URINARY SCHISTOSOMIASIS AND ITS RISK FACTORS IN TWO SELECTED RURAL COMMUNITIES IN KOGI STATE

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ABSTRACT
Urinary schistosomiasis is an infectious disease of the tropical and sub-tropical countries. Contact with freshwater infested with water snails of the genus Bulinus is the major risk factor. The disease is endemic in Nigeria, but information on its endemicity is still lacking in some parts of the country and the data collected are grossly inadequate for planning a credible control programme. This study was aimed at determining the prevalence of urinary schistosomiasis and the risk factors associated with it in two selected communities in Igalamele/Odolu Local Govt. Area of Kogi State. Urine samples were collected from one hundred and fifty seven (157) volunteers who consented to be studied using structured questionnaires designed to obtain their demographic and clinical information. The samples were examined for the presence of Schistosoma haematobium eggs using centrifugation method. Out of the total number examined the overall prevalence of 14(8.9%) was recorded. With respect to age, infection cuts across all the age groups with no significant difference in prevalence (P>0.05) among the age groups. There was a significant difference in prevalence (P<0.05) between the genders with the females having a higher prevalence of 11(12%) than the males 3(4.6%). With respect to occupation, there was a significant difference in prevalence (P<0.05) among the different occupations with higher prevalence recorded among traders and artisans (18.2% and 66.7%) compared to students (5.2%) and farmers (4.0%).There is statistically significant association(P<0.05)between risk factors and prevalence. This finding showed that prevalence of urinary schistosomiasis is considerably low in the area. Adequate control measure is however, recommended.

Keywords: Urinary Schistosomiasis, Prevalence, Risk Factors, Bulinus, Infectious Disease, Demographic Information.

INTRODUCTION

Urinary schistosomiasis is a human disease condition caused by infection of the trematode parasite (*Schistosoma haematobium*). It is one of the most common parasitic infections in the world, ranking second only to malaria in terms of its socio-economic and public health importance in tropical and sub-tropical countries (Bala *et al*., 2012). It is also the most prevalent of the water-borne diseases and constitutes a serious health risk in rural areas of developing counties (Kanwai *et al*., 2011).

Urinary schistosomiasis is endemic in 76 countries where some 600 million people are at risk of becoming infected and over 200 million people already infected (Julius *et al*., 2015; Tidi, 2015). Nigeria is one of the most affected countries in sub-sahara Africa with an estimated 10 million people at risk of infection and over 2.0 million already infected with *Schistosoma heamatobium* (Kanwai *et al*., 2012; Babatunde *et al*., 2013). This figure might not be realistic because epidemiological studies have not been conducted in some rural communities in Nigeria. The disease is wide spread and constitutes a public health problem especially in children (Bala *et al*., 2012; Adewole *et al*., 2013).

The distribution of the disease is focal, aggregated and usually related to water resources and development schemes such as irrigation projects, rice-farming, fishing and dams. Movement of people in unstable regions may also contribute to the transmission of the disease in addition to rapid urbanization and increase in off track tourism (Okwori *et al*., 2014). Infection occurs through contact with water infested with the free swimming larval stage of the parasitic worm during swimming, farming, fishing, washing and even sporting (Saotoing *et al*., 2014; Tidi, 2015; Kalu *et al*., 2016). Bulinus snails are the intermediate hosts of *Schistosoma haematobium* (Bala *et al*., 2012). Some of the clinical manifestations of the disease include: haematuria, anaemia, cystis and squamous cells cancer of the bladder, urolithiasis, ascending urinary tract infection, urethral and ureteral stricture

with subsequent hydronephrosis and renal failure (Reuben *et al*., 2013; Tidi, 2015). So far, very little has been achieved in the control of the disease in Nigeria (Houmsou *et al*., 2012; Tidi, 2015).

The current control strategy recommended by the WHO is to control morbidity due to schistosomiasis by mass drug administration (MDA) with praziquantel, targeting mainly school-age children and adult at high risk of infection. To ensure success of MDA program in Nigeria, there is need to update information regarding the prevalence and distribution of urinary schistosomiasis in the country (Ogochukwu and Ubachukwu, 2013). Currently, not much information on the prevalence of the disease in Igalamela/Odolu Local Government Area is available. Assessment of disease prevalence is the first step in the conduct of effective control.

This study determined the prevalence of urinary schistosomiasis and the risk factors associated with it in Ogbogbo and Agbanaka communities of Igalamela/Odolu Local Government Area of Kogi State, Nigeria.

MATERIALS AND METHODS

Study Areas

This study was conducted in two sedentary villages (Ogbogbo and Agbanaka) in Igalamela/Odolu Local Government Area of Kogi State. The Local Government is in the eastern part of Kogi State Nigeria. It is bordered by river Niger to the west, and Enugu State to the East. On the Southern part is Idah Local Government Area while on the Northern part is Ofu Local Government Area of Kogi State. Its Headquarters is located at Ajaka on latitude 7^{O} 1016N and longitude 6^{O} 4935E. The vegetation cover is typical of southern guinea savanna with annual precipitation of between 1000 to 1400mm on the average, rainfall of between 1000 to 1500mm and 8 months wet season. The average monthly temperature is about 29^{O}c during the hot season and 18^{O}c during cold season. Its soil type is largely lateritic and clay.

They are mostly Igala speaking communities whose inhabitants are predominantly farmers and traders. A few of them are artisans, students and civil servants who also engage in farming activities.

Study Population

A total of one hundred and fifty seven (157) subjects were sampled in this study. Out of this sixty five (65) were males and ninety two (92) were females. The age range of one to ten (1-10) and above (>40) from the two communities were considered for this study.

Sample collection

Before the commencement of the study, permission was obtained from the community leader having been educated on the objective of the study. Structured questionnaires containing demographic and clinical data were administered to the consented individuals randomly recruited for the study.

Ten milliliters (10 m L) of urine samples was collected from the consented individuals into wide-mouth screw-capped specimen bottles that are leak-proof. They were properly labeled and immediately taken to the laboratory for analysis.

Preparation and Microscopic Examination of Samples

Urine examination for *Schistosoma haematobium* eggs was carried out on the 157 samples using the standard centrifugation method as described by Cheesbrough (2006). The content of each specimen bottle was well mixed after which 10 mL of the urine sample was added into centrifuge tube and centrifuged for 5 min at 1500 revolutions per minute (rpm). The supernatant was decanted while the sediment was re-mixed by tapping the bottom of the tube and a little drop placed on a microscope slide. This was covered with a cover slip and examined microscopically, using x10 and x40 objectives and eggs of *S. haematobium* identified by their possession of terminal spines. Urine samples containing *Schistosoma haematobium* eggs were recorded as positive while those that contained no eggs were considered negative. (Oluwasogo *et al*., 2013).

Statistical/Data Analysis

1. Descriptive data were expressed as percentages.
2. Chi-square analysis was carried out to determine the differences in prevalence amongst age groups and between genders.

3. Odds ratio was used to determine whether there is an association between the risk factors and urinary schistosomiasis among the study population.
4. All statistics were carried out using statistical package for social sciences (SPSS) window version 20.0 .

RESULTS

Prevalence of Urinary Schistosomiasis in two Communities in Igalamela/Odolu Local Govt. Area, Kogi State

The result of the prevalence of urinary schistosomiasis among the study population showed overall prevalence of 14(8.9%). Out of this, Ogbogbo community recorded the higher prevalence of 13 (20.0%) while Agbanaka recorded 1 (1.09%) (Table 1.0)

Table 1.0: Prevalence of urinary schistosomiasis in two communities in Igalamela/Odolu LGA, Kogi State

Communities	No. Examined	No. Infected	Prevalence (%)
Ogbogbo	65	13	20.0
Agbanaka	92	01	1.09
Total	157	14	8.92

n=157; P>0.05, CI=95%

Age Specific Prevalence of Urinary Schistosomiasis in two Communities in Igalamela/Odolu LGA, Kogi State

The result of age specific prevalence of urinary schistosomiasis among the study population is shown in table 2.0. It shows that the age group of 1-10 has the prevalence of 2 (2.94%); 11-20 years 4 (11.76%); 21-30 years 2 (12.5%); 31-40 years 2 (16.67%) and above 40 years (>40) 4 (14.81%).

Table 2.0: Age specific prevalence of urinary schistosomiasis in two communities in Igalamela/Odolu LGA, Kogi State

Age Range (Years)	No. Examined	No. Infected	Prevalence (%)	P-Value	95% CI
1-10	68	02	2.94	0.8454	0.0421, 0.929
11-20	34	04	11.76	0.1310	0.4428, 5.1528
21-30	16	02	12.50	0.1025	0.3312, 8.0507
31-40	12	02	16.67	0.0264	0.4354, 11.3205
>40	27	04	14.81	0.0366	0.6034, 7.2397
Total	157	14	8.92		

n=157

Gender specific prevalence of urinary schistosomiasis in two communities in Igalamela/ Odolu LGA, Kogi State

Out of sixty five (65) males sampled, 3 (4.62%) were infected while out of ninety two females sampled, 11 (12.0%) were infected (Table 3.0).

Table 3.0: Gender specific prevalence of urinary schistosomiasis in two communities in Igalamela/ Odolu LGA, Kogi State.

Gender	No. Examined	No. Infected	Prevalence (%)	P-Value	95%CI
Males	65	3	4.62	0.7218	0.0952, 1.3310
Females	92	11	12.0	0.005	0.7510, 10.4986
Total	157	14	8.92		

n=157

Relationship Between some Risk Factors and Occurrence of Urinary Schistosomiasis in two Communities in Igalamela/ Odolu LGA, Kogi State

A total of six risk factors were considered in this study. They include: age, gender, farming, trading, artisanship and studentship (Table 4.0)

Age as a risk factor: Out of a total of sixty eight (68) that falls into the age group of 1-10 years, two were infected, representing a prevalence of 2.9% with odds of infection (OR= 0.195) at 95% C.I of 0.0421-0.929, P value = 0.8454; thirty four (34) falls into the age group of 11-20 years out of which 4 (11.8%) were infected with odds of infection (OR= 1.51) at 95% CI of 0.4425-5.1528, P value =

0.1310; sixteen(16) belongs to the age group of 21-30 years out of which 2 (12.5%) were infected with odds of infection (OR=1.633) at 95% CI of 0.3312-8.0507, P value = 0.1025 and twelve (12) are in the age group of 31-40 years out of which 2 (16.7%) were infected with the odds of infection (OR=2.22) at 95% CI of 0.4354-11.3205, P value =0.0264; while the age group of above fourty (>40) years had twenty seven (27) out of which 4 (14.8%) were infected with the odds of infection (OR= 2.09) at 95% CI of 0.6034-7.2397, P value = 0.0366.

For gender as a risk factor, out of the sixty five (65) males sampled, 3 (4.62%) were infected with odds of infection (OR= 0.356) at 95% CI of 0.0952-1.3310, P value = 0.7218 and out of a total of ninety two females sampled, 11 (12.0%) were infected with odds of infection (OR=2.807) at 95% CI of 0.7510-10.4986, P value = 0.005.

Meanwhile for occupation, those engaged in trading, have a higher number of infection 6 (18.18%) with odds of infection (OR=3.22) at 95% CI of 1.0325-10.0517, P value = 0.0013; followed by students 5 (5.21%) with odds of infection (OR= 0.317) at 95% CI of 0.1009-0.9963,

P value = 0.7512; artisans has the prevalence of 2(66.67%) with odds of infection (OR=23.67) at 95% CI of 1.9986-280.3297, P value = 0.0000 and farmers 1 (4.0%) with odds of infection (OR= 0.3814) at 95% CI of 0.0476-3.0519, P value = 0.7032.

Table 4.0: Relationship between some risk factors and occurrence of urinary schistosomiasis

Risk factors	Number Infected	Number uninfected	Odds Ratio	P. value	95% C.I
Age					
0-10	2	66	0.195	0.8454	0.0421, 0.929
11-20	4	30	1.51	0.1310	0.4425, 5.1528
21-30	2	14	1.633	0.1025	0.3312, 8.0507
31-40	2	10	2.22	0.0264	0.4354, 11.3205
>40	4	23	2.09	0.0366	0.6034, 7.2397
Gender					
Males	3	62	0.356	0.7218	0.0952, 1.3310
Females	11	81	2.807	0.005	0.7510, 10.4986
Occupation					
Farming	1	24	0.3814	0.7032	0.0476, 3.0519
Trading	6	27	3.22	0.0013	1.0325, 10.0517
Artisan	2	01	23.67	0.000	1.9986, 280.3297
Students	5	91	0.317	0.7512	0.1009, 0.9963

DISCUSSION

The result of this study has showed that the prevalence of urinary schistosomiasis in the study population is low 14 (8.92%). The low prevalence could be due to the small sample size involved. The higher prevalence recorded at Ogbogbo 13 (20%) could probably be due to a higher water contact activities of members of this community than those of Agbanaka community with the prevalence of 1 (1.09%).There are statistically insignificant difference (P>0.05) in prevalence among the age groups with the prevalence slightly increased from age group of 31-40 and above 40 years (Table 2). The slight increase in prevalence which is statistically insignificant may probably suggest equal level of exposure of the various age groups to the prevailing environmental conditions in the area. There is associations (P<0.05) between age groups (21-30 and >40 years) and prevalence of urinary schistosomiasis. These age groups are the most involved in water contact activities such as fishing, farming, washing, swimming and fetching of water. This result did not agree with the report of Bala *et al.* (2012), who reports a higher prevalence of urinary schistosomiasis among age groups 10-19 years in addition to Okwori *et al*. (2014) who also records a higher prevalence (62.8%) among the age groups of 10-14 years.

In relation to gender, there was a significantly higher prevalence (P<0.05) among the females than the males. This could be due to the fact that the females have a higher contact with water than their male counterparts in the study area especially, as it involves house chore activities like washing, fetching of water and other water contact activities like farming. This result closely agrees with that of Kanwai *et al*. (2011) who observes a higher worm burden in females than males. Oluwasogo *et al*. (2013) also reports that females had relatively higher frequency of infection than their male counterparts. However, in contrast to this result Okwori *et al*. (2014), reports a higher prevalence of urinary schistosomiasis among males (60.0%) than the females (35.9%). Therefore, the prevalence of urinary schistosomiasis with regard to gender could be higher in males or females depending on the culture of the people. In some culture the females may have a higher water contact activities than the males while in other culture the males have higher water contact activities than the females.

In relation to occupation, there was a significant association (P<0.05) between occupation and prevalence. The higher prevalence observed among traders and artisans in comparison with that of students and farmers (Table 4) could be attributed to the fact that traders and artisans may be involved in water contact activities that subject them to infection by *Schistosoma haematobium.* They might not be exclusively involved in trading and artisanship, hence the higher prevalence recorded. Traders and artisans have significantly close association (P<0.05) with prevalence of urinary Schistosomiasis. This result is related to that of Olusegun *et al.* (2011), who reveals a higher prevalence of 0.7% among artisans. However, the result is in contrast to that of Bala *et al*. (2012) who reports a higher infection of urinary schistosomiasis among farmers and students in his study area. In the same vein, Ugochukwu *et al*. (2013) reports a higher prevalence of urinary schistosomiasis among farmers

CONCLUSION AND RECOMMENDATION

From the study, it has been determined that prevalence of urinary schistosomiasis among the study population is relatively low, but infection is wide spread. Prevalence is not dependent on age but on gender and occupation. Water contact activities such as fishing, farming, washing in streams or any water body infested with the snail intermediate hosts are the major risk factors.

Though, the prevalence is low in the study areas, it is recommended that control measures be put in place to ameliorate or prevent further spread of the infection. Measures such as provision of potable water, creation of awareness about the disease and drug distribution in the area will help in the control of the disease thereby leading to improvement in health status of the people and consequently, the attainment of sustainable development goals (SDGs) in the area. More surveillance is needed to be carried out in the study population in order to determine the actual prevalence of the infection in the area.

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