The scale **Journal Website:** https://thescalejournal.com.ng/
An Interdisciplinary Journal of
The ACADEMIC STAFF UNION OF POLYTECHNICS - ZONE D
ISSN: 2992-3727 Published 30th November, 2025

PREVALENCE OF SCHISTOSOMA HAEMATOBIUM INFECTION AMONG THE STUDENTS OF SCIENCE LABORATORY TECHNOLOGY, FEDERAL POLYTECHNIC, OFFA, KWARA STATE- NIGERIA

***Kabir. A. Olawale [1]; Amina. A. Amedu [2]; Hammed. O. Olawuyi [3]; Elizabeth. O. Oyagbola [4]**
[1,2,3]Department of Biological Sciences, School of Science and Technology, Federal Polytechnic, Offa, Kwara State, Nigeria.
[4] Department of Science Laboratory Technology, Institute of Applied Sciences, Kwara State Polytechnic, Ilorin Nigeria.
Corresponding Email: olawalekabir5@gmail.com

Abstract
Urinary Schistosomiasis is an infection of the urinary system which can lead to haematuria. This study was aimed at determining the prevalence of *Schistosomia haematabium* infection among students of Science Laboratory Technology Department, Federal Polytechnic, Offa, Kwara State Nigeria. Samples were collected using sterile vials and sent to the laboratory for analysis. Medi-Test combi 9 test strips were used to determine the presence of blood, protein, colour and the pH of the urine samples before centrifugation was done at 2,000 rpm for 5 minutes. The supernatant of each centrifuged urine sample was decanted and a drop of the sediment was placed on the grease free sterile slide and observed under x10 objective lens. Out of the 150 urine samples examined, 4 had the presence of the *S. haematobium* egg and 3 of this were found in urine samples from ND I students while the remaining one was found in urine sample of ND II students. The percentage of blood detected in the urine ranged from 0.67% to 67% while the percentage of protein detected ranged from 0.67% to 6.0%. The colour of the various urine observed ranged from amber, pale yellow and deep yellow while the pH values observed ranged from 5-8. The presence of blood mainly from the female students' urine was as a result of the menstrual cycle activity.
Key words: *Schistosoma haematobium,* urine, blood, protein

INTRODUCTION

Schistosomiasis is an infectious, parasitic disease of tropical and subtropical regions. Various forms of it afflict more than 200 million people in tropical and subtropical Asia, Africa, South America and the Caribbean, and of these probably more than 20 million suffer clinical morbidity or disability (Dulbecco *et al*, 2017). Schistosomiasis saps the energy and sometimes causes the death of its victims by exerting injurious effect on the liver, intestines, kidney, bladder mesenteric veins and urinary tract. it equally renders people less resistant to other infectious diseases, and by weakening their ability to work. The disease reduces national output and thereby engenders poverty.

Human schistosomes belong to the genus Schistosoma in the family schistosomatidae. This family shows affinity with strigeids and certain other flukes in having miracidia with two pairs of flame cells, daughter sporocysts instead of radiae, and cercariae with forked tails, but is peculiar in having separate males and females. There are around 20 species of schistosomes of which three are major pathogens of humans. These three are *Schistosoma mansoni, Schistosoma japonicum* and *Schistosoma haemotobium.* These three species of schistosoma are morphologically and geographically distinct but

share similar life cycle, transmission methods and general disease manifestations. (Talaro and Talaro 2016).

Schistosoma haematobium mainly affects the urogenital system and classically presents with haematuria which can later lead to dysuria. The late effects of *S. haematobium* include contraction of the bladder, obstructive uropathy from involvement of the ureter and 'secondary bacterial infection. Cancer of the bladder is associated with chronic vesical schistosomiasis. *Schistosoma mansoni* and *S. iaponicum* mainly affect the bowel with secondary changes in the liver. Initially, the patient may present with weakness, tiredness, loss of weight, anorexia, dysenteric syrnptoms, abdominal, tenderness and hepatosplenomegaly. Late effects include progressive fibrosis of the liver and secondary portal hypertension. Infection with *S. japonicum* has been associated with lesions occasionally occur in the skin, brain, spinal cord and other sites. Pulmonary arteritis may lead to corpuimonate in severe long-standing schistosomiasis of all types. (Lucas and Glues, 2009).

Acute schistosomiasis caused most often by *S. japonicum* occurs between 2 to 6 weeks after exposure. The infected person experiences abrupt onset of abdominal pain, headache, malaise, chills, fever, myalgia, diarrhea and dry cough. Chronic infection with *S. mansohi* and *S. japönicum* begins 6 months to 3 or 4 years after infection and occur as diarrhea, abdominal pain, bloody stool, hepatomegaly or hepatosplenomegaly, and bleeding esophageal varices. In *Schistosoma haematobium* infection, chronic schistosomiasis occurs as terminal hematuria, urinary frequency, and urethral and bladder pain (Frenay and Mahoney, 2018).

The egg of *Schistosoma haematobium* is pale yellow brown, large and oval in shape, measuring about 145 x 551µm. It has a characteristic small spine at one and (terminal spine.). It contains a fully developed miracidium. A living egg (in fresh unpreserved urine) shows what is called flame cell movement i.e. flickering of the excretory flame cells. (Lucas and Glues, 2009). The miracidium is highly organized. it bears an anterior boring papilla from which arises a primitive digestive sac lying between two small penetration glands. There are in addition, two large unicellular penetration glands, a minute central nervous system and a well-developed excretory system. The posterior half of the miracidium is occupied by a mass of germ-cells. The cercaria measures 400 pm in length including tail, by 80 pm in breadth and is also highly organized. It consists of an anterior, somewhat oval, body, and a tail-stem of about the same length, which bifurcates terminally. In the cercariae of the human schistosomes, the tail fork measures less than half the length of the tail stem. Urinary schistosomiasis caused by *S. haematobium* is endemic in many of Africa mainly countries among school age children (Eltagi *et al.*, 2020)

Adult schistosoma are dieocious, the male bearing the female in a ventral canal, the gynecophoric canal and secondly, they live in the blood stream of warm-blooded hosts, being the only trematodes to do so. The portal system which carries intestinal breakdown products from the duodenum is rich in glucose and amino acids; so that together with the protein available in the plasma and blood cells, it would represent an environment of a level sufficient to satisfy the metabolic demands of an egg producing trematode. The male is actually flat but has the side of the body rolled ventrally to form a gynecophonic canal bearing the long narrow body of the female. The cuticle of the male is covered with minute papillae. In the female, these only occur at the anterior and posterior ends, the middle region being mainly held in the gynecophoric canal of the male. Oral and ventral suckers are present, the latter being longer and more muscular in the male than the female and serve to maintain the position of the worms within the blood vessels against the circulation current. The alimentary canal is unusual in that the paired intestinal caeca rejoined into the middle of the body to continue as a single

unwinding tube ending blindly posteriorly. The nervous, muscular and excretory systems present no unusual features. All the usual trematode genitalia are present except for the lack of a muscular cirrus (Colley *et al.,* 2014). There are 6-9 testes in male with efferent duct leading to a vas deferens which swell to form a seminal vesicle opening by a non-muscular cirrus tube into the genital pore situated just posterior to the ventral sucker. In female, the vitellaria occupy the posterior part of the body and alternate on either side of a single med Ian vitelline duct. The latter leads into a well-developed ecotype with which the uterus and oviduct bear the usual relationship. The proximal part of the oviduct acts as a receptaculum seminis. (WHO, 2023). In most schistosomes, the male and female seem to remain permanently wedded and monogamous, the uncoupled female remaining spinsters, but in *S. mansons,* the union is of more companionate nature. The male schistosome is usually about 8 to 16 mm long. The female is longer and more slender (*Colley et al.*, 2014).

This study was carried out:

- ❖ to determine the present status of *Schistosoma haematobium* infection among students in tertiary institution
- ❖ to see if there is any relationship between the presence of blood, or protein in urine and schistosomiasis.
- ❖ to know whether the pH of the urine was affected by the disease.

MATERIALS AND METHODS

STUDY AREA

This research was carried out at the Mini-campus of the Federal Polytechnic, Offa, a tertiary institution founded over 30 years ago located along Oshogbo Express way. The study took place between May to June 2024. Students were selected from Science Laboratory Technology (S.L.T) department of the school of science and technology.

COLLECTION OF SAMPLES

One hundred and fifty urine samples were collected among the students of Science Laboratory Technology Department. Vials and centrifuge tubes were washed and dried in the oven. A vial was handed to each student, on the day of urine collection. Collection was done between 10:00 and 14:00 hours. A record was taken of the age, class and sex. About 25-40 samples were collected on each of the sampling days as described by Gryseels *et al.* (2006)

ANALYSIS

Fresh urine samples were taken to the Microbiology Laboratory in the department of Biological Sciences immediately for analysis. The appearance of each urine sample was noted and recorded. The Medi-Test Combi 9 test strips manufactured by Macherey-Nagel Company in France were used to rapidly detect the presence of blood, protein and pH of each urine sample. The test strip was dipped in urine sample five one seconds and withdrawn across the rim of the container to remove excess urine. After 30-60 seconds, the colour of the test strip was compared with the colour scale at the side of the test strip can. The results were recorded for each sample as described by Eltagi *et al* (2020).

Each urine sample was mixed and 10ml was poured into a centrifuge tube. The sample was spun at 2,000 r.p.m. for 5 minutes. The supernatant of each sample was decanted and a. drop of the sediment at the bottom of the tube was placed on a clean dry slide. The slide was covered with a cover slip and examined under the microscope using x10 objective lens to detect the presence of egg as described by McMannus *et al.* (2018).

RESULTS

Out of the total 150 urine samples examined, 4 (2.67%) students were found with the eggs of *S. haematobium* in their urine during the period of the study. Three (3) of the infected urine were from the batch of 46 students sampled in ND I class while one (1) was from the batch of 57 students sampled in ND II. The HND I and HND II classes were observed to be free of *Schistosoma haematobium* as shown in Table 1. This result corroborates with the findings of Colley *et al.* (2014).

The presence of blood was detected in 10 (6.7%) samples of urine examined during the course of this study. HND II and HND I had 4, 1, 3 cases respectively while 2, samples of urine were detected to contain blood. In all the urine samples with traces blood were detected in female students as shown in Table 2. McMannus *et al.* (2018) equally detected blood in the urine sample of people suffering from schistosomiasis which conformed with these findings. The urine samples from 9 students were found to contain protein. Two (2) out of these cases were from ND I class. Students sampled from ND II and HND II classes had 3 samples each with presence of protein in their urine while HND I class had 1 sample containing protein as shown in Table 3 this finding corroborates with the findings of Gryseels *et al.* (2006) where protein was detected in urine samples.

The pH of 150 urine samples examined ranged from 5-8. Seventy-six (76) representing 50.67% of the students had urine with pH value between 5 and 6 while 74 (49.33%) had urine with pH value of 7-8 as revealed in Table 4 this result corroborates with the finding of Fremay and Mahoney (2018) where the urine samples were confirmed to have pH ranged from 5-9. The colour of the urine samples examined ranged from amber, pale yellow, to deep yellow. A total of 23 (15.33%) of the students had amber urine while 49 (32.67%) and 78 (52.0%) respectively had pale and deep yellow as shown in Table5.

Table 1: Prevalence of *Schistosoma haematobium* eggs in Urine Samples from students of Science Laboratory Technology Department, Federal Polytechnic, Offa.

Classes	Total No. of Students examined	No. of Infected Students		Total No. of Infected Students	% of Infected Students
		MALE	FEMALE		
ND I	46	2	1	3	2.0%
ND II	57	1	-	1	0.67$
HND I	22	-	-	-	-
HND II	25	-	-	-	-
TOTAL	**150**	**3**	**1**	**4**	**2.67%**

Table 2: Presence of Blood in urine samples from students of Science Laboratory Technology Department, Federal Polytechnic, Offa.

Classes	Total No. of Students examined	Total No. of Students with Blood in Urine	No. of Students with Blood in Urine		% of Students with Blood
			Male	Female	
ND I	46	2	-	2	1.33%
ND II	57	3	-	3	1.99%
HND I	22	1	-	1	0.67%%
HND II	25	4	-	4	2.27%
TOTAL	**150**	**10**	**-**	**10**	**6.7%**

Table 3: Presence of Protein in Urine samples from students of Science Laboratory Technology Department, Federal Polytechnic, Offa.

Classes	Total No. of Students examined	Total No. of Students with Protein	No. of Students with Protein		% of Students with Protein
			Male	Female	
ND I	46	2	-	2	1.33%
ND II	57	3	1	2	2.0%
HND I	22	1	1	-	0.67%
HND II	25	3	-	3	2.0%
TOTAL	**150**	**9**	**2**	**7**	**6.0%**

Table 4: The pH Range of Urine samples from students of Science Laboratory Technology Department, Federal Polytechnic, Offa.

Classes	Total No. of Students examined	Total No. of Students with 5-6 Range	No of % Students with 7-8 Range
ND I	46	25	21
ND II	57	32	25
HND I	22	11	18
HND II	25	8	10
TOTAL	**150**	**76**	**74**

Table 5: Colour of Urine samples from students of Science Laboratory Technology Department, Federal Polytechnic, Offa.

Classes	Total No. of Students examined	No. of Urine Samples with Pale Yellow	No. of Sample with Deep Yellow	No. of Urine Samples with Amber
ND I	46	12	27	7
ND II	57	10	38	9
HND I	22	8	10	4
HND II	25	19	3	3
TOTAL	**150**	**49**	**78**	**23**

CONCLUSION

Urinary schistosomiasis is an infectious disease among school age children that usually in contact with the stream with the intermediate snail host but it seemed that the prevalence of *Schistosomia haematobium* infection among students in Tertiary Institution was low because of their water contact pattern as they are mainly adults. The blood detected had no relation with the infection since the female students with traces of blood in urine had record of menstrual cycle activities but were not having schistosomiasis.

REFERENCES

Colley, D.G., Bustinduy, A.l., Secor, W.E. and King, C.H. (2014). Human schistosomiasis. *The Lancet*, 383(9936), 2253-2264. https//dol.org/1016/So140-8736(13)619449-2

Dulbecco, R., Paul J and Brindley, G. (2017) *Encyclopedia of Human Biology,* Vol. 7, Academic Press London, 2nd edition pg 697-702.

Eltagi, A., Adnan, M. and Babiker, M. (2020), prevalence of *S. haematobium* infection among students at Al-Agali Islamic complex in AL-Kalakela area, Khartoum state-Sudan

ISSN: 2992-3727 Published 30th November, 2025

International Journal of Community Medicine and Public health 7 (10): 3796 Doi: 1018203/2394-6040

Frenay, A.C. and Mahoney, R.M. (2018) *Understanding Medical Terminology* WUB/MC Graw-Hill Company Inc., 10th edition pg 420.

Gryseels, B., Polman, K., Clerinx, J. and Kestens, L. (2006). Human Schistosomiasis. *The Lancet.* 368(9541), 1106-1118.https//doi.org/10.1016/S0140-6736(06)69440-3

Lucas, A.O. and Gilles, H.M. (2009), *A New Short Text Book of Preventive Medicine for the Tropics.* Edward Arnold Publishers pg. 127-136.

McManus, D.P., Dunne, D.W., Sacho, M., Utzinger, J., Vennervald, B.J. and Zhou, X.N. (2018). Schistosomiasis *Nature Reviews Disease Primers*, 4 Article 13. https//doi.org/ 10.1038/s41572-018-0013-1.

Talaro, K. and Talaro, A. (2016) *Foundation in Biology* McGraw-Hill Company Inc. New York pg 73.

World Health Organization (2023). Schistosomiasis. Retrieved from www.who.int/news-room/fact-sheets/detail/schistosomiasis.