Original Research Article

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

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. 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 GSSJ had the highest prevalence (22.0%) followed by GCJ (15.0%) with no significant difference (P>0.05). There was higher infection in age group 9-12 years (60.0%), while students in age group 19-21 years had least infection rates (13.0%). Prevalence of infection based on age were statistically significant when subjected to chi-square (P<0.05).There was a close relationship between haematuria and positive urine samples as 72.7 % of the students who tested positive urinate blood (P<0.05). Major risk factors were poor hygiene behaviour, ignorance and poverty. Community participatory health education is needed in this community as a first step in reducing infection and transmission of the disease. The results of this study have shown that secondary school students also harbor infection and are a source of transmission of Schistosomiasis in the study area. Planning and provision for their treatment should be considered in prevention and control programmes.

Keywords: Schistosomiasis, School, Infection, Prevalence, Risk factor.

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 related to flatworms called schistosomes which are digenetic blood Trematodes. Urinary Schistosomiasis is a waterborne parasitic infection caused by several species of Trematodes (Platyhelminthes 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. Bamgbola [2] 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 considerate public health importance, with substantial socio-economic impacts on impoverished communities. It is one of the most prevalent, though neglected Tropical infectious diseases [3]. Schistosomiasis is widely 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, research needs to be done effectively in order to create awareness to various individuals on the danger of being infected with Schistosomiasis. Nigeria as a country is severely affected by Schistosomiasis. 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. It operates on the WAT time zone. Taraba is bordered on the north by Bauchi and Gombe states, on the east by Adamawa state, on the south by Cameroon, and on the west by Benue, Nassarawa, and Plateau states.

2.2 Study population

The populations of this study were students from secondary schools in Jalingo town, of Taraba state, Nigeria which comprises of both males and females with a population size of 200 students of which 114 were males and 86 were females.

2.3 Ethical clearance

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 who parents agreed were enrolled in this study. Also, an introduction from the Department of Biological Science, Benue State University was given to the UMCN Hospital where the samples were taken for microbiological examination.

2.4 Sample collection

A total of 200 urine samples comprising 114 samples from males and 86 from females were collected and examined within the period of March, 2019. Urine Samples were collected in a 20ml capacity wide mouthed leak proof universal containers between 10 hours and 14 hours (10am and 12pm) as described by Cheesbrough [4].

2.5 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, [4]. Urine deposits (sediments) were examined under a light microscope using 10X and 40X objectives. Urine samples containing eggs of *S. haematobium* and without eggs were recorded. The procedures for the urine examination were as follows:

1. The urine specimens were thoroughly agitated. 10ml 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 [4], for urine sample.

2.6 Data analysis

The data obtained were analyzed using chi-square statistics and simple percentage method of analysis.

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 200 examined, 37 (18.5%) were tested to be positive for urinary Schistosomiasis, see table 3.

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%) see table 1, and there was no significant difference between the rate of infection and the sexes (X^2=1.06, df =1, 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%) see table 2. There was no significant difference between the two schools sampled (X^2=1.63, df=1,P=0.20).

Age ranges 9-12, 13-15, 16-18, 19-21 were considered in relation to prevalence of urinary Schistosomiasis in this study. However, age group 13-15 had the highest infection rate of 15 (15.2%) with age group 19-21 having the least infection rate of 3 (13.0%) see table 3. There was a strong positive correlation between the age groups and rate of infections (X^2=12.63, df=3, P=0.006).

Table 1: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town in relation to sex

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

X^2=1.06, df=1, P=0.30

This is not statistically significant with P>0.05

Table 2: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town 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)**

X^2=1.63, df=1, P=0.20

This is not statistically significant with P>0.05

Table 3: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town 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)**

X^2=12.63, df=3, P=0.006

This is statistically significant with P<0.05

Table 4: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town in relation to urinating blood

Urinate blood	Number examined	Number positive (%)
Yes	22	16 (72.7)
No	178	21 (11.8)
Total	**200**	**37 (18.5)**

X^2=48.21, df=1, P=0.000

This is statistically significant with P<0.05

Table 5: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town in relation to swimming or bathing in rain or standing water

Swim/bath in rain/ standing water	Number examined	Number positive (%)
Yes	72	18 (25.0)
No	128	19 (14.8)
Total	**200**	**37 (18.5)**

X^2=3.15, df=1, P=0.08

This is not statistically significant with P>0.05

Table 6: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town in relation to colour of urine

Colour	Number examined	Number positive (%)
Amber	111	0 (0.0)
Brown	3	3 (100)
Dark red	5	5 (100)
Green	5	0 (0.0)
Orange	2	2 (100)
Pale red	3	3 (100)
Pale yellow	17	0 (0.0)
Red	24	24 (100)
Yellow	26	0 (0.0)
Yellowish-green	4	0 (0.0)
Total	**200**	**37 (18.5)**

X^2=200.0, df=9, P=0.000

This is statistically significant with P<0.05

Table 7: Prevalence of Urinary Schistosomiasis among secondary school students in Jalingo town in relation to presence of visible haematuria

Visible haematuria	Number examined	Number positive (%)
Visible	37	37 (100.0)
Non visible	163	0 (0.0)
Total	**200**	**37 (18.5)**

X^2=200.0, df=1, P=0.000

This is statistically significant with P<0.05

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.,* [5] which reports prevalence rate of 19.5% and higher than a prevalence rate of 13% recorded in Nkhotakota district, Malawi [6]. However, Nwosu *et al.*, [7] 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 LGAs, respectively [8], [9].

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 with a prevalence rat of 24.3% for male and 12.4% for females reported by Nwosu *et al.*, [7]. This is in contrast with the result reported by Dawaki *et al.,* [10] 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) and also in other west African countries where the difference between males and females was also significant with an infection rate of 66.3% and 49.5% respectively [11]. The result obtained from this study indicates 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, [12] 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 [7]; [11]. However, it is agreed by most researchers that ages 9-15 are mostly responsible for the transmission of the disease in most areas Anzaka, [13] reported a similar result in Wowyen community. This peak in incidence recorded in early adolescence may be as result of frequent contact as in swimming or being in contaminated water bodies. Bangbola, [2] reports that apart from exposure, the capacity to resist new infection by eosinophil secretion of antigen specific immunoglobatin (IgE) is age dependent in children younger than 13 years have a higher several level of Igm, IgG_2 and IgG_4 is types which block the protective effect of IgE [2].

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 is also observed in this study that most subjects that urinate blood or has visible haematuria in urine sample tested positive which concurs with the observations of Mbata *et al.*, [15] and Adeyeba and Ojeaga [16]. The prevalence rate was also statistically significant in relation to the consistency of urine colour which further correlates with the aforementioned. This work however disagree with the work of Ekpo, [17] in Abeokuta, Nigeria.

In this case study, playing under rain or in standing water which includes ponds, gutters Monday areas were statistically significant as it this agrees with the observation made by Moyo *et al.,* [6], it has been observed that such water contact points were found to be harbouring infected snails species. This observation therefore implies that frequency of contact with this water source is an important risk factor. The infection rate as regards to contact with fresh water bodies was not significant statistically. However those involved in fishing activities had the highest prevalence (50.0%) followed by those who engaged in washing (18.8%). This result may be due to proximity of subjects to such water bodies and availability of alternate source of water supply for domestic activities since Jalingo is an urban settlement. This study is consistent with Mbata *et al.,* [15]. The urban

settlement of Jalingo town which is the state capital have an advantage over other study locations previously reported because they have government water projects that supplies pipe born water and bore holes to the town. This may explain why the overall infection rate was low (18.5%). People who used hand dug well as their source of water had the highest infection rate of (34.3%). Other factors like swimming and bathing in river or stream was subjected to statistical analysis and showed no significant difference.

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. The moderate prevalence could be attributed to the personal hygiene behaviour 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 of the dangers and risk factors of the disease are major reasons for the rate of prevalence recorded. However, most of the subjects were not actively sourcing their drinking water from the rivers, streams or other fresh water bodies as improved source of water supply were available in the urban settlement. The infection of the disease was however independent of sex, schools sampled, parent's occupation, swimming or bathing in river or stream and other contact with fresh water bodies, but a statistical significant difference was observed in relations to age group, urination of blood and presence of visible haematuria. There is a tendency of the increase of the infection 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.

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