



A Survey of Urinary Schistosomiasis among Secondary School Students in Jalingo Town, Jalingo Local Government Area, Taraba State

Zakki Yula Hosea¹, Liamngee Kator^{1*} and Jacob John Geraji¹

¹*Department of Biological Sciences, Benue State University, Makurdi, Nigeria.*

Author's contributions

This work was carried out in collaboration among all authors. Author ZYH designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors LK and JJG managed the analyses of the study. Author JJG managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

This study was carried out to determine the prevalence of urinary Schistosomiasis among secondary school students in Jalingo town, Jalingo local government area, Nigeria. Ordinary centrifugal sedimentation technique was used and the deposits were examined microscopically. Data collected were analyzed using chi square. Out of the 200 samples examined, 37 (18.5%) had infection, with no significant difference ($p > 0.05$) in infection rates between males (21.1%) and females (15.1%). Among the two schools sampled School A had the highest prevalence (22.0%) followed by School B (15.0%) with no significant difference ($p > 0.05$). Children aged 9-12 years (60.0%) were more infected than those aged 19-21 (13.0%) ($p < 0.05$). There was a close relationship between haematuria and positive urine samples as 72.7% of the students tested positive excreted blood in their urine ($p < 0.05$). Major risk factors were poor hygiene, ignorance and poverty. The results of this study show that secondary school students harbor infection and are a source of transmission of Schistosomiasis in the study area. Planning and provision of drugs for

*Corresponding author: Email: katorliamgee@gmail.com;

treatment should be considered in disease prevention and control programmes. Community participatory health education should be encouraged as the first step in reducing infection and transmission of the disease.

Keywords: Schistosomiasis; students; infection; prevalence; risk factors.

1. INTRODUCTION

Schistosomiasis is a tropical and subtropical disease caused by infection with fresh water parasitic worms. It is also known as Bilharzia or snail fever as it relates to flatworms called schistosomes which are digenetic blood Trematodes. Urinary Schistosomiasis is a waterborne parasitic infection caused by several species of Trematodes (Platyhelminth infection, or flukes), a parasitic worm of the genus *Schistosoma* [1]. According to World Health Organization, Schistosomiasis remains an important public health problem globally with an estimated 249 million infected cases reported each year occurring in 779 million people worldwide with the vast population occurring in sub-Saharan Africa where with about estimated 224 million suffer the malignant effects of the disease with an estimated 280,000 death toll every year mostly among the rural inhabitants [2]. Bamgbola [3] also affirms that Schistosomiasis is a major neglected tropical disease that afflicts more than 240 million people including many children and young adults, in the tropic and subtropics. This disease is characterized by chronic infections with significant residual morbidity and is of considerable public health importance, with substantial socio-economic impacts on impoverished communities. It is one of the most prevalent, though neglected Tropical infectious diseases [4]. Schistosomiasis is spreading among poor people in under-developed and developing countries who have no access to proper healthcare or effective preventive measures. The occurrence of the disease is particularly linked to agricultural and water development schemes such as lakes streams, rivers and ponds. Infection is predominantly among individuals who use such water for various domestic purposes. Children that swim in contaminated pools and rivers are at high risk because of their prolonged and complete body exposure in water. Because of these, more research need to be done in order to create awareness on the dangers of being infected with Schistosomiasis. Nigeria as a country is severely affected by Schistosomiasis [5]. Unfortunately, control programmes have had minimal effect on

the overall elimination of Schistosomiasis. Data and resources are scarce, and it is uncertain when reliable control can be achieved.

2. MATERIALS AND METHODS

2.1 Study Area

Jalingo is the capital of Taraba, State, North-East Nigeria. It was created in 1991 from the southwestern half of former Gongola state. Jalingo is located on 8.89 latitude and 11.36 longitudes and it is situated at elevation 349 meters above sea level. Jalingo has a population of 117,757 making it the biggest city in Taraba.

2.2 Study Population

The study population was students from secondary schools in Jalingo town, of Taraba state, Nigeria. The sample size of the population was 200 students of which 114 were males and 86 were females.

2.3 Sample Collection

The study was cross-sectional. A total of 200 urine samples were collected and examined within the period of March, 2019. Each urine sample was collected in a 20ml capacity wide mouthed leak proof universal containers between 10 hours and 14 hours (10am and 12pm) as described by Cheesbrough [6] and immediately moved to the laboratory for analysis.

2.4 Microscopic Examination

Microscopic examination of the urine samples were performed at microbiological laboratory of the UMCN Hospital, Jalingo Taraba state-Nigeria using the sedimentation method as described in Cheesbrough, [6]. Urine deposits (sediments) were examined under a light microscope using 10X and 40X objectives. The procedures for the urine examination were as follows:

1. The urine specimens were thoroughly agitated. 10 ml of each sample taken was centrifuged at 3000 rpm for 5 minutes;

2. The supernatant was discarded and the whole sediment was transferred to a clean slide and covered with the cover slip;
3. The entire sediment was examined under the microscope using X10 objective lens with the condenser iris closed sufficiently to give good contrast;
4. The results were recorded as egg/10ml urine according to age and sex;
5. The results were interpreted according to Cheesbrough [6], for urine sample.

2.5 Data Analysis

The data obtained were analyzed using chi-square at 5% level of significance.

3. RESULTS

A total of 200 secondary school students were sampled and examined in Jalingo town; 100 from school A and 100 from school B.

Out of the total population examined, 114 were males and 86 were females, of which the males had the highest prevalence rate of 24 (21.1%) followed by the females with a prevalence rate of 13 (15.1%) as shown in Table 1 and there was no significant difference between the rate of infection and the sexes ($\chi^2=1.06$, $p=0.30$).

Table 1. Prevalence of urinary schistosomiasis among students in relation to sex

Sex	Number examined	Number positive (%)
Male	114	24 (21.1)
Female	86	13 (15.1)
Total	200	37 (18.5)

$\chi^2=1.06$; $P=0.30$

Among the two secondary schools surveyed, school A had the highest prevalence rate of 22 (22.0%) while school B recorded a prevalence rate of 15 (15.0%) as shown in Table 2. There was no significant difference between the two schools sampled ($\chi^2=1.63$, $p=0.20$).

The study population was divided into four age groups: 9-12, 13-15, 16-18, and 19-21 years. Significantly higher infection rates were recorded among children aged 9–12 years (60.0%) and

significantly lower infection rates in those 19-21 years (13.0%) (Table 3) ($\chi^2 = 12.63$, $p=0.006$).

Table 2. Prevalence of urinary schistosomiasis among students in relation to schools

School	Number examined	Number positive (%)
School A	100	22 (22.0)
School B	100	15 (15.0)
Total	200	37 (18.5)

$\chi^2=1.63$; $P=0.20$

Out of the 200 examined, 37 (18.5%) were tested to be positive for urinary Schistosomiasis for those who swim in water (Table 4). Out of the 72 students who swim in water, 18(25.0%) were positive and this was significantly higher than 19(14.8%) for the 128 students who did not swim in water but were positive for Schistosoma (Table 4) ($\chi^2 = 3.15$; $p=0.08$).

Out of the 200 students examined, 37(100%) showed macroscopic haematuria which was significantly higher than the 163 (0.00%) who showed no macroscopic haematuria in the urine (Table 5) ($\chi^2 = 200.0$; $p=0.000$).

Table 3. Prevalence of urinary schistosomiasis among students in relation to age groups

Age group	Number examined	Number positive (%)
9-12	10	6 (60.0)
13-15	99	15 (15.2)
16-18	68	13 (19.1)
18-21	23	3 (13.0)
Total	200	37 (18.5)

$\chi^2=12.63$; $P=0.006$

Table 4. Prevalence of urinary schistosomiasis among students in relation to swimming or bathing in standing water

Swimming in water	Number examined	Number positive (%)
Yes	72	18 (25.0)
No	128	19 (14.8)
Total	200	37 (18.5)

$\chi^2=3.15$; $P=0.08$

Table 5. Prevalence of urinary schistosomiasis among students in relation to the macroscopic haematuria

Visible haematuria	Number examined	Number positive (%)
Haematuria	37	37 (100.0)
No haematuria	163	0 (0.0)
Total	200	37 (18.5)

$\chi^2=200.0; P=0.000$

4. DISCUSSION

From the findings, urinary Schistosomiasis infection had an overall prevalence of 18.5% among students attending two secondary schools in Jalingo town, Jalingo Local Government Areas, Taraba State, North-East Nigeria. This result is similar to a research done in Bomo Village Zaria-Nigeria carried out by Raji et al. [7] who reported prevalence rate of 19.5% and higher than a prevalence rate of 13% recorded in Nkhotakota district, Malawi [8]. The differences in the prevalence could be attributed to the variation in risk factors in the areas. However, Nwosu et al. [9] recorded a prevalence rate of 17.5% in Ebonyi State which correlates with the result obtained in this research. Schistosomiasis infection level in the present study was significantly higher than findings in other parts of the state, 10.1% and 15.5% in Gashaka and Bali Local Government Areas respectively [10,11]. This may be due to the presence of contaminated water bodies which predisposes individuals to infection, untreated sources of drinking water and length of contact of the individuals with contaminated water bodies in the study area compared to the mentioned sites.

There was no significant difference between both sexes even though the male had higher prevalence rate than the females; 24% and 13% respectively. This result corresponds to those reported by Nwosu et al. [9]. However, this is in contrast with the result reported by Dawaki et al. [12] among Hausa communities in Kano State, Nigeria, in which the infection rate was significantly higher among males than females (20.6% and 13.3% respectively). It also differs to those described in other West African countries where the males are significantly infected than females [13]. The differences might be due to variation in cultural activities. In the far North, men are busy with farming activities while the females don't participate actively but in Taraba state, both males and females participate actively (both dry and rainy season farming) including

fishing. The results obtained from this study indicate that both genders are equally exposed to infection through water contact.

In this studies, ages 9-12 had the highest infection rate of 60% as compared to other age groups: This is statistically significant and is in line with the finding of Naphtali [5] in Adamawa State, north-east Nigerian and also in agreement with other studies who reported similar results in Ebonyi State-Nigeria and region of Fatick-Senegal among similar age groups with prevalence rate of 24% and 56% respectively [9,13]. Anzaka [2] reported a similar result in Wowyen community. This peak in incidence recorded in early adolescence may be as result of frequent contact (swimming) in contaminated water bodies. Bangbola, [3] reports that apart from exposure, the capacity to resist new infection by eosinophil secretion of antigen specific immunoglobulin (IgE) is age dependent.

The prevalence of urinary schistosomiasis in relation to visible haematuria was statistically significant. This is in agreement with other studies who reported that visible haematuria is a major characteristic of Schistosoma infection [14] as individuals who are infected tend to urinate blood. It was also observed that subjects which showed visible haematuria in their urine samples tested positive for schistosomiasis infection. This concurs with the observations of Mbata et al., [15] and Adeyeba and Ojeaga [16]. The prevalence could be attributed to the personal hygiene exhibited by students of such age groups and incessant contact with contaminated water bodies which predisposes them to infection. Poor sanitary environment, indiscriminate waste disposal, poverty and inadequate health education/sensitization on the dangers and risk factors of the disease [17].

5. CONCLUSION

This survey reveals a moderate prevalence of urinary schistosomiasis among secondary school students in Jalingo town, Jalingo Local Government Area of Taraba State, Nigeria. There is a tendency of the infection to increase in the study area if the factors responsible for the transmission of the disease are not eliminated even though the infection rate appears considerably low.

6. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made;

1. Community participatory health education should be encouraged as the first step in reducing infection and transmission of the disease.
2. Planning and provision of drugs for treatment should be considered in
3. Disease prevention and control programmes.

CONSENT AND ETHICAL APPROVAL

A pre-survey visit was made to the two schools selected at random; subjects were enrolled from both schools. Prior to the collection of urine samples, all the school principals were contacted for permission, cooperation and necessary briefing regarding the purpose and relevance of the exercise while a letter seeking permission and parental consent were distributed to students and only those whose parents agreed were enrolled in this study. Also, an introduction from the Department of Biological Sciences, Benue State University was given to the UMCN Hospital where the samples were taken for microbiological examination.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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