported in earlier study in Edo state by Noriode *et al.*, (2018). Also, past studies in urinary schistosomiasis in other parts of Nigeria has shown high rate of prevalence and intensities (Chen and Mott, 1989; Agi and Okafor 2005; Ebereokafor and Elenwo, 2007; Okafor- Elenwo and Elenwo, 2014).

Water is a necessary component of life, and the ongoing reliance on streams for domestic water supply and other activities, put people at an inescapable danger of contracting various illnesses, as well as increasing the infection level of the parasites. Among the activities that expose the children of the study sites to the infection, fetching of water was rated higher than the others. Awareness of disease transmission among the children, through some forms of education by health workers and researchers in the communities can provide some help. In the present study, it was observed that the communities lack consistent supply of portable water, even though they also play their roles during elections and selections of political rulers in the state and local headquarters.

Drug treatment of parasitic infections alone, disregarding the social welfare of the rural communities in Nigeria, may not be sustainable. Therefore, while supporting endemic areas with treatment procedures, it is pertinent that government or economically viable citizens should provide such areas with, good roads, good drinking water, hospitals and electricity. This will not only help alleviate severe sufferings of the local populations, economically and health wise but also create a good sense, that they also belong to our country, Nigeria.

CONCLUSION

The excretion of blood, protein and other parameters in urine of children examined in this study was generally found to be moderate. Rates of urinalysis from 40% and above occurred in some of the communities especially Ogbese, Igwuomo and Olumove. The most important factors encouraging urinary schistosomiasis in the communities (in descending order) were fetching of water, swimming and washing in the contaminated streams/ponds. It is noted that treatment of the infection with urinary schistosomiasis is ongoing in the communities, that was probably the reason for the moderate infection encountered in this study. It is therefore recommended that, improved economic and social welfare should be incorporated in the control campaign strategy in endemic areas, to better the condition of the local communities.

ACKNOWLEDGEMENTS

The authors appreciate with thanks, the support and encouragements of the management and teachers of the selected schools in the study communities, the Local Health Authorities, parents of the candidates and the Local Government Education Secretary.

REFERENCES

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. Vol. 9 (3); 37-43 JASEM. ISSN 1119-8362.http//:www.bioline.orp.br/ja

Brindley, P. J. Hotez, and P. J.(2013). Break Out: Urogenital Schistosomiasis *and Schistosoma haematobium* Infection in the Post-Genomic Era. PLoS *Neglected Tropical Diseases*;7(3): e1961.

Chen, M. G and Mott, K. E. (1989). Progress in assessment of morbidity due to *S. haemotobium* infection: a review of recent literature *Tropical Diseases Bulletin* 86: R1-R 36.

Chun-lian, T., Yan-ru, G., Li-xia, W., Ya-wen, Z., Qun, P. Rong-hui, Z. and Ying, X., (2019) Role of regulatory T cellsin Schistosoma-mediated protection against type 1 diabetes *Elsevier Molecular and Cellular Endocrinology.* Volume 491, 1,110434 https://doi.org/10.1016/j.mce.2019.04.014

EbereJ. Okafor and Elenwo Augustus C. (2007). Haemoglobin status of children with mixed infection of malaria and urinary schistosomiasis in Odau community Rivers State. *Journal of Agriculture and Social* Research (JASR). Vol7.N01. 56-74

Mazigo, H. D., Amuasi, J. H. and Osei, I.(2018*).* Integrating use of point-of-care circulating cathodic antigen rapid diagnostic tests by community health workers during mass drug administration campaigns to improve uptake of praziquantel treatment among the adult population at Kome Island, North-Western Tanzania: a cluster randomized community trial. *BMC Public Health,* **18**, 840. https://doi.org/10.1186/s12889-018-5732-y

Nelwan, M. L. (2019). Schistosomiasis: Life Cycle, Diagnosis, and Control. *Current Therapeutic research- Clinical and Experimental*; 91:5-9. doi: 10.1016/j.curtheres..06.001. PMID: 31372189; PMCID: PMC6658823.

Noriode, R. M., Idowu, E. T., Otubanjo, O. A. and Mafe, M. A. (2018). Urinary schistosomiasis in school aged children of two rural endemic communities in Edo State, Nigeria. *Journal of Infectious Public Health* (3):384-388. doi: 10.1016/j.jiph.2017.09.012. Epub 2017 Sep 29. PMID: 28970097.

Oladeinde, B. H., Okpala, O. H., Onifade, A. A., Osaiyuwu, O. C. and Ayoola, A. V. (2018). Urinary Schistosomiasis: A Study Among Primary School Pupils In A Rural Community In Nigeria. *The Tropical Journal of Health Sciences* 25(1) Https://Doi.Org/: 10.9734/Arrb/2016/25076

Olveda, D. U., Li, Y., Olveda, R. M., Lam, A. K., Chau, T. N., Harn, D. A., Williams, G. M., Gray, D. J. and Ross, A.G.(2013) Bilharzia: Pathology, Diagnosis, Management and Control. *Tropical Medicine and Surgery*;1(4):135. doi: 10.4172/2329-9088.1000135. PMID: 25346933; PMCID: PMC4208666.

Okafor- Elenwo, E. J. and Elenwo, A. C. (2014). Assessment of Morbidity in Malaria and Urinary Schistosomiasis using some Specific Indicators. *Journal of Natural Sciences Research* Vol.4, No.1, www.iiste.org. ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)

Okafor-Elenwo, E. J., Izevbuwa, E.O. &Akpoka, O. A.(2020a).Prevalence of Intestinal Parasites amongst selected age groups within Okada, South –South Nigeria. *International Journal of Applied Biology, 4(1), ISSN : 2580-2410. eISSN: 2580-2119*

Okafor-Elenwo, E. J. and Izevbuwa, O. E. (2020b). Occurrence of geohelminths amongst children and young adults in Ovia North-East LGA of Edo State, South-South, Nigeria. *International Journal of Microbiology and Immunology Research* Vol.7(1), pp. 001-006, Available online at http://www.apexjournal.org ISSN 2315-8743© 2020 Apex Journal International

Okafor -Elenwo, E. J. and Eze, A. M. (2021). Poor Affordability of Socio-Economic Indicators as a Major Contributor to High Rate of Parasitic Infection in Okada Town and Environ. *International Journal of Advanced Academic Research* | ISSN: **2488-9849,** Vol. 7, Issue 5, *Series 2* (May, 2021) | www.ijaar.org. Journal DOI: 10.46654/ij.24889849, Article DOI: 10.46654/ij.24889849.e75526

Okafor-Elenwo E. J. andAkinya-Obi, C. E. (2024). Vesical schistosomiasis among adult females in parts of Edo state, Nigeria. *Journal of Science Research:* Vol. 2, Issue 3 | ISSN: 3027-1185 | www.ijaar.org

Salawu, O. T., & Odaibo, A. B. (2013). *Schistosomiasis among pregnant women in rural communities in Nigeria*. *International Journal of Gynecology & Obstetrics*, 122(1), 1–4. https://doi.org/10.1016/j.ijgo.2013.01.024

Shiff, C., Veltri, R., Naples, J., Quartey, J., Otchere, J., Anyan, W., Marlow, C., Brakohiapa, E., Bosompem, K., Wiredu, E. and Adiei, A. (2006). Ultrasound verification of bladder damage is associated with known biomarkers of bladder cancer in adults chronically infected with *Schistosoma haematobium* in Ghana. *Transactions of the Royal Society of Tropical Medicine and Hygeine,* 2006; 100: 847–854.

Van der Werf, M. J., de Vias, S. J., Brooker, S., Looman, C. W., Nagel kerke, N. J., Habbema, J. D., and Engels, D. (2003*)* Quantification of clinical morbidity associated with schistosoma infection in Sub-Saharan Africa. *Acta Tropica;* 86(2-3): 125.

WHO. (2002). Report of the WHO Informal Consultation on the use of praziquantel during pregnancy/lactation and albendazole/mebendazole in children under 24 months: Geneva, 8–9 April 2002. Geneva: *World Health Organization*8–9 April 2002. Geneva.