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Survey of *Schistosoma haematobium* and Environmental Factors in Donga Local Government Area, Taraba State, Nigeria

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Abstract

Schistosoma haematobium infection is known to be endemic especially among residents along Rivers, This study was conducted to establish the prevalence of urinary schistosomiasis in relation to some epidemiological factors among elementary pupils in Donga Local Government Area. Urine filtration technique using polycarbonate membrane filters was employed to check the presence of *Schistosoma haematobium* eggs in urine and questionnaires were administered. Overall prevalence of 8.94% (21) was recorded out of the 235 urine examined. Chi square analysis showed insignificant association of the infection with the various schools (χ^2= 6.192, P = 0.185). Similarly, ANOVA revealed no significant difference in the mean egg intensity (27.29 eggs/10ml of urine) among the schools (p = 0.293). Males were more infected 13.33%(16) than females 4.50%(5) with a significant difference (P=0.020). However, there was no statistical significant difference in their mean egg intensities (30.3 eggs/10ml of urine in male and 17.6 eggs/10ml of urine in female) (p = 0.27). The age-related prevalence was higher 11.82% (13) in 10-15 years children while children aged 16-20 had the least prevalence 0.01% (1). Chi square showed statistical significant association between infection and age (χ^2=12.964, P=0.002). But there was a statistical insignificant difference between their mean egg intensities; 10-15, 4-9 and 16-20 (31.08, 23.4, 5 eggs/10ml of urine respectively) with p=0.462. Children who fish had the highest prevalence 16.67% and children that do not partake in any of these activities had no case

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of infection 0%(64). Chi square revealed a statistical significant association between participant's water contact activities and infection (χ^2 =11.21; p = 0.024). However, ANOVA showed statistical insignificant difference in the mean egg intensity among these activities (p = 0.486). This findings indicates that urinary schistosomiasis has low endemicity in this area which could be due to the fact that It was concluded that the overall low prevalence could be attributed to improved environmental hygiene among others.

Keywords: Domestic Activities, Infection, Pupils, Rural Areas, *Schistosoma haematobium,* Water

INTRODUCTION

Globally, *Schistosomiasis* is a Neglected Tropical Disease (NTD) and is caused by dioecious blood fluke (digenetic trematodes) of the genus *Schistosoma* (Atalabi *et al.,* 2018). It is ranked as the second most socioeconomically destructive parasitic disease after malaria (Saidu *et al.*, 2023). Reports of the World Health Organization (WHO) estimated that at least 251.4 million people required preventive treatment for *Schistosomiasis* in 2021, out of which about 75.3 million people were reported to have been treated. It also estimated that at least 90% of those requiring treatment for *Schistosomiasis* live in Africa (WHO, 2023). The heavy burden is carried by sub-saharan Africa where an estimate of 224 million suffer the malignant effects of the disease with an estimated 280,00 death occuring every year mostly among the rural inhabitants (WHO, 2016).

Nigeria is one of sub-saharan African's most heavily impacted countries with respect to both urinary and intestinal *Schistosomiasis*, accounting for almost 14% of the disease worldwide (Hotez, *et al*., 2012; Onyekwere *et al*., 2022). The disease, urinary *Schistosomiasis* is caused by *Schistosoma haematobium (S. haematobium)*, and it is a water-based parasitic disease transmitted by fresh water-snails of the genus *Bulinus*, while humans of all age groups (especially pre-school and school-aged children) act as the definitive host (Saidu *et al*., 2023; Pukuma and Musa, 2007). Urinary *Schistosomiasis* is a significant cause of clinical morbidity and disability in the endemic countries of Africa and the Middle East, where more than 110 million people are infected (Agere *et al.,* 2010). The disease is most prevalent in low-income rural communities without access to potable water proper sanitation, and adequate healthcare facilities. People are infected during routine agriculture, domestic, occupational and recreational activities which expose them to infested water (WHO, 2023). Risk factors

include persons living in or travelling to areas where *Schistosomiasis* occurs, and those who come in contact with fresh water where the intermediate host is present (Houmsou *et al*., 2012). Associated risk factors include illiteracy, poor socio-economic standard, poor hygiene, and inadequate healthcare facilities (Mafe *et al*., 2005).

Taraba state is well-known for its diverse relief made of mountainous and plain areas. Many of these plain areas are places of intense agriculture activities that are surrounded by streams, rivers, and ponds where inhabitants depend on ignorantly neglecting the health implications. The indigenous people in the state rely on fishing and other agricultural activities such as rice farming, irrigation etc. with complete dependence on the existing natural water resources (Houmsou *et al*., 2016). There is dearth of epidemiological data on *Schistosoma haematobium* infection in Donga LGA communities. This lack of epidemiological data can adversely affect adequate management and control programmes. This study therefore investigated the level of *Schistosoma haematobium* infection, infection intensity and factors associated with the infection among elementary pupils in some selected areas of Donga Local Government. The result of this study can be used to plan strategies for control programmes for the infected areas in accordance with WHO recommendations.

Schistosomiasis, ranked as the second most socioeconomically destructive parasitic disease after malaria, occurs in remote areas where most people depend on natural freshwater bodies and rainwater for their daily water needs. Since most of the inhabitants of Taraba State rely on this natural freshwater bodies for their agricultural, domestical, occupational and recreational activities, a need to survey the disease in the area has become imperative hence, the survey of *Schistosoma haematobium* among elementary pupils in five selected schools in Donga LGA Taraba state.

Urinary *Schistosomiasis* is a persistent health burden among Nigerian children. It has been associated with risk of bladder cancer, impairment of growth in children and congenital developments (Carter, 2008). Despite the public health significance of the disease and several studies conducted in different parts of the State, information on *Schistosomiasis* and possible epidemiological factors are lacking in some areas such as Donga. These informations are required by stake holders if total eradication of the infection is to be achieved. The survey therefore determined the prevalence and intensity of urinary *Schistosomiasis* and the association of the disease with some risks factors among elementary pupils in five selected schools of Donga LGA in Taraba State, Nigeria.

Life Cycle of Schistosome

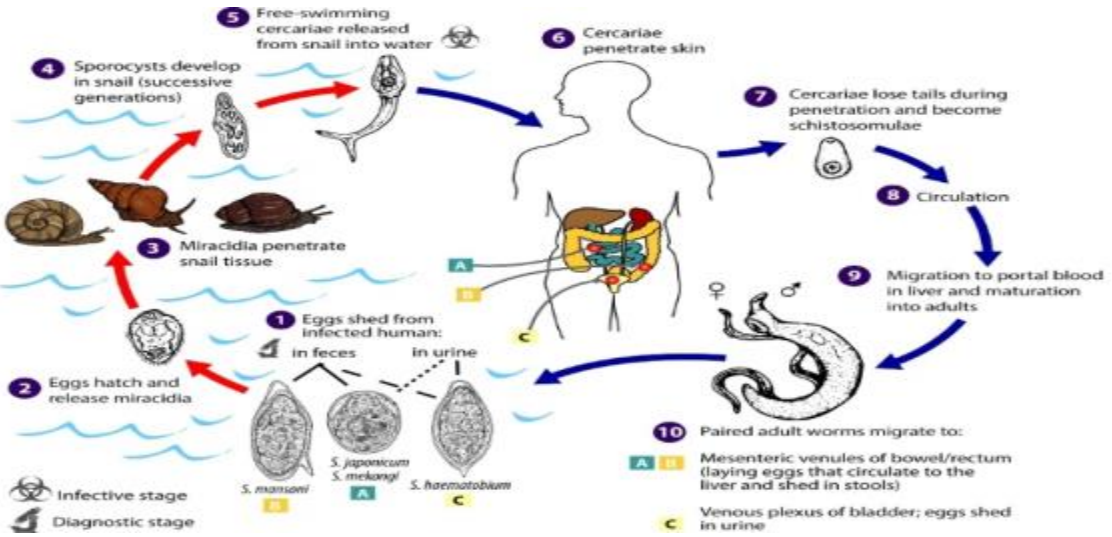


Fig. 1: The life cycle of three schistosome species (CDC, 2019)

METHODS

Study Area

The study was carried out in Donga Local Government Area, Taraba State, Nigeria. Donga has its headquarter in the township of Donga. Geographically, it lies within latitude 70'43"N of the equator and longitude 10E of the meridian with the land area of approximately 58 square kilometers. It is located in the southern Taraba, bounded on the Northeast by Kurmi Local Government Area, by the Northwest by Bali Local Government, to the Southwest by Wukari Local Government Area, while to the Southeast by Takum Local Government Area. Donga has approximately 177,900 populations with the conglomeration of different tribes but mainly; the Fulani; Tiv; Chamba; Itchen; and the Hausa, with Hausa language popularly spoken (Donga-Local Government Area, Nigeria-Population Statistics, Charts, Map, and Location. citypopulation.de retrieved 2022). The occupations of most inhabitants are farming, hunting, fishing, cattle rearing and trading (Donga Local Government Area. www.manpoer.com.ng.Retrieved 2022). Their sources of water are rivers, streams and ponds.

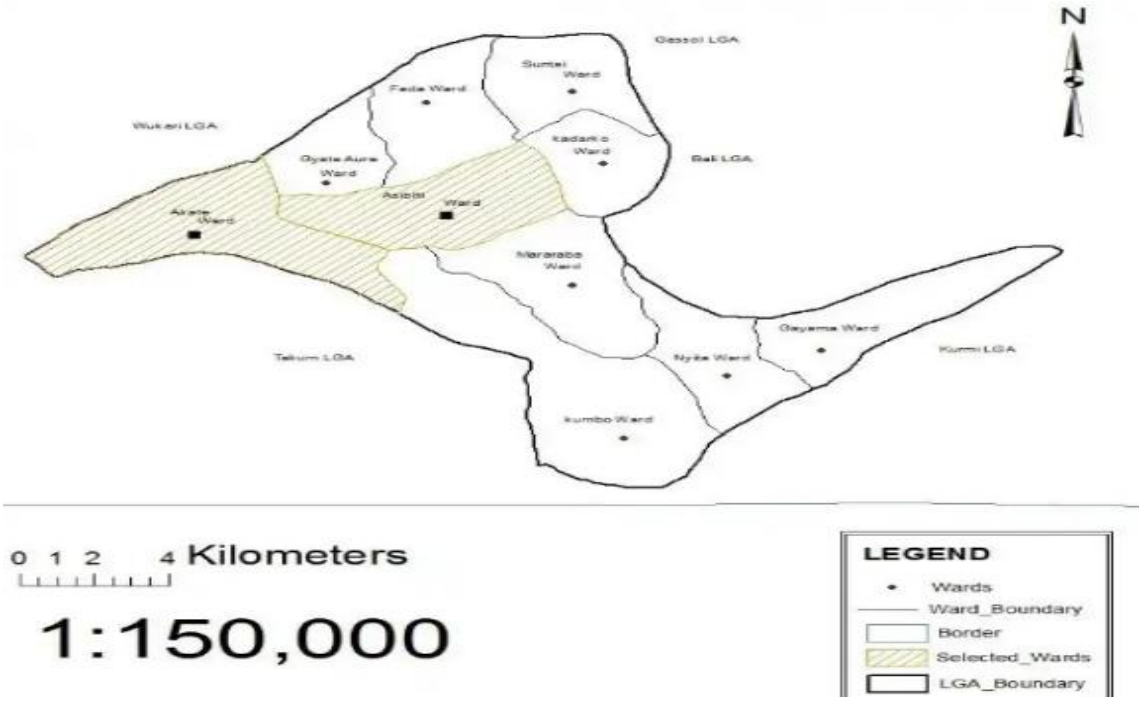


Fig.2: Map of Donga LGA Showing the Selected Wards (GIS and Remote Sensing Lab, Kwararafa University, Wukari).

Research Design

The participants of this school-based cross-sectional study, conducted in October 2023, were selected by simple random sampling from amongst pupils of five selected schools within Donga Local Government Area, Taraba state, Nigeria to investigate the current status of urinary *Schistosomiasis* among elementary pupils of the area. Urine filtration technique using polycarbonate membrane filters was employed to determine presence of *Schistosoma haematobium* eggs in urine. Structured questionnaires were used to collect information on LGA, years of residence, sex, age, occupation, and water-contact activities

Study Population

Prior to the commencement of the research, permission was sought from the Local Government Educational secretary (ES) of Donga after presenting an introductory letter obtained from the Head of Department (HOD) Biological Sciences Federal University Wukari. The study was designed to target a total number of 250 pupils aged 3-16 years, who are attending school and permanent residents of the selected areas for at least two years to be enrolled in the study. Out of 250 pupils to be recruited from five primary

schools (50 pupils each from five schools randomly selected), a total of 235 pupils, aged 4-20 years, participated in this study due to the lack of pupils in some schools.

Sample Size and Its Determination

The sample size of 250 elementary pupils was estimated using the formula for cross-sectional surveys as described by Creswell (2007). In each of the selected schools, the total number of pupils per class was obtained from the head teacher's office so as to help calculate the representatives or number of pupils to be enrolled for the study.

Data Collection

Urine samples collection

From each of the participating primary school pupils, urine samples were collected after the filling of the questionnaire. The pupils were given a 30-ml sterile wide mouth, screw-capped plastic container carrying their identification number to collect their terminal urine and were instructed on how to collect the urine. Urine samples were collected between 10:00am hours and 2:00pm hours which is the optimum time for *S. haematobium* egg passage.

Urine Samples Processing

The collected urine samples were check for macrohaematuria by their color whether there is visible hematuria or none after then, it was immediately transported to Donga First Referral Hospital for laboratory analysis.

Laboratory analysis of urine

Each universal bottle was assigned a serial number which corresponded to the number on every questionnaire. The urine samples were examined for the presence of *S. haematobium* eggs using urine polycarbonate membrane filter, the urine filtration technique as recommended by WHO for the detection of *Schistosoma haematobium* eggs (Ngasala, *et al.*, 2020; WHO, 2002). In every sample, briefly, a 10 ml of a urine was aspirated into a syringe containing a few drops of Lugol's iodine solution and agitated for about 15 seconds to stain any *S. haematobium* eggs present. The sample was then gently forced through a 12-µm pore size polycarbonate membrane filter that was placed in a swinnex filter holder. Remnants of urine were removed by forcing air through the filter membrane using an empty syringe. The filter holder was unscrewed and the filter membrane removed with the

aid of forceps, placed on a microscope slide, and viewed at ×40 magnification. In case of positive, the Schistosome eggs were seen as orange oval shaped bodies, characterized with a terminal spine and the egg counts/10 ml of urine were documented. Egg counts were recorded as the number of eggs per 10ml of urine and categorized according to WHO guideline of either light intensity, ≤50 eggs/10mls or heavy intensity, ≥ 51 eggs/10ml of urine (WHO, 2002).

Materials Used

Urine specimens, 10ml syringe, tweezers, filter holder (13mm diameter), polycarbonate membrane filters (12μm porosity), microscope, clean grease free slide, beaker, hand grooves, masking tape.

Questionnaire administration

A well-structured questionnaire was employed to collects informations on socio-demographic data such as sex, age, years of residency, and water contact behaviors of the participating pupils.

Statistical Analysis

All data obtained were analyzed using SPSS statistical version 25. Statistical significant associations between gender, age, water contact activities and Schistosome infection were evaluated using Pearson's Chi-square. The intensity of the infection was estimated using ANOVA. Statistical significant difference was considered at 95% confidence level with p-value ≤0.05 in regards to have association.

RESULTS

Table 1: Prevalence and Intensity of Urinary *Schistosomiasis* in the study area.

Primary school	Number examined	Number infected	Prevalence (%)	No. of eggs	Mean intensity±SE
Kapye pri. sch.	32	3	9.38	85	28.33±14.88
Dozomga pri. sch.	55	3	5.45	144	48.00±10.21*
D/kwancha pri. sch.	53	8	15.09	235	29.38±7.43
Sheilk Abubakar Gumi pri. sch.	38	5	13.16	64	12.80±7.96*
Akate Nomadic pri. sch.	57	2	3.51	45	22.50±20.50
Total	235	21	8.94	573	27.29±4.77

$\chi^2 = 6.192$, df =4, p =0.185. ($p = 0.293$). * = Significant association. S.E. (Standard Error)

Of the 235 urine samples, 8.94% (21) were found infected. D/Kwancha primary school had the highest prevalence of the infection 15.09% (8), Sheilk Abubakar Gumi primary school 13.16% (5), Kapye primary school 9.38(3), Dozomga primary school 5.45% (3), and Akate Nomadic primary school had the least prevalence of 0.04% (2). Chi square analysis showed statistically insignificantly association between infection and the schools ($p = 0.185$; df = 4 Table 1). On the other hands, the highest mean egg intensity was recorded among subjects in Dozomga primary school (48 eggs/10ml of urine), followed by subjects in D/Kwancha primary school (29 eggs/10ml of urine), Kapye primary school (28 eggs/10ml of urine), Akate Nomadic primary school (22.5eggs/10 of urine), while Sheilk Abubakar Gumi primary school had the lowest mean egg intensity of 12.8 eggs/10 of urine. Analysis of Variance (ANOVA) shows no significant difference in the mean egg intensity among the schools ($p = 0.293$; df = 4 Table 1).

Table 2: Association and Intensity of Urinary *Schistosomiasis* in Relation to Sex in the study area.

Gender	Number examined	Number infected	Prevalence (%)	Number of eggs	Mean±SE intensity
Male	122	16	13.33	485	30.32±5.57
Female	113	5	4.50	88	17.60±5.89
Total	235	21	9.09	573	27.29±4.77

χ^2 = 5.439; df =1; p=0.020*, (p =0.27), *=Significant difference, S. E. (Standard Error)

Out of the 122 male pupils examined, 13.33% (16) were infected while 4.50% (5) of the 113 female pupils were also infected with urinary *Schistosomiasis*. Chi square analysis showed that, the impact of sex on the prevalence of infection was statistically significant (p = 0.020*; Table 2). Similarily, male recorded the highest mean egg intensity of 30.3 eggs/10ml of urine, whereas female recorded the lowest mean egg intensity of 17.6 eggs/10ml of urine. However, ANOVA revealed no statistical significant difference in the mean egg intensity among gender (p = 0.27)

Table 3: Prevalence and Intensity of Urinary *Schistosomiasis* in Relation to Age

Age of pupil	Number examined	Number infected	Prevalence (%)	Number of eggs	Mean±SE intensity
4-9	124	7	5.65	164	23.43±7.70
10-15	110	13	11.82	404	31.07±6.35
16-20	1	1	0.01	5	5.00
Total	235	21	8.94	573	27.29±4.77

χ^2 = 12.964; df = 2; p = 0.002* (p = 0.462), *= Significant difference. S. E. =Standard Error

Among the 235 urine samples (from pupils aged 4-20 years) examined, pupils aged 10-15 years had the highest prevalence of the infection 11.82% (13), followed by those with age 4-9 5.65% (7), whereas subjects aged 16-20 had the lowest prevalence 0.01% (1). Chi square analysis showed that, the association between prevalence of infection and age of the participants was statistically significant (p = 0.002*; df = 2, Table 2). Similarly, pupils aged 10-15 had the highest mean egg intensity of 31.08 eggs/10ml of urine, followed by subjects with age 4-9 years (23.4 eggs/10ml of urine, while subjects age 16-20 had the lowest mean

egg intensity (5 eggs/10ml of urine). Although, there was no statistical significant difference between the mean egg intensity for the various age groups (p =0.462).

Table 4: Prevalence and Intensity of Urinary *Schistosomiasis* Based on Subject's Water Contact Activities in the study areas.

Activity	Number examined	Number infected	Prevalence (%)	Number of eggs	Mean±SE intensity
Swimming or bathing	86	12	13.95	406	31.83±6.63
Fishing	24	4	16.67	231	29.25±10.56
Washing	21	1	4.76	2	2.00
Participating in all activities	40	4	10.00	91	18.00±9.96
None	64	0	0.00		
Total	235	21	8.94	573	27.29±4.77

χ^2 = 11.209; df = 4; p = 0.024*, (p= 0.486), *= Significant difference S. E. (Standard Error)

A high infection rate of 16.67% (4) was found amongst participants who engaged in fishing, 13% (12) found amongst those who responded participating in swimming or bathing, pupils that were said to be involved in all activities had a prevalence of 10%(4), Those responded washing in freshwater bodies had a prevalence of 4.76% (1), while subjects who do not participate in any of these activities had the least prevalence of 0%(64). Chi square analysis showed a statistical significant association between participant's water contact activities and the occurrence of the infection (p = 0.024*). On the other hands, participants who swimmed/bathed had the highest mean egg intensity (31.83 egg/10ml of urine), followed by those that fished (29.25 egg/10ml of urine), 18.00 egg/10ml of urine observed in those that participates in all of the activities, participants that washed had a low mean egg intensity of 2.00 egg/10ml of urine, while those who do not involved in any of the activities recorded no mean egg intensity (0egg/10ml of urine). ANOVA showed no statistical significant difference in the mean egg intensity among these activities (p = 0.486 Table 4).

Table 5: Prevalence of Urinary *Schistosomiasis* based on Combi-9® Medi-Test in the study area.

Primary School	Number examined	Number positive	Prevalence (%)
Kapye pri. sch.	32	5	15.63
Dozomga pri. sch.	55	7	12.73
D/kwancha pri. sch.	53	11	20.75
Sheilk Abubakar Gumi pri. sch.	38	8	21.05
Akate Nomadic pri. sch.	57	3	5.26
Total	235	34	14.47

$\chi^2 = 8.00$; df = 4; $p = 0.092$.

Out of the 235 urine samples examined using urinalysis dipstick (Combi-9® Medi-Test), 14.47% (34) were found infected. Sheilk Abubakar Gumi primary school had the highest prevalence of the infection 21.05% (8), D/Kwancha primary school 20.75% (11), Kapye primary school 15.63% (5), Dozomga primary school 12.73% (7), and Akate Nomadic primary school had the least prevalence of 5.26% (3). Chi square analysis showed statistically insignificantly association between infection and the schools (p = 0092; df = 4 Table 5).

Table 6: Comparison between chemical reagent strip and microscopy test

Variables	Positive	Negative	χ2	*p*-value
Microsopy	21(8.94%)	214(91.1%)	0.69	0.4
Microhaematuria	34(14.5%)	201(85.5%)		
Microscopy	21(8.94%)	214(91.1%)	22.8	0.1
Proteinuria	80(34.0%)	155(65.9%)		

χ^2:chi-square value, *p*-value: Significant value

As a secondary reference, urinalysis dipstick (Combi-9® Medi-Test) was also performed on all the 235 urine samples to evaluate the chemical reagent strip performance in testing for microhaematuria and proteinuria. For microhaematuria, there was no significant difference ($\chi2$=0.69, p=0.4) between the efficacy of the two methods, 34(14.5%) pupils were tested positive using strip while 21(8.94%) were positive using polycarbonate filter membrane.

However, the two methods were significantly different ($\chi 2=22.8$, $p=0.01$) in proteinturia outcome, 80(34.0%) tests were positive using strip (Table 6).

DISCUSSION

Several authors have reported the endemicity of Urinary *Schistosomiasis* in many parts of Nigeria with varying degree of prevalence. Houmsou *et al.* (2012) reported prevalence of 41.5% in two Local Government Areas in Benue State, Atalabi, *et al.* (2016) reported 22.7% prevalence among Junior High School Students in two LGAs around Zobe Dam in Katsina State, Balogun *et al.* (2022) reported a prevalence of 65.7% in school pupils in Jidawa and Zobiya communities of Jigawa State, Nigera. The prevalence 8.94%, recorded in this present study therefore appears relatively low especially when compared with the above studies carried out in the other parts of Nigeria. Also, the finding of this present study contradicts the findings of other researchers in Taraba State where; Monday, *et al.* (2015) reported 15.5% in Bali LGA. Agere *et al.* (2010) reported a prevalence of 28.8% in Jalingo and Ardokola Local Government Areas. However, the prevalence of 8.94% obtained in this present study supported reports of earlier researchers in other parts of Taraba state: Houmsou *et al.* (2016) reported 10.1% in Gashaka LGA, Federal Ministry of Health which found low endemicity of *Schistosomiasis* (5.6%) in nine LGAs of Taraba State FMoH (2015) and Nse *et al.* (2020) in Ikwo and Ohaukwu Communities of Ebonyi State, Nigeria who also revealed a relatively low prevalence of *S. haematobium* infection (8.0%) in the rural area with no statistical significant association of the infection ($p = 0.24$). The low egg mean intensity (27.29eggs/10 ml of urine) obtained in this present study is in line with the 25.05 eggs/10ml of urine reported by Atalabi *et al.* (2016). However, this contradicts with findings of Sunday *et al.* (2018) who showed 61.9 eggs/10ml of urine. This disparity in both prevalence and intensity of the infection could be due to a function of the interplay of various factors ranging from ecological to socio-economic which in turn took toll on the water contact activities of the study population. These factors limit the network of freshwater bodies and ensure that the few available become characteristically infested with *S. haematobium* infections.

Furthermore, a statistical significant association was recorded ($p=0.020$) between the rate of infection in male and female (male had 13.33 % and female 4.50 %). This result is in tandem with previous studies wherein; Atalabi *et al.* (2016), demonstrated that male (19.5%)

were more prevalent to the infection than female (3.2%) with a *p* valup;e = 0.0001, again, Sunday *et al.* (2018) in a research on the distribution of human urinary *Schistosomiasis* in Kwara State showed that, males (20.6%) were more prevalent to the infection than females (14.3%) with a *p* value < 0.0001. The higher prevalence recorded among males is suggestive of more water contact activities in males like swimming, playing with shallow water and fishing, in addition to the normal duty of fetching water and washing which are peculiar to both sexes. On the other hands, this present finding confined the consistently high egg intensity in males (17.6eggs/10 ml of urine) compared to females (30.31 eggs/10 ml of urine). This agreed with previous studies; Dawuda *et al.* (2019) (males 2.76 eggs/10 ml; girls: 2.12 eggs/10 ml), Atalabi *et al.* (2016) (males: 19.5 eggs/10 ml; females: 3.2 eggs/10 ml of urine). However, the intensity of the disease as indicated by the number of eggs per 10 ml of urine, in this study, and others, showed that intensity is not sex dependent, an indication that both sexes carry equal worm burden.

Prevalence increased with age as shown by this survey. However, the highest prevalence of 11.82% was recorded in the age group 10-15 years. This quite agrees with previous similar findings such as that of Abdullahi and Saicki (2011), who reported high prevalence of 48.75% among 10–15 years old children and Nafiu *et al.* (2016), where children aged 12–14 had the highest prevalence (28%). The association could be due to the fact that the children of school-age and young adults are often involved in more activities that bring them in contact with infested water bodies, such as swimming, irrigation, fetching of water, bathing and fishing. Moreover, egg mean intensity decreased with age, the highest egg mean intensity (31.07 eggs/10ml of urine) found in this present study was among 10-15 years old children. This finding is in consonance with previous findings of Abdullahi and Saicki (2011) who reported highest egg mean intensity (16.0 eggs/10ml of urine) among 10-15 years old children but disagree with the findings of Sunday *et al.* (2018) who demonstrated 412.25 eggs/10ml of urine among 16-20 years old children. This could be explained by reduction in the frequency of water contact activities among older students as a result of maturity and acquisition of knowledge about the disease by formal education.

The relationship between the prevalence of Urinary *Schistosomiasis* and contact with freshwater bodies infested with cercariae is well established (Ugbomoiko *et al.*, 2010; Gbonhinbor and Abah, 2019). In collaboration with the above, frequent contact with freshwater bodies infested with cercariae, like contact when collecting water for domestic

use, swimming, washing and fishing was associated with urogenital *Schistosomiasis*. This is somewhat logical since Urinary *Schistosomiasis* is directly linked to exposure to contaminate freshwater.

As far as infection category was concerned, 8.94% (21) infected of the whole 235 surveyed accounted for low endemicity and the light eggs mean intensity of 27.29 eggs/10 ml of urine.

Results from the urinalysis dipstick (Combi-9® Medi-Test) shows that, 34 (14.57%) pupils were positive for microhaematuria and 80(34.0%) for proteinuria. The two msethods considered in this study were not significantly different in diagnosis for urinary *Schistosomiasis* (p=0.4) but different when detection base on proteinuria (p=0.01). There were 13 positive samples detected by chemical reagent strip but appeared negative to microscopy. Therefore, this made prevalence by strip (34%) higher than that of the microscopy (8.94%) and this was in consonance to the findings of Fatiregun *et al.* (2005) and Krauth *et al.* (2015) where strip had higher prevalence outcome than microscopy. Since 1980s, haematuria and proteinuria have been a major disease biomarker for urinary *Schistosomiasis* but Taylors *et al.* (1990) and Eltoum *et al.* (1992) considered microhaematuria to be more sensitive and specific than proteinuria.

CONCLUSION

In conclusion, the findings of this survey showed that children are mostly unaware of the risks transmission of Urinary *Schistosomiasis* through cercaria penetration in infested freshwater bodies, while the disease ranked as second most socioeconomically destructive parasitic disease only after malaria. The occurrence of Urinary *Schistosomiasis* is location-dependent. Such variations could be attributed to the difficulties in estimating the national prevalence and is compounded by the relatively slow pace of progress towards control of the disease, despite the availability of Praziquantel as an effective chemotherapy. It is, therefore, important to continue to expand surveillance for the disease, especially in those areas as yet unsurveyed. The prevalence of urinary *Schistosomiasis* in Donga Local Government Area, Taraba State as established in the current study can be described as Low endemicity. Sex, age, and water contact activities appear to the major risk factors that influenced the prevalence of the disease while those factors do not seem to have association with the intensity of the disease in the area. The disease also appeared to

location (schools) independent both in terms of prevalence and intensity. The presence of the disease in this area confirmed that the river Donga was infected. Perhaps, the prevalence and intensity of the disease observed in the survey indicates the interplay between many of the water contact activities.

Conflict of Interest

All contributing authors declared no conflict of interest

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