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RESEARCH ARTICLE

PREVALENCE OF URINARY SCHISTOSOMIASIS AMONG PRIMARY SCHOOL CHILDREN IN A NORTHERN NIGERIAN POPULATION

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Abstract

The study was carried out to determine the prevalence of *Schistosoma haematobium* among primary school pupil in Keffi Local Government Area of Nasarawa State, Nigeria. A total of 360 urine samples were collected. Samples were investigated using standard World Health Organization guidelines for identification of parasite and they were analyzed macroscopically and microscopically. Out of the 360 children screened, Yelwa Primary School had a prevalence rate of 2%, ECWA Transfer Primary School had a prevalence rate of 8%, Majema Primary School had a prevalence rate of 15%, Baptist Primary School had a prevalence rate of 10%, Kofar Hausa Primary School had a prevalence rate of 12% and Saint Williams Primary School had a prevalence rate of 6% while the overall prevalence of *Schistosoma haematobium* in the six schools is 53%.There was no significant difference in the prevalence rate between the six primary schools (P>0.05) Children of age group (5-8year) were more infected with urinary schistosoma. Male had higher prevalence of *Schistosoma haematobium* (34%) than the female (19%). statistically there was significant different in prevalence infection of *Schistosoma haematobium* among males and females investigated. Children whose parents are farmers and fishermen had the highest prevalence infection, followed by Artisan, Civil servant and the Businessmen respectively. However, the overall total pupils infected is 88% and uninfected 511%. Conclusively, School based treatment campaign and health education should be encouraged in ensuring the prevention and control of the disease in Nigeria.

INTRODUCTION

Schistosomiasis also known as Bilharziasis is a parasitic disease caused by several species of parasitic trematodes (fluke of the genus Schistosoma***)***[1]. It is the second to malaria in human impact among tropical diseases and the third after malaria and intestinal helminthiasis a global parasitism[2,3]. It is the most devastating prevalent parasitic disease due to morbidity and mortality rates in developing countries in Africa, South America, the Caribbean, Middle East and Asia [4,5,6,13].

Urinary Schistosomiasis is often chronic and can cause pain, secondary infections, kidney damage and even cancer[7]. It has been infecting humans for at least 4000 years and had its own specific hieroglyph in ancient Egyptian[8]. In the time before treatments were widely available, it was still so prevalent in Egypt that boys were traditionally expected to go through a “male menarche” sometimes during adolescence, it was normal for them to urinate blood [14,26].

Schistosomiasis occurs in most parts of the tropics and subtropics, affecting some 200 million persons and is most prevalent in sub-Saharan Africa [3,15]. It was also observed by Alam and Okwori, 2012 that highly disease endemic areas, prevalence rates can exceed 50% among the local population and high rates have been reported among expatriates living in such areas and even among short term travellers to these areas[15,16]. The distribution of the diseases is focal and often restricted to areas with peculiar ecology which favours its transmission[17].

Schistosoma haematobium, the focus of the study is a very serious environmental health problem in many tropical and sub-tropical countries with school age children usually being the most affected group [18,19,42]. S*chistosoma haematobium* attributes to inflammation of the genital which normally facilitate the propagation of Human Immunodeficiency Virus (HIV)[20,21,21]. Studies have shown the relationship between *S. haematobium* infection and the development of squamous cell carcinoma of the bladder [19,22,23].

Methods to prevent the disease include improving access to clean water and reducing the number of snails[24,25]. In areas where the disease is common entire groups may be treated all at once and yearly with the medication Praziquantel[26]. This is done to decrease the number of people infected and therefore decrease the spread of the disease[26,27]. Praziquantel is also the treatment recommended by the World health Organization (W.H.O) for those who are known to be infected[51,52].

In Nigeria, the prevalence of Urinary Schistosomiasis in both rural – urban communities is within 2% and 90% and occurring more among the poor and marginalized group [29,30,35]. Radiological imaging modalities such as pelvic ultrasonography with emphasis on urinary bladder is useful and recommended in the diagnosis of schistosomiasis. Features such as bladder wall thickness, low level mobile internal echoes, trabecculation, polyps can be seen on ultrasound scan .

The aim of this study is to determine the prevalence of Urinary Schistosomiasis among school children in Keffi Local Government Area of Nasarawa State.

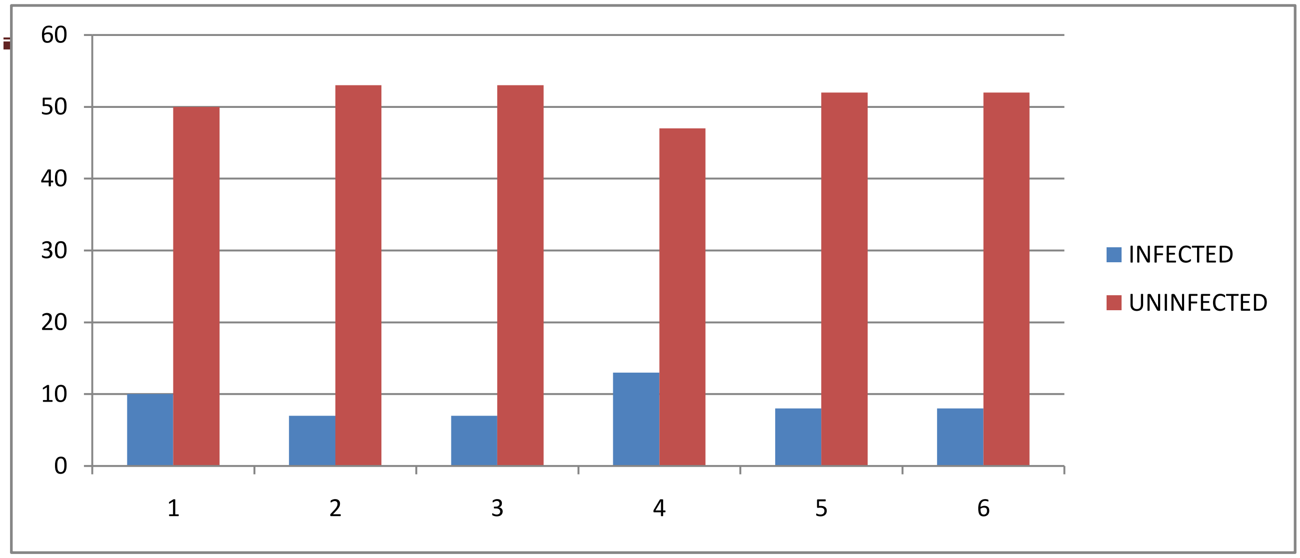
III METHODOLOGY

The study was conducted in Keffi and its environs of Nasarawa State, Nigeria..The study population comprises of children who were five (5) to twelve (12) years old in 6 different schools at Keffi and its environs who agreed to participate in the study from a period of June through August 2014. Their age and sex were obtained using oral interviews in the study population.

Before the commencement of the research work, ethical approval was taken from the Nasarawa State Ministry of Health through the Director Public Health. Meeting was held with community heads and Parent Teachers' Association (PTA) of the schools. At these meetings consent were obtained directly from the parents, teachers as well as the children before the collection of samples.

About 360 urine samples were randomly collected from the pupils in some selected schools from primary 1 – 6. Selection of these schools was based on the high prevalence of Schistosomiasis in the study area. Each pupil was given a clean well labelled specimen container for early morning urine sample and was transported using a cold box to the laboratory department of School of Health Technology, Keffi for processing. Oral questions were asked to each pupil for demographic information and source of drinking water. The standard examination and urine microscopy method were used to detect *Schistosoma haematobium* according to Cheesbrough procedure[34,35]. Urine sample was transferred into a glass test tube and spun for 3,000 rpm for 5 minutes. Deposit was examined for presence of parasite. Urine samples were processed using filtration and sedimentation methods. 10 ml of well mixed urine was transferred into a centrifuge tube, urinalysis strip (medi – test combi 9) was inserted and removed immediately, the strip was matched with the standard on the container for the presence of blood and protein. The urine was spun for 5 minutes at 3,000 rpm to sediment the Schistosome eggs, and the supernatant fluid was discarded and the bottom of the tube was gently tapped to mix the sediment. A drop of the sediment was put on a clean grease free slide, covered with cover slip and examined using x10 and x40 objectives lens of the microscope. The number of eggs on the entire slide was counted. Number of eggs counted were recorded as number of eggs/10ml of urine and recorded as:Low infection: $<$ 50 eggs /10ml of urine. Heavy infection: $\geq$ 50 eggs /10ml of urine.The macroscopic haematuria was noted and recorded. The presence of haematuria and proteinuria were confined using medi -test strip (Combi 9) and concentration was recorded as (+), (++), (+++) respectively.

Urine Filtration method was also used for detecting and quantifying *Schistosoma haematobium* eggs in the urine samples. A blunt ended forceps was used to carefully place a filter on the filter support of the filter holder, the filter holder was re-assembled and attached to the end of a 10ml luer syringe, the plunger was removed from the syringe, the syringe was filled to the 10ml mark with well mixed urine, and the plunger was replaced. Holding the syringe over a beaker or other suitable container, the urine was slowly passed through the filter; the filter holder was removed and unscrewed. The filter was carefully removed using a blunt forceps and transferred face upwards (eggs



on surface) to a clean. slide. A drop of physiological saline was added and it was covered with a cover slip and examined with x10 and x40 objectives of microscope systematically the entire filter for *S. haematobium* eggs. Numbers of eggs counted were recorded as low infection: < 50 eggs /10ml of urine, heavy infection: ≥ 50 eggs /10ml of urine.

The data gathered were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 and Chi-square will be used to determine the prevalence rate of Urinary Schistosomiasis among School Children with the studied risk factors at P value ($P \leq 0.05$).

IV RESULTS

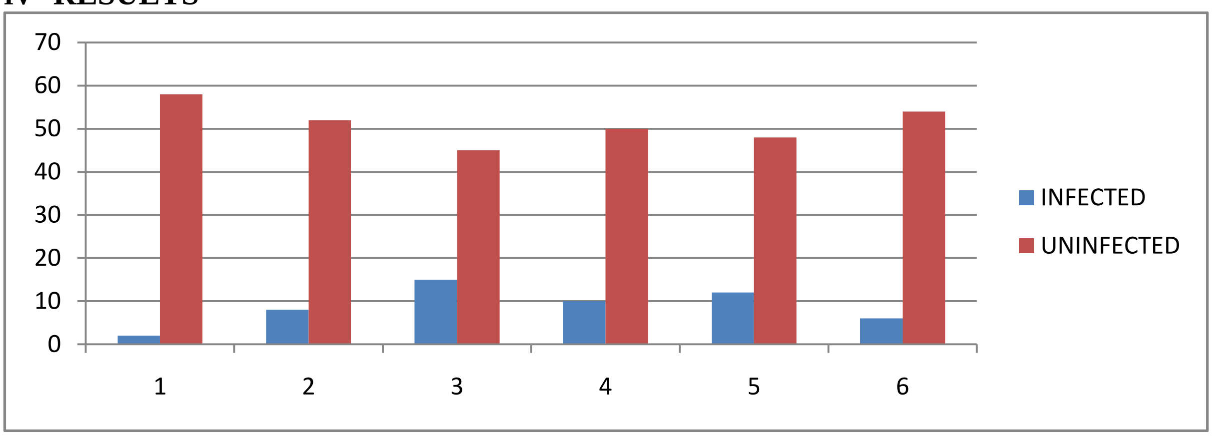


Figure 1: Histogram Showing the Prevalence of *S. haematobium* Infection in the Schools Investigated.

Figure 2: Histogram Showing the Prevalence of *S. haematobium* in Relation to Class of Pupils in different Schools.

Table 1: Showing the Prevalence rate of *S. haematobium* Infection in the Six Schools Investigated.

Schools	No. Examined (%)	No. Infected (%)	No. Uninfected (%)
Yelwa Primary Sch.	60	2(3.3)	58(96.7)
ECWA Transfer Primary Sch.	60	8(13.3)	52(86.7)
Majema Primary Sch.	60	15(25.0)	45(75.0)
Baptist Primary Sch.	60	10(16.7)	50(83.3)
Kofar-Hausa Primary Sch.	60	12(20.0)	48(80.0)
St. Williams Primary Sch.	60	6(10.0)	54(90.0)
Total	**360**	**53(88.3)**	**307(511.7)**

Table 2: Prevalence of *S. haematobium* in Relation to Class of Pupils in different Schools.

Schools	No. Examined (%)	No. Infected (%)	No. Uninfected (%)
1	60	10(16.7)	50(83.3)
2	60	7(11.7)	53(88.3)
3	60	7(11.7)	53(88.3)
4	60	13(21.7)	47(78.3)
5	60	8(13.3)	52(86.7)
6	60	8(13.3)	52(86.7)
Total	**360**	**53(88.4)**	**307(511.6)**

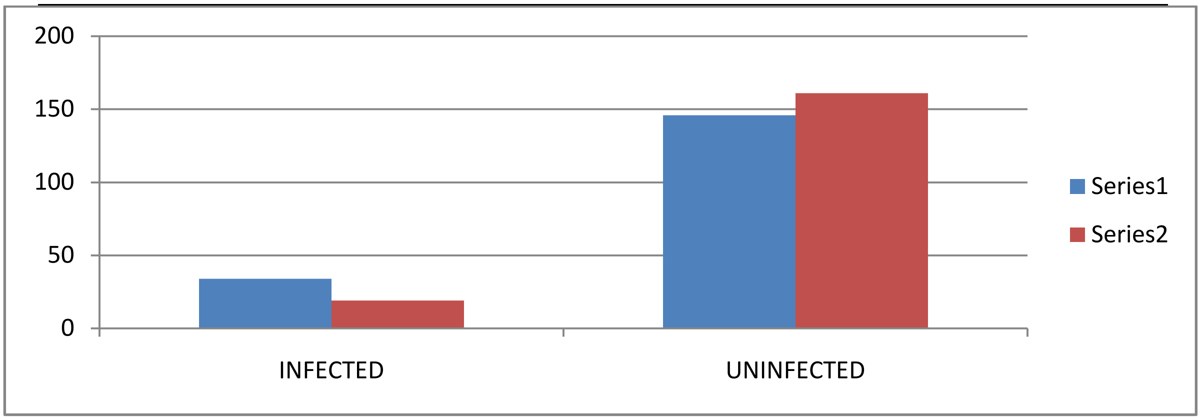


Figure 3: Histogram Showing the Prevalence of *S. haematobium* in Relation to sex distribution among School children

Table 3: Prevalence of *S. haematobium* in Relation to Sex Distribution among School Children.

Sex	No. Examined (%)	No. Infected (%)	No. Uninfected (%)	Chi – square value X^2	P value
Male	180	34(18.9)	146(81.1)	4.98	0.0256
Female	180	19(10.6)	161(89.4)		
Total	**360**	**53(29.5)**	**307(170.5)**	**Df = 1**	

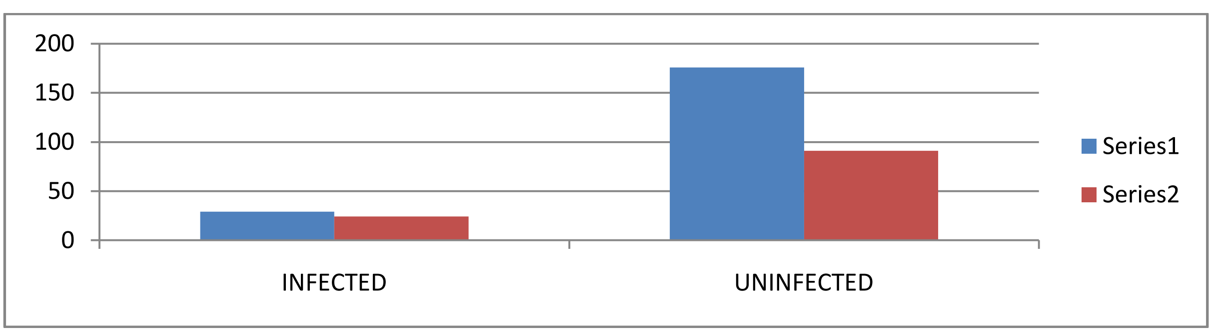


Figure 4: Histogram Showing the Prevalence of *S. haematobium* in Relation to age Distribution among the School Children

Table 4: Prevalence of *S. haematobium* in Relation to Age Distribution among the School Children.

Age (yrs)	No. Examined (%)	No. Infected (%)	No. Uninfected (%)	Chi-square Value X^2	P value
5 – 8	225	29(14.2)	196(85.8)	1.6063	0.4478
9 – 12	135	24(20.9)	111(79.1)		
Total	**360**	**53(35.1)**	**307(164.9)**	**Df = 1**	

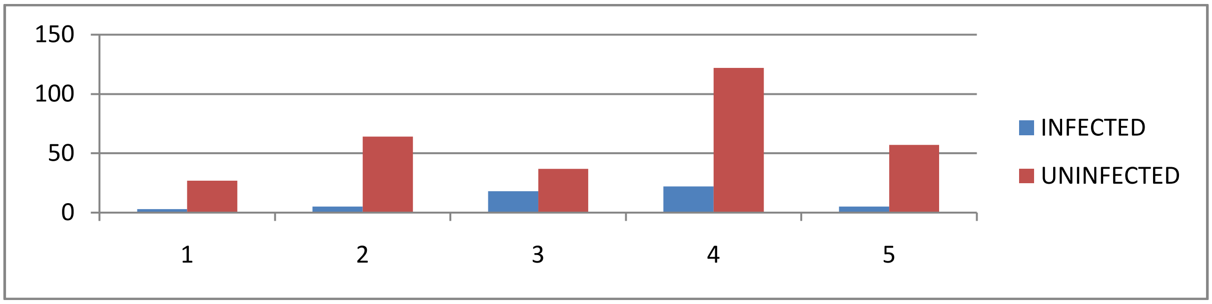


Figure 5: Histogram Showing the Prevalence of *S. haematobium* in Relation to Occupation of Parents among the School Pupils.

Table 5: Prevalence of *S. haematobium* in Relation to Occupation of Parents among the School Pupils.

Occupation	No. Examined (%)	No. Infected (%)	No. Uninfected (%)	Chi –square value X^2	P value
Civil Servants	30	3(10)	27(90.0)	20.0305	0.003
Artisans	69	5(7.3)	64(92.7)		
Fishing	55	18(32.7)	37(67.3)		
	144	22(15.3)	122(84.7)		
Farmers	62	5(8.1)	57(91.9)		
Businessmen					
Total	**360**	**53(35.1)**	**307(164.9)**		**Df = 4**

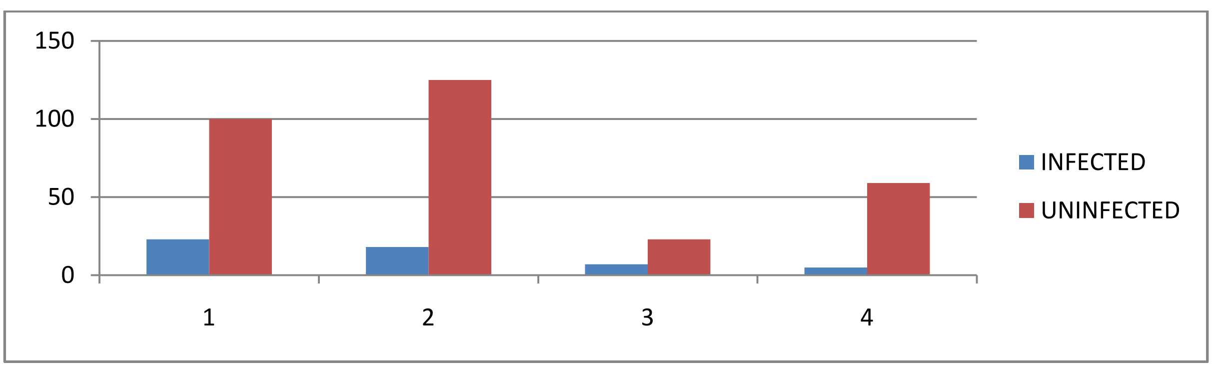


Figure 6: Histogram Showing the Prevalence of *S. haematobium* in Relation to Sources of Drinking Water among the School Children.

Table 6: Showing Prevalence of *S. haematobium* in Relation to Sources of Drinking Water among the School Children.

Sources of Drinking water	No. Examined (%)	No. Infected (%)	No. Uninfected (%)	Chi-square value X^2	P value
Streams	123	23(18.7)	100(81.3)	6.27	0.0909
Well	143	18(12.6)	125(87.4.7)		
Borehole	30	7(23.3)	23(76.7)		
Tap	64	5(7.8)	59(92.2)		
Total	**360**	**53(62.4)**	**307(337.6)**		**Df = 3**

III DISCUSSION

This study showed that over 88% of school children were infected with *Schistosoma haematobium* and 511% were not infected in the schools investigated. There is low prevalence rate of the *Schistosoma haematobium among* the school children in Keffi Local Government Area of Nasarawa State. The low prevalence rate of the *Schistosoma haematobium* can be as a result of good school environment and proper medical sensitization of school children in various schools by health personnel and health teachers.

From the result, a sample of 360 subjects were examined, 88% were found infected with *Schistosoma haematobium* (Table 1) from the six areas investigated, subject from Yelwa Primary School had the prevalence rate of 3%, ECWA Transfer Primary School had the prevalence rate of 13%, Majema Primary School had the prevalence rate of 25%, Baptist Primary School had the prevalence rate of 16%, Kofar Hausa Primary School had the prevalence rate of 20% while Saint William Primary School had the prevalence rate of 10%.

The prevalence rate of *Schistosoma haematobium* among school children at baseline by sex and age group showed that males (18%) had the highest prevalence, while females (10%) had the least. Higher prevalence and intensity of infection among the males compare with females could be attributed to swimming activities engaged by males which exposed them to Cercariae infected water. The intensity was higher among males (18%) within the age bracket of 5 – 8 years (10%) while the intensity was low among the females (10%) that are within the age bracket of 5 – 8 years (20%) (Table 4).

However, there was no significant difference (p > 0.05) in the infection of *Schistosoma haematobium* between the occupation groups (Table 5). Children whose parents are fishermen and farmers have the highest rate of infection followed by Civil servants and Artisans.

The intensity was higher among males 18% and age bracket 5-8 and was low among females 10% and age bracket 5-8 years 20%. Which is in contrast with the earlier work [49]. There is no significance difference in prevalence of infection between the age group (p>0.05).

In relation to occupation, there is higher prevalence of *Schistosoma haematobium* in school children who engaged in fishing 32%, farming 15%, followed by civil servants and businessmen 8% and the artisans respectively in Keffi Local Government Area of Nasarawa State.

IV Conclusion

The study has identified Urinary Schistosoma as endemic in Keffi Local Government of Nasarawa State Nigeria, with a high prevalence rate of infection particularly among male teenagers. The lack of proper knowledge of the cause of the disease and insufficient safe water supply coupled with inadequate health care facilities may have influenced the infection rate and distribution of the disease in the area. There is need for health and hygienic education enlightenment in the rural areas, designed to discourage the contact of pupil with water source.

Prevalence of intestinal and urinary schistosoma among school children continues to be a major public health problem in tropical areas, especially Keffi Local Government of Nasarawa State. Although intestinal and urinary schistosoma is among the group of neglected tropical diseases that occur predominately in rural areas. The occurrence of intestinal and urinary tract schistosoma among school children causes chronic infection which can negatively affect the health, nutrition and learning of the children. Schistosoma infection during childhood cause substantial growth retardation and anaemia and also causes structural abnormalities of urinary tract.

V Recommendations

Based on the result of the study a number of possible policy recommendation that would enhance the preventives and control measure of *Schistosoma haematobium* can be made to the community and relevant stakeholders.

Provision of good and quality safe water source for the pupil and community, destruction of intermediate host snail vectors by trained professionals should be done at the commencement of raining season, pupil and households should practice good environmental health and sanitation, the government should embark on routine treatment of infected patients both at school and community level and screening of migrants from neighbouring border town should be encouraged before allowing them to settle down.

Also, there is need for government to provide adequate sanitary facilities and public enlightenment such as developing participatory health education programmes with community members to effect behavioural change by mothers who expose their children to *Schistosoma haematobium* infection. It also requires the involvement of the community in providing safe water sanitary facilities which would reduce contaminations of the reservoir. Children should be restricted from bathing or swimming in contaminated water bodies.

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