

## Prevalence Of Urinary Schistosomiasis Among Pupils Attending Primary Schools In Bomo Village, Zaria-Nigeria

Omenesa, H. O., Bishop H.G.\* and Raji, H. M.

Department of Microbiology, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

Corresponding Author's E-mail: gabrielhenrybishop@gmail.com; 08176357626

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**ABSTRACT:** The prevalence of urinary schistosomiasis among pupils attending two different primary schools in Bomo village, Zaria, Kaduna State, Nigeria was investigated. A total of two hundred urine samples were collected and analysed for the eggs of *Schistosoma haematobium* using centrifugation technique. The schools were located close to a lake where the pupils often swim among other recreational activities. A prevalence of 19.5% was obtained at the end of the study. The infection was higher among the male pupils (17.5%) than the female pupils (2.0%). There was higher infection in age group 11-15 years (13%), while pupils in age group 5-10 years had lower infection (6%). Structured questionnaires were used in collecting relevant data on risk factors and symptoms of urinary schistosomiasis from the pupils. There is need for eradication of the intermediate host (*Bulinus* spp.) of schistosomes from lakes as well as a concerted effort in educating the pupils on the dangers of exposing themselves to unprotected water bodies.

**Key words:** Urinary Schistosomiasis, recreational activities, pupils, lake, centrifugation method, Bomo-Zaria.

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### I. INTRODUCTION

Urinary schistosomiasis is caused by a blood fluke, *Schistosoma haematobium* (W.H.O, 2007). It is the most common parasitic disease in the world (Gracio *et al.*, 1992; Okpala *et al.*, 2004) and only second to malaria among tropical diseases and third after intestinal helminthiasis in global parasitism (Ofoefie *et al.*, 1997; Chitsulo *et al.*, 2000; Okwori *et al.*, 2014). Globally over 200 million people are infected with schistosomiasis (Nmansi *et al.*, 2005; Ruelas *et al.*, 2006) in 74 countries of Africa, the Middle East, South America and South East Asia, and more than 600 million people are at risk (Ruelas *et al.*, 2006). It was first isolated from the human blood vessels by a German physician Theodore Bilharz in 1851 and first named Bilharzia or Snail Fever but later renamed schistosomiasis (Orihel *et al.*, 1995). Urinary schistosomiasis causes progressive damage to the bladder, ureters and kidneys (Baberjee and Agrawal, 1992). Transmission can take place in almost any type of habitat: from large lakes or rivers to small seasonal ponds or streams (WHO, 2002). The disease is common in the Niger Basin and is found in every country of West African sub-region (Brown and Wright, 1985). Nigeria is one of Africa's most severely affected countries with estimated 101.28 million people at risk of the infection while 25.83 million are already infected (Chitsulo *et al.*, 2000). Urinary Schistosomiasis affects people in developing countries particularly children who acquire the disease during recreational activities in snail-infested water (Bello *et al.*, 2002). It is a neglected parasitic disease of childhood that is endemic in Nigeria (Adewumi *et al.*, 1991, Adeyeba *et al.*, 2002). This research was aimed at finding the current prevalence of urinary schistosomiasis via egg detection in urine of pupils from two Primary schools in Bomo Village, Nigeria, as well as to ascertain the association of the disease to some socio-demographic factors using appropriate questionnaire and statistical tools.

### II. MATERIALS AND METHODS

#### 2.1 Study Area

The study was conducted in Bomo Village in Sabon Gari Local Government Area of Nigeria. It is located between latitude 11.811° N and longitude 7.038° E at altitude of 675 metres. The hottest months are March-April, while the coldest months are December-January. Soil of Bomo Village is a ferruginous tropical soil (Klinkenberg and Higgings, 1998). The people of the village engage mainly in agricultural activities. Their main crops are maize, millet, rice, groundnut, yam and sugar cane.

#### 2.2 Sample Collection

Two hundred urine samples were collected from pupils attending two different primary schools in Bomo village, Zaria, Kaduna State. The samples were collected between 10am and 2pm in clean plastic containers. The sealed sample containers containing the urine were placed inside the storage flask containing ice cubes. The samples were immediately transported to the Department of Microbiology, A.B.U, Zaria for analysis. Structured questionnaires were used to collect relevant data from the pupils (Appendix I).

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## 2.2 Analysis of urine samples

The method used for the analysis was centrifugation method as outlined by Cheesebrough, (2006). Ten millilitres (10ml) of urine was dispensed in a test tube and centrifuged at 3000rpm for 5 minutes to concentrate the eggs of the schistosome. After centrifugation, the upper layer (the supernatant) was discarded, the sediment was tapped and a drop was placed on a clean glass slide. A cover slip was used to cover the drop. Wet mounts were examined microscopically using x10 and x40 objectives of the light microscope for the characteristic eggs as described by Cheesebrough (2006). The positive samples were those in which the *Schistosoma haematobium* eggs were seen with its characteristic terminal spine, while the negative samples revealed none of the eggs. Pus crystals and red blood cells in the positive samples were also noted.

## III. RESULTS

A total prevalence of 19.5% of urinary schistosomiasis was found among pupils attending two different primary schools in Bomo village, Zaria, Kaduna state, Nigeria. The higher prevalence was among students attending a primary school at Kurmin Bomo (14%), while the lower prevalence of 5.5% was among students attending a primary school at Bomo (Table 1).

In relation to gender of pupils attending the primary schools at Bomo Village, male pupils were shown to have a higher prevalence (17.5%). But female pupils had a lower prevalence of 2.0% (Table 2).

Age groups of pupils were analyzed as a factor. Age group 11-15 years had a prevalence of 13% while 5-10 years group had a prevalence of 6.5% (Table 3).

Urinary schistosomiasis in relation to recreation in/at near lake by pupils attending primary schools was analysed. The highest prevalence of urinary schistosomiasis was among pupils that indulge in swimming (34.7%), followed by those that bath with raw water from lake (24.3%) and the least prevalence was among pupils that washed clothes near the lake (22.5% (Table 4).

The symptoms associated with the infection in the pupils included haematuria (experienced by 69.2% of the infected pupils), dysuria (54.6%), frequent urination (25.6%) and 37.8% of the infected pupils claimed to experience abdominal pain. Haematuria was the symptom shown to be most associated with the disease (Fig. 1).

**Table 1: Prevalence of urinary schistosomiasis among pupils attending two primary schools in Bomo village, Zaria, Kaduna state.**

School	No. of samples	No. and % positive
Primary school at Bomo	100	11 (5.5%)
Primary school at Kurmin Bomo	100	28 (14%)
Total	200	39 (19.5%)

**Table2. Prevalence of urinary schistosomiasis in relation to gender\* of pupils attending primary schools in Bomo village, Zaria, Kaduna state.**

Sex	No. of Samples	No. and % Positive
Male	120	35 (17.5%)
Female	80	4 (2%)
Total	200	39 (19.5%)

\*Statistically significant: P = 0.00 (P < 0.05)

**Table 3: Prevalence of urinary schistosomiasis in relation to age\* of pupils attending primary schools in Bomo village, Zaria, Kaduna state.**

Age Group (Years)	No. of Sample Examined	No. and % Positive
5-10	100	13(6.5%)
11-15	100	26(13%)
Total	200	39(19.5%)

\*Statistically significant: P = 0.02 (P<0.05)

**Table 4: Prevalence of urinary schistosomiasis in relation to recreational activities carried out at freshwater habitat, by pupils attending primary schools in Bomo village, Zaria, Kaduna state.**

Risk Factor	No. of respondents#	No. and % Positive
Swimming in lake	69	24(12.0)
Bathing with raw lake water	74	9(4.5)
Washing near lake	71	6(3.0)
Total	214	39(19.5)

#: 14 respondents were involved in more than one risk factor.

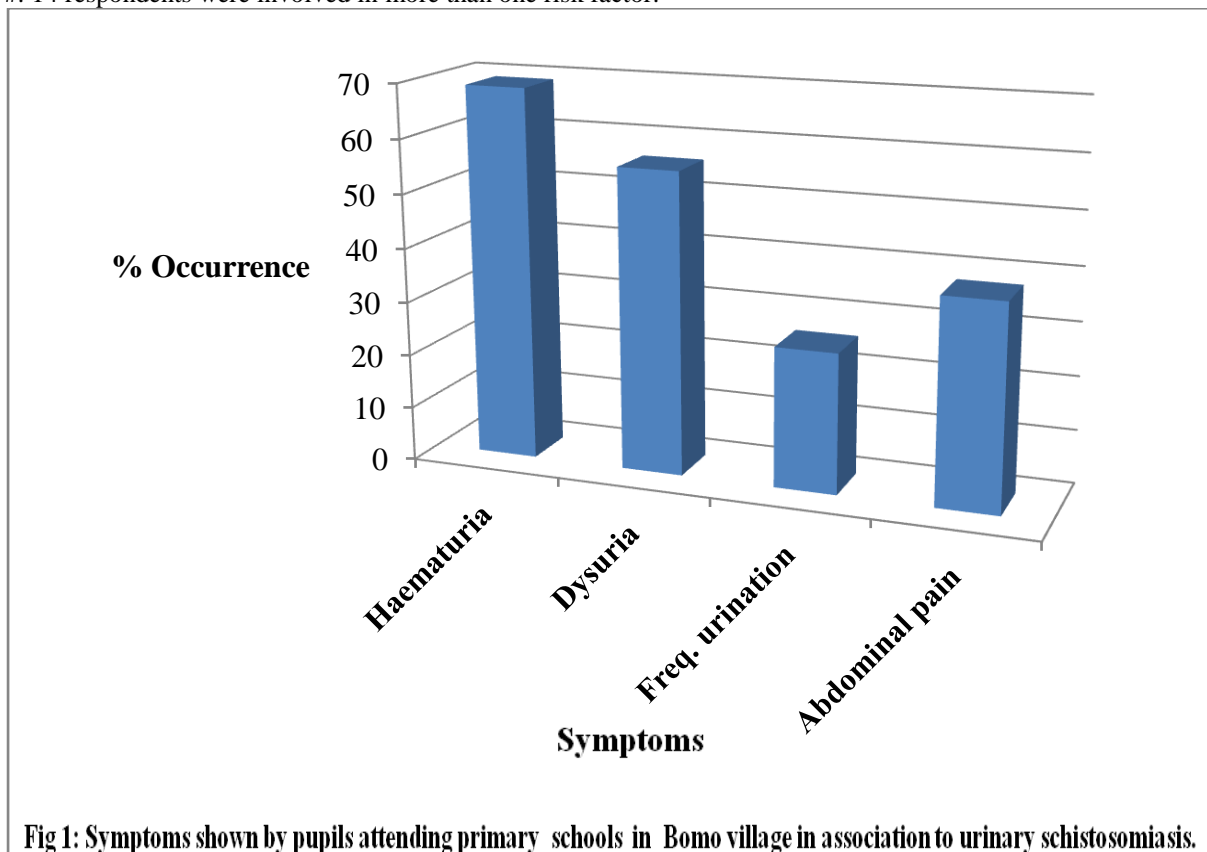


Plate I: Lake Bomo, located close to one of the schools where the study was conducted.

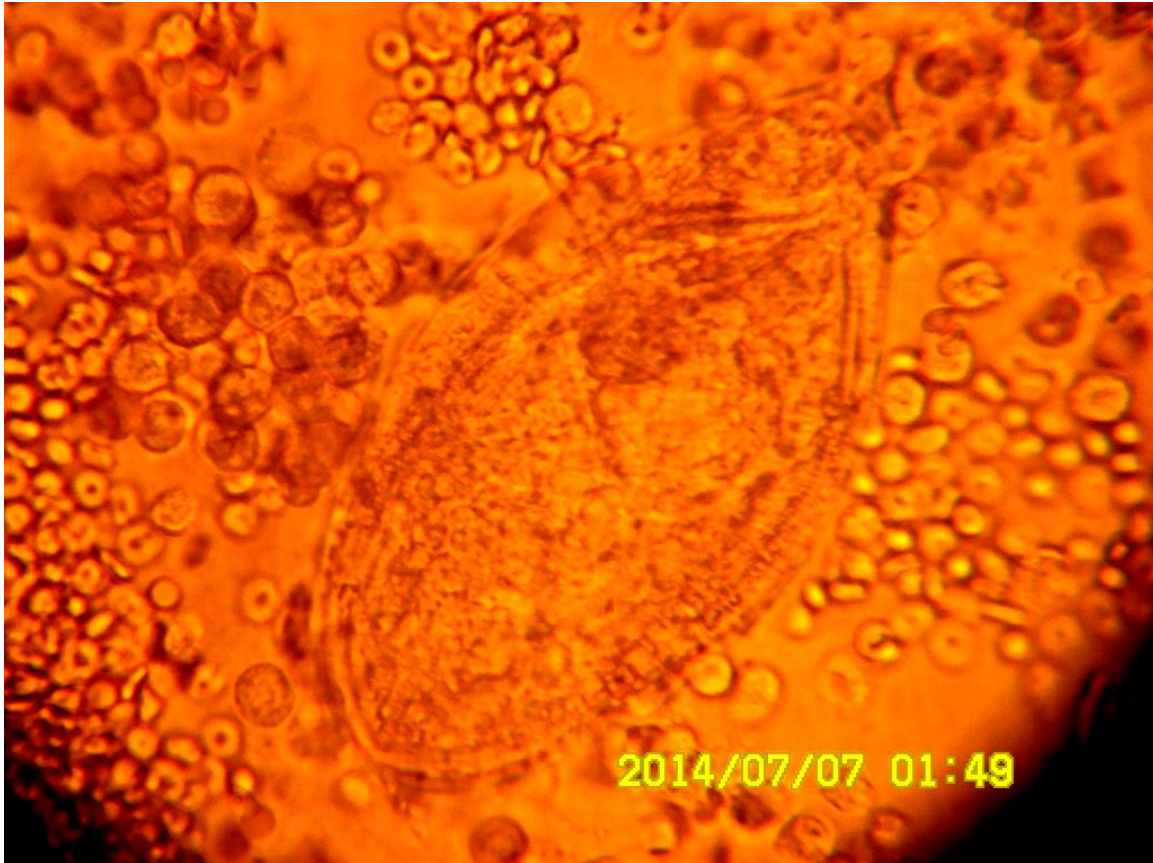


Plate II: An egg of *Schistosoma haematobium* with the characteristic terminal spine.

#### IV. DISCUSSION

This study was based on egg detection by microscopy of urine samples sediments (Chessbrough, 2006) taken from pupils. The *Schistosoma haematobium* egg had characteristic terminal spine (Fig II). From the findings, urinary schistosomiasis infection had a prevalence of 19.5% among pupils attending two primary schools in Bomo Village, Zaria, Kaduna State, Nigeria. A similar research in Zaria, Kaduna State reported a prevalence of 22% among children of Fulani herdsman in Zaria (Mato, 2010: unpublished B.sc Project). The prevalence of urinary schistosomiasis in Bomo Village can be attributed to low literacy level, lack of basic amenities, inadequate and indiscriminate disposal of human sewage, proximity to infested water bodies and high water contact activities in the snail-infested ponds (WHO, 2007). The reason why the infection was higher among the male pupils (17.5%) than the female pupils (2%) could be due to socio-cultural and religious factors that expose males to activities at the infested water bodies, such as swimming, washing, and bathing, fishing, sugarcane and crop production. These activities increase their rate of exposure to infection (Okoli *et al.*, 1999; Uneke *et al.*, 2007). The infection was higher among children belonging to the age group 11-15 years (13%) than children belonging to the age group 5-10 years (6.5%), which was probably due to their more frequent water contact activities at cercariae-infested water bodies. Usually, older children are afforded more liberty to take a swim, fish, irrigate crops, wash clothes or take a bath using water from the lake. Pupils attending the primary school at Kurmin Bomo had a higher prevalence of 14%, than those attending the primary school at Bomo with a prevalence of 5.5%. The higher infection among pupils attending the primary school at Kurmin Bomo could be attributed to the proximity of the school to Lake Bomo, thereby making the pupils have higher contact time with the lake. From the study, it could be seen that among all the water contact activities that the pupils indulge in at cercariae-infested water bodies, swimming makes them most susceptible to the disease. Haematuria was the symptom shown by most of the infected children.

#### V. CONCLUSION

The prevalence of urinary schistosomiasis among pupils attending primary schools in Bomo Village in Zaria, Kaduna State, Nigeria was found to be 19.5%. Statistical analysis of the data obtained showed close association of the infection with the presence of the Lake Bomo. Schistosomiasis is more prevalent in male pupils than female pupils and age 11-15 harbour more of the parasite.

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## Appendix 1: Questionnaire

Project research on: prevalence of urinary schistosomiasis among pupils attending primary schools in Bomo Village, Zaria-Nigeria

Department of Microbiology  
Ahmadu Bello University, Zaria.

### PUPIL'S PERSONAL DATA

1. Gender: Male  Female
2. Age: 5-10years  11-15years
3. Is blood present in your urine? Yes  No  No response
4. Do you experience pain during urination? Yes  No  No response
5. Do you urinate frequently? Yes  No  No response
6. Do you constantly experience abdominal pain? Yes  No  No response
7. Do you drink water from Lake Bomo? Yes  No
8. Do you bath with raw water from Lake Bomo?
9. Do you swim in Lake Bomo? Yes  No
10. Do you wash with water from Lake Bomo? Yes  No
11. Do you swim in Lake Bomo? Yes  No

## **BIBLIOGRAPHIES OF AUTHORS**



Mr. Haliru Ogirima Omenesa is from Okene Local Government Area of Kogi State, Nigeria. He obtained his first degree in Microbiology from Ahmadu Bello University, Zaria, Nigeria in December, 2014. He was among the top five students in his class and presented a conference paper on his final year project during the Nigerian Society for Microbiology 37<sup>th</sup> Annual Conference in Zaria (September, 2014). He graduated with a Second Class Upper degree (B.Sc Microbiology), and has always shown a keen interest in research. His field of interest is Industrial Microbiology. He is a member of Nigerian Society for Microbiology (NSM).



Mr. Henry Gabriel Bishop is from Bitaro-Kwoi, Jaba Local government Area of Kaduna State, Nigeria. He obtained his first degree (BSc. Microbiology, FIRST CLASS) from Ahmadu Bello University Zaria (A.B.U.), Nigeria in 2012. He was a recipient of Certificate of Recognition and A.B.U. Student of Excellence Award by the Vice Chancellor, Student Affairs Division, A.B.U. Zaria in May, 2013. He is presently undergoing his Masters Degree programme in Medical Microbiology (Parasitology) at the Department of Microbiology, A.B.U Zaria, where he is also a staff (lecturer). He has interest in immunology and immunobiology of Parasites (*Schistosoma haematobium* in co-infection with bacteria in children). Mr. Bishop is a writer (of novels and inspirational books). He is member of Nigerian Society for Microbiology (NSM). He has one conference paper, one published journal paper and three journal papers in press.



Mrs. Habiba Mustapha Raji is a lecturer at Ahmadu Bello University, Zaria, Nigeria. She is from Kogi state, Nigeria. She received the “Innovators of Tomorrow” award (2006) from the STEP-B project in conjunction with the World Bank, for her M.Sc thesis on “Studies on biodegradation of crude oil using soil bacteria”. Mrs Raji also received a scholarship (Local Scholarship Scheme) from the Petroleum Technology Development Fund, Nigeria (2010) for her Ph.D research, which afforded her the opportunity of undergoing a bench work in the United Kingdom. She is about concluding her Ph.D research on “the molecular characterization of soil bacteria with polycyclic aromatic hydrocarbon degradation ability”. She has about ten conference papers, two journal publications and one journal paper in press. Her areas of interest include: biodegradation of pollutants by bacteria, Biotechnology, Soil Microbiology, and Medical Parasitology. She is a member of Nigerian Society for Microbiology (NSM), American Society for Microbiology (ASM), and Society for General Microbiology (SGM).