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**Azoro AV**

Tropical Disease Research Unit,  
Department of Biology, Alvan  
Ikoku Federal College of  
Education Owerri, Imo State,  
Nigeria

**Onyeonula NI**

Tropical Disease Research Unit,  
Department of Biology, Alvan  
Ikoku Federal College of  
Education Owerri, Imo State,  
Nigeria

**Egeruo AS**

Tropical Disease Research Unit,  
Department of Biology, Alvan  
Ikoku Federal College of  
Education Owerri, Imo State,  
Nigeria

**Dike MN**

Tropical Disease Research Unit,  
Department of Biology, Alvan  
Ikoku Federal College of  
Education Owerri, IMO State,  
Nigeria

**Mbagwu Chioma B**

Department of Animal and  
Environmental Biology of IMO  
State University, Nigeria

**Corresponding Author:**

**Azoro AV**

Tropical Disease Research Unit,  
Department of Biology, Alvan  
Ikoku Federal College of  
Education Owerri, Imo State,  
Nigeria

## Endemicity of urinary schistosomiasis in Ihube Okigwe Imo state

**Azoro AV, Onyeonula NI, Egeruo AS, Dike MN and Mbagwu Chioma B**

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### Abstract

Studies on urinary schistosomiasis and its snail vector were undertaken. Of the 1,564 urine specimens examined, 472 (30.2%) comprising 312 (66.1%) males and 160 (34.0%) females were infected, with visible haematuria as their predominant presenting symptoms. Among the infected, 331 (70.1%) were excreting under 100 eggs per 10 ml urine, while 132 (28.0%) and 9 (1.9%) were excreting 10,500 and above respectively. Statistical analysis revealed the intensity of the infection to be significantly higher ( $p < 0.01$ ) in persons under 20 years than in persons above 20 years, while significant variation ( $p < 0.01$ ) in incidence was recorded among different villages, sex, age, and occupational groups. The snail intermediate hosts collected during the routine malacological survey include *Bulinus globosus*, *B. truncatus*, *Lymnaea natalensis* and *Melanoides tuberculata*. Of those snails, only *B. globosus* was found infected with cercariae believed to be human schistosomes.

**Keywords:** Schistosomiasis, endemicity, snail host, *Bulinus globosus*, Liver fluke Okigwe

### Introduction

Urinary schistosomiasis is a major health problem in African countries <sup>[1]</sup> and it's endemic in Nigeria. It is a chronic and debilitating disease caused by the liver fluke (trematode) *Schistosoma haematobium*. It affects the lower abdomen and the gastro-urinary track and visible haematuria has been associated with the disease amongst affected persons <sup>[2]</sup>. Also, the disease has been associated with anatomic infertility <sup>[3]</sup> as well as subjective changes in ejaculation among male travelers <sup>[3]</sup>. Inflammation is characterized by frequent urination and haematuria.

Accumulation of eggs and resultant histological reaction in the bladder and uterus leads to the formation of granuloma and fibrosis.

The bladder may show bilharzial tubercles, which may ulcerate and cause papilloma formation and chronic fibrosis.

Calcification of the bladder wall may occur, making the bladder wall rigid and increasing pressure on the uterus and kidneys – causing dilation of the uterus.

The ureters, urethra, prostate and seminal vesicles may become involved, and secondary bacterial infection may lead to abscess formation. In women, the vagina, cervix, and uterus may be involved <sup>[4]</sup>.

Schistosomiasis is an acute and chronic disease caused by parasitic worms. People are infected during routine agricultural, domestic, occupational, and recreational activities, which expose them to infested water. Lack of hygiene and certain play habits of school-aged children, such as swimming or fishing in infested water, make them especially vulnerable to infection. Schistosomiasis control focuses on reducing disease through periodic, large-scale population treatment with praziquantel; a more comprehensive approach including potable water, adequate sanitation and snail control would also reduce transmission. Estimates show that at least 236.6 million people required preventive treatment for schistosomiasis in 2019, out of which more than 105.4 million people were reported to have been treated <sup>[5]</sup>.

People become infected when larval forms of the parasite-released by freshwater snails—penetrate the skin during contact with infested water.

Transmission occurs when people suffering from schistosomiasis contaminate freshwater sources with their excreta-containing parasite eggs, which hatch in water <sup>[5]</sup>.

Schistosomiasis is a neglected tropical disease that continues to cause morbidity and mortality in Sub-Saharan Africa. Due to its endemicity, co-infection with malaria is common. The disorders cause anaemia and impaired nutritional status among children [6].

## Materials and Methods

**Study design:** Descriptive cross-sectional study.

**Study area:** Ihube in Okigwe LGA Imo State, Nigeria.

**Study population:** 1564 persons are comprising all age groups.

**Sample size:** 472 persons.

**Study period:** February to April 2021.

## Methods

Urine and stool specimens collected from each person were examined for *S. haematobium* and *S. mansoni* by direct parasitological methods [7] (examination of urine sediment and wet mount).

## Data collection

Data was collected through well-designed results from specimen analysis from the laboratory examinations done.

## Data analysis

Data were analyzed using the package for social science (SPSS) version 16.

**Table 1:** Prevalence of schistosomiasis haematobium in the study area

Villages	Number examined	Number infected	% infection
Akpugo	230	80	(34.8)
Eziama	190	39	(20.5)
Ogube	202	62	(30.7)
Nkoto	178	142	(23.6)
Ugwuntu	195	50	(25.6)
Agbala	239	79	(33.1)
Amagu	209	81	(38.8)
Ozara	121	39	(32.2)
Total	1564	472	(30.2)

**Table 2:** Sex-related prevalence of *S. haematobium* in the study area

Villages	Males			Females		
	No. examined	No. infected	%	No. examined	No. infected	%
Ogube	138	44	(31.9)	80	22	(27.5)
Ugwuntu	130	42	(32.3)	52	18	(34.6)
Agbala	161	46	(28.6)	68	20	(29.4)
Nkoto	119	27	(22.7)	71	25	(35.2)
Akpugo	143	44	(30.8)	50	18	(36.0)
Amagu	132	41	(31.1)	72	23	(31.9)
Eziama	120	40	(33.3)	58	20	(34.5)
Ozara	99	28	(28.3)	71	14	(19.7)
Total	1,042	312	66.1%	522	160	(33.9)

**Table 3:** Prevalence of urinary schistosomiasis according to age

Age groups	Number examined	Number infected	% infected
1 – 10	208	82	(39.4)
11 – 20	492	246	(50.0)
21 – 30	100	8	(8.0)
31 – 40	170	61	(35.9)
41 – 50	330	47	(14.2)
51 – 60	168	22	(13.1)
60 +	96	6	(6.3)
Total	1564	472	(30.2)

**Table 4:** Distribution of schistosomiasis infection rates in different occupational groups

S/N	Occupational groups	Number examined	Number infected	% infection
1	Pupils	667	191	(28.6)
2	Students/apprentices	240	108	(45.0)
3	Civil servants	225	18	(8.00)
4	Farmers	432	155	(35.9)
	Total	1564	472	(30.2)

## Results

Out of the 1,564 persons examined, 472 (30.2%) had *S. haematobium* infection (Table 1). Although the infection rate differed from one village to another, statistical analysis revealed no significant difference ( $p > 0.05$ ). Amagu recorded the highest rate of infection (38.8%), followed by Akpugo and Agbala with (34.8%) and (33.1%) respectively, while Nkoto recorded the least infection rate with (23.6%). There was no statistical significance difference ( $p > 0.05$ ).

Tables 2 revealed a sex-related prevalence of *S. haematobium* in the area. Evaluation of the relationship between sex and the prevalence of urinary schistosomiasis (Table 2), revealed that of the 1,564 persons examined, (1,042 males and 522 females), only 312 (66.1%) males and 160 (33.9%) females were infected. However, statistical analysis using the chi-square test revealed that the higher infection rate observed in males was not a significant at the 95% probability level.

An evaluation of the prevalence in age (Table 3) revealed a gradual increase in the number of persons with a decrease in age. More than forty-six percent (46.9%) of infection was recorded in persons within 0-20 years of age. This indicates that the infection was higher in persons within the first two decades of life ( $p > 0.05$ ), ages 21-30 and 60 and above recorded 8% and 6.3%, respectively. This may be a result of low exposure to the infested stream.

Table 4: Occupational-related prevalence of human schistosomiasis: The prevalence of human schistosomiasis was not uniform among the various occupational categories. All the occupational categories were infected with *S. haematobium* with the highest rate in students (45.0%), followed by farmers (35.9%), while civil servants had the least infection rate (8.0%).  $p < 0.001$

## Discussion of finding

The study has revealed that urinary schistosomiasis is endemic in eight villages in Ihube in Okigwe L.G.A of Imo state, Nigeria. Indeed, the occurrence of urinary schistosomiasis in these villages, and the findings of the snail intermediate host and the transmission site show that this part of Imo state is an established endemic area and a major health problem that calls for necessary attention in the health Programme of Imo state. A close look at the prevalence rate for these villages shows variation which can be interpreted to mean that transmission is higher at Amagu (38.8%) followed by Akpugo (34.8%) and that infection is probably new at Nkoto (23.6%). However, the overall prevalence of 30.2% observed in this study is lower than the figures reported by [8] in the north-central zone of Abia state (42.3%). Udonsi [9] in Igwu river basin north Bende (37.0%), schistosomiasis is the second leading cause of infectious diseases next to malaria in Africa [10]. According to [11] the pooled prevalence of schistosomiasis during pregnancy was 13.2%. Observations of [12] showed that odds of schistosome infections were lowest among people between (15-24 years of age), caregivers (0.1, 95%), and those who used tap water (0.3, 95%) for domestic purposes. Schistosome infections were however higher among those who bathed in river water (17.4, 95% ci). On the other hand, infection was lowest among those who did not play in soil (0.1, 95% ci: 0.51-0.28), which were from households that used tap water for domestic purposes.

Considering the intensity of the infection, it was observed that the majority of persons examined in the study have light to moderate infections. This relationship between prevalence, intensity as well as age gave the same characteristic pattern of *S. haematobium* as had been previously in some other parts of Africa<sup>13</sup> observed that a total of 339 (84.8%) of children were found to be infected with at least one parasite species. The researchers also observed that out of the 400 persons that were examined, 127 (31.8%) were found to be infected by either *S. manson* or *S. haematobium*.

In their research<sup>[14]</sup>, a hundred and fifty-one individuals (61.7% males and 38.3% females) aged between one and ninety years of age with a median age of 25 years were enrolled in a study. About 38.8% of the participants claimed that they had a past history of schistosomiasis.

According to the WHO,<sup>[15]</sup> schistosomiasis is prevalent in tropical and subtropical areas especially in poor communities, without access to safe drinking water and adequate sanitation. It is estimated that at least 90% of those requiring treatment for schistosomiasis live in Africa.

Considering the intensity of infection it was observed that the majority of persons examined in the study have light to moderate infections. This relationship between prevalence intensity as well as age gave the domestic characteristics pattern of *S. haematobium* infection had been reported in other parts of Nigeria<sup>[15-17]</sup>.

The highest prevalence rate of 50.0% observed in ages 11-20 is seconded by 39.4% observed in age 1-10 years. This being so, for any meaningful control and treatment of urinary schistosomiasis in this part of the Imo state, attention should therefore be paid to persons between the first two decades of life. The picture shows that they are the most infected group of persons.

Visible haematuria was the predominant presenting symptom observed among infected persons. This represents 36.8% of the total infected population of 472 persons. The presence of visible haematuria varied significantly with age as a greater number of persons within the first two decades of life had visible haematuria. The observations conform to the reports of<sup>[19, 20]</sup> WHO observed a close association between haematuria in the urine and the presence of *S. haematobium* ova.

The observations conform to the reports of<sup>[19, 20]</sup> who observed a close association between haematuria in the urine and the presence of *S. haematobium* ova.

A comparative analysis of occupation-related prevalence of urinary schistosomiasis in the study area showed a significant variation ( $\chi^2 = 19.09$ ,  $df = 3$ ).

The researchers observed that the high incident rate of infection was a result of the unawareness of the participants. The sources of drinking waters are infested by schistosomiasis infection carried by the snail hosts. As they go on their daily activities in the infested water they keep on being infected.

The study revealed that persons between the first two decades of life mostly the pupils are important in the spread of this disease since they pass the greatest number of eggs, coupled with their low sanitary habit habits. Administration of anti-Schistosomal drugs to this age group could play a great role in the reduction of infection in the study area. The flowing water bodies should be used by the populace more to reduce contact with the vector which transmits the infection. The vectorial studies should be extended to cover two seasons and all the other streams of the area to give a better picture of the seasonal variation in their abundance and the infectivity of the snails.

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