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Prevalence and Risk Factors Of Urinary Schistosomiasis In Pre-School And School Aged Children In Katsina South Senatorial Zone, Katsina State.

[1]Hali Ibrahim Abba; [2]Saifullahi Yusuf & [3]Abba Hali

[1&2]Department of Mathematics and Statistics,
College of Science and Technology,
Hassan Usman Katsina Polytechnic, P.M.B 2052, Katsina, Katsina State, Nigeria

[3]ICT Department, Federal University Kashere, Gombe State, Nigeria
Email:aihali.aih@gmail.com

ABSTRACT
The prevalence and risk factors of urinary schistosomiasis in pre-school and school-aged children in Katsina South Senatorial Zone, Katsina State, Nigeria was studied. Various studies have reported high prevalence rates of urinary schistosomiasis among pre-school and school-aged children in the region. Poor sanitation, limited access to clean water, lack of hygiene education and poor socioeconomic status are some of the risk factors responsible for the high prevalence rates of the disease. This study confirmed the existence of urinary schistosomiasis in three local governments from Katsina south Senatorial zones. Funtua, Malumfashi and Musawa are considered to represent the 11 local governments from the zone. with a prevalence of 44 (14.7%) schistosomiasis cases in the study areas representing the zones. the association between schistosomiasis and it risk factors in this study was statistically significant ($p = 0.001$). The study highlights the need for effective control measures, improved access to clean water, sanitation, hygiene education, and effective treatment strategies to reduce the burden of urinary schistosomiasis in the region.

Keywords: Prevalence, Schistosomiasis, Risk factors, pre-school, school-aged children

INTRODUCTION

Schistosomiasis, is a parasitic infection caused by digenetic blood trematode worms of the family Schistosomatidae, is one of the most prevalent neglected tropical diseases (NTDs) and still considered as a major public health problem in about 77 developing countries in the tropics and subtropics. It is estimated that over 240 million people are infected, with about 700 million people worldwide at risk of infection. Over 90% of this infection occurs in sub-Saharan Africa with almost 300,000 deaths annually from Schistosomiasis in Africa, Dawaki *et'al* (2016) In September 2021, Nigeria has a high prevalence of schistosomiasis, a parasitic disease caused by blood flukes of the genus Schistosoma. Schistosomiasis is a significant public health concern in many parts of Nigeria, particularly in areas with inadequate sanitation and limited access to clean water. According to the World Health Organization (WHO) data from 2018, it is estimated that over 27 million Nigerians were infected with schistosomiasis at that time. The disease is most prevalent in rural communities where there is frequent contact with infested freshwater bodies, such as rivers, lakes, and dams. Children are particularly vulnerable to infection due to their frequent water-related activities. The two main species of Schistosoma that cause schistosomiasis in Nigeria are *Schistosoma haematobium*, which causes urinary schistosomiasis, and *Schistosoma mansoni*, which causes intestinal schistosomiasis. The distribution of these species varies across the country, with *S.*

haematobium being more common in the northern and central regions, while *S. mansoni* is more prevalent in the southern regions.

Schistosomiasis prevalence and morbidity is highest among schoolchildren, adolescents and young adults. Thus, the negative impacts on school performance and the debilitation caused by untreated infections demoralize both social and economic development in endemic areas. Intestinal *Schistosomiasis* caused by *S. mansoni*, presents with bloody diarrhea and bowel ulceration, chronic infections progressing to hepatomegaly and or associated with periportal liver fibrosis, portal hypertension, and hematemesis. Although *S. intercalatum* can cause another form of intestinal Schistosomiasis, its distribution is limited to West and Central Africa. In Katsina State, Nigeria, urinary Schistosomiasis, despite being a serious public health, no reasonable effort has been made by the stakeholders to control the disease particularly in rural communities that are deprived from health infrastructures and potable drinking water. The Nigerian government, in collaboration with international partners and organizations, has been implementing control programs to combat schistosomiasis. These efforts include mass drug administration with praziquantel, which is the primary drug used for treatment. Other strategies include improving access to safe water and sanitation facilities, health education and awareness campaigns, and snail control programs. Nigeria can be attributed to several factors, including Lack of proper sanitation facilities, especially in rural areas, leads to open defecation and contamination of water sources with human waste. Schistosoma eggs, excreted in human urine or feces, can survive in water for a certain period. When individuals come into contact with the contaminated water, they become susceptible to schistosomiasis infection. Another problem is Limited Access to Clean Water, many communities in Nigeria do not have access to clean water sources, forcing people to rely on contaminated water bodies for various purposes, including bathing, washing, and domestic use. Contaminated water bodies, such as rivers, lakes, and ponds, serve as breeding grounds for the freshwater snails that host the intermediate stage of the Schistosoma parasite, contributing to the transmission of the disease. Then in some communities Certain agricultural and occupational practices can increase the risk of schistosomiasis transmission. Activities like rice farming, fishing, and washing clothes in infected water bodies expose individuals to contaminated water and increase their chances of contracting the disease. While among the issue is Lack of Awareness and Health Education that is Insufficient knowledge about schistosomiasis, its transmission, and preventive measures can contribute to its high prevalence. Lack of awareness may lead to continued contact with contaminated water sources and failure to adopt protective measures, such as avoiding direct contact with infested water or using protective footwear. Another aspect is Poverty and Limited Healthcare Infrastructure like Socioeconomic factors, such as poverty, limited access to healthcare services, and inadequate healthcare infrastructure, can hinder effective control and treatment of schistosomiasis. Changes in rainfall patterns, irrigation projects, and dam construction can create or alter water bodies, increasing the risk of schistosomiasis transmission in certain areas.

Eradicating the prevalence of diseases in Nigeria requires a comprehensive and coordinated effort involving the state government, healthcare agencies, communities, and various stakeholders. Here are some key strategies that state governments can implement to address disease prevalence suc as Strengthen Healthcare Systems, State governments should invest in healthcare infrastructure, including healthcare facilities, laboratories, and medical equipment. They should also focus on recruiting and training healthcare professionals, ensuring an adequate supply of essential medicines and vaccines, and improving the overall quality of healthcare services. Disease Surveillance and Monitoring, Implementing robust disease surveillance systems is crucial for early detection, monitoring and response to disease outbreaks. State governments should establish effective mechanisms to track and report disease cases, conduct regular epidemiological studies and share data with national and international health authorities for better coordination and response. State governments should prioritize health education and awareness campaigns to educate communities about disease prevention, symptoms, and the importance of seeking timely healthcare. These campaigns can be conducted through various channels, including schools, community centers, radio, television and social media platforms.

Also, governments should support and promote routine immunization programs to protect individuals from vaccine-preventable diseases. They should ensure the availability and accessibility of vaccines, develop outreach programs to reach remote communities, and implement strategies to address vaccine hesitancy. then, water, Sanitation, and Hygiene (WASH) Initiatives: Improving access to clean water, proper sanitation facilities, and promoting good hygiene practices are essential for preventing the transmission of waterborne and sanitation-related diseases. State governments should invest in water and sanitation infrastructure, promote hygiene education in schools and communities and enforce regulations to ensure safe water sources and proper waste management. Many diseases in Nigeria are transmitted by vectors such as mosquitoes, flies, and snails. State governments should implement vector control measures, including insecticide-treated bed nets, indoor residual spraying, environmental management, and snail control programs, depending on the specific diseases prevalent in their regions. State governments should collaborate with national health agencies, international organizations, non-governmental organizations (NGOs), community-based organizations, and other stakeholders to pool resources, expertise, and funding for disease control and prevention programs. Building partnerships can enhance the effectiveness and sustainability of initiatives. Finally, State governments should support research initiatives to better understand disease patterns, risk factors, and develop innovative solutions. Investing in research can lead to the development of new diagnostics, treatments and prevention strategies tailored to the specific disease challenges in Nigeria. Implementing these strategies requires strong leadership, political commitment and adequate allocation of resources. Additionally, collaboration with other states, the federal government and international partners can enhance the effectiveness and impact of disease eradication efforts in Nigeria.

Schistosomiasis as a chronic and devastating tropical disease

Schistosomiasis is a chronic and devastating neglected tropical disease that is caused by waterborne digenetic trematodes of the genus Schistosoma. The five medically important species are *Schisotosoma haematobium, S. mansoni, S. japonicum, S. mekongi, S. guineensis, and S. intercalatum* Balogun et al (2022). The first three are the most relevant from a global health perspective. Adult male and female schistosomes reside in the blood system, specifically the vesical venous plexus of the bladder (S. haematobium) or mesenteric vessels of the gastrointestinal tract (*S. mansoni* and *S. japonicum*). At these sites, mated female worms lay eggs, which are expelled via urine or feces, respectively, into the surroundings. In freshwater, the eggs hatch to release miracidia, which seek out and penetrate intermediate snail hosts. In the appropriate host, asexual reproduction leads to the development of sporoscysts and their terminal differentiation as cercariae. Cercariae are released back into the water in response to sunlight and penetrate human skin to establish themselves in the systemic circulation as schistosomula. These mature in the liver into adult worms that end up in the blood vessels around the bladder or intestines to continue the cycle (McManus et al. 2018) Whereas S. haematobium is responsible for urogenital schistosomiasis (UgS), the other two species cause intestinal schistosomiasis (IS). Both forms of the disease can lead to chronic and morbid illhealth that may lead to low self-esteem and stigmatization. UgS is associated with haematuria in children and adults, with haematospermia and painful ejaculation in adult males, and with abnormal vaginal discharges and pelvic discomfort in females (Abdel-Naser et al. 2019, Colley et al. 2014, Zida et al 2016.). Schistosomiasis was first documented in any part of modern-day Nigeria in 1881 in the old Borno Empire, which is comprised of regions that form the present Borno State in North-Eastern Nigeria and has since been shown to be widespread across the country, although prevalence varies by district (Ezeh. et al. 2019).

Urinary schistosomiasis spread in both rural and urban communities

In Nigeria, urinary schistosomiasis is wide spread in both rural and urban communities, with prevalence ranging between 2% and 90% and vast majority of cases occurring among the poor and marginalizes. It has been reported in all 36 states of Nigeria including the Federal Capital Territory. The disease is associated with water resources development project such as dams and irrigation schemes, and slow-flowing and stagnant water which support the breeding and survival of snail intermediate host. The

resident of societies around such water development projects or in land water whose style of life steady contact with the contaminated water are at a great risk of the disease, most importantly, the school-aged children. The problem of lack of pure and portable water supply in school and homes in Kirfi Local Government Area makes the children at high risk of exposure to Schistosomiasis and implication of this disease in the children affects socio-economic development of country (Nnoruka, 2000). Those at high risk of infection are people involved in fishing activities, farming, padding of canoes, swimming and possible handling of infected snail host during collection of edible ones (WHO, 1985). Although schistosomiasis can be fatal, most infected individuals suffer from chronic debilitating symptoms such as anemia, haematuria and fatigue. Schistosomiasis is prevalent but the associated morbidity is low and varied (Gryseel et al., 2006). Based on 200 million infected people worldwide, the total number of disability adjusted life years (DALY) lost to schistosomiasis is estimated at 1.532 million per year of which 77% are in subSaharan Africa (Lopez et al., 2006). Although the intimate connection between conflict and Neglected Tropical disease (NTD) such as schistosomiasis is known (Beyreret al., 2007), the prevention and control of such disease in conflict and emergency setting are often neglected. In such context, more emphasis is given for life saving services and disease of epidemic importance. If the prevention and control of such disease do occur, they are often uncoordinated and driven by the occurrence of a cluster of cases. Urinary Schistosomiasis can be controlled by the provision of latrines and urinals or the introduction of effective sewage disposal system. The provision of civilized swimming pool or recreational activities would serve as a good control measures for the spread of the diseases.

Urinary schistosomiasis as a parasitic disease

Urinary schistosomiasis is reported to be endemic in virtually all rural regions of Nigeria, because of a widespread occurrence of ecological and socio-economic factors associated with the disease (Umoh et al. 2020) Urinary schistosomiasis is a parasitic disease of the tropics and sub-tropics caused by infection of humans with the trematode (parasitic flatworm) known as *Schistosoma haematobium*. Although highly preventable, the disease ranks second only to malaria in terms of prevalence and socioeconomic importance of parasitic diseases in endemic tropical and subtropical countries. (CDC 2011, WHO 2013 and Kazibwe et al. 2006). Schistosomiasis remains a challenging disease of public health importance, with approximately 779 million people estimated in 2008 to be at risk globally. Hotez (2009) Worldwide, Nigeria has the highest prevalence of urinary schistosomiasis, with about 29 million cases and about 101 million people at risk of infection in 2010. (Hotez et al. 2012, WHO 2013,). (WHO 2016) Human infection results when man comes into contact with water harbouring the infective stage of the parasites, the frees wimming cercariae, which have the capability of directly penetrating the water-softened, intact skin of humans who are carrying out water-related activities, such as fishing, laundry, bathing and swimming. The presence of the intermediate snail hosts of the parasite and increased human contact with contaminated water bodies are the key determining factors that favour the transmission of the disease. People at maximum risk are those who live in, or travel to, endemic areas and make contact with water containing the intermediate host. Children are usually prone to acquiring urinary schistosomiasis, because of a strong tendency for playing in water, which predisposes them to infection.

Objectives of the Study

The aim of this study is to investigate the prevalence and risk factors associated with urinary schistosomiasis among pre-school and school-aged children in the Katsina South Senatorial Zone of Katsina State.

Objectives of the Study:

- To determine the prevalence of urinary schistosomiasis among pre-school and school-aged children in Katsina South Senatorial Zone.
- To identify the socio-demographic characteristics of the children affected by urinary schistosomiasis and To assess the knowledge, attitudes and practices related to urinary schistosomiasis among pre-school and school-aged children and their caregivers and To investigate the risk factors associated with urinary schistosomiasis in the study

population, including water contact patterns, water sources, sanitation facilities and hygiene practices.

- To evaluate the impact of urinary schistosomiasis on the health and well-being of affected children, including its effects on physical growth, nutritional status, and school attendance .

RESEARCH METHOD

The Study Area

Katsina State is located in the North-West geopolitical zone of Nigeria alongside Jigawa, Kaduna, Kano, Kebbi, Sokoto and Zamfara States. It has an area of 24,192 km². The state has 34 local government areas. Katsina State is predominantly inhabited by Hausas and Fulani's. The 34 local government areas of the state are grouped into 3 zones that are otherwise known as senatorial districts. The 3 senatorial districts of Katsina state are: Katsina North, Katsina South and Katsina Central, and the research focus only at the Katsina south senatorial zone.

The Research Design

This study utilized a cross-sectional research design.
Sampling: Target Population: Pre-school and school-aged children (aged 3-15 years) in the Katsina South Senatorial Zone, Katsina State. Sampling Technique: A multistage sampling approach was employed.
Stage 1: Random selection of schools within the senatorial zone.
Stage 2: Random sampling of classes within selected schools.
Stage 3: Random selection of children within the sampled classes.
Sample Size: Adequate sample size was determined based on prevalence estimates, anticipated effect sizes and statistical power considerations.

Administration of questionnaire and collection of samples

A questionnaire titled 'prevalence and risk factors of urinary Schistosomiasis in pre-school and school aged children in Katsina south senatorial zone, Katsina state.' was administered verbally to each participant, parents or guardian by the research assistants with the generous support of school tutors, who helped in communicating effectively in the local dialect. Participants' information sought for in the questionnaire included age, residence, source(s) of water for domestic use, water contact activities, history of diseases with symptoms of haematuria, access to healthcare facilities, the occupation and educational status of parents or guardian, amongst others. Each participant was given a sterile dry plastic universal container with a screw lid, in which they were asked to take a terminal urine sample between 10:30am and 11:30am, when the ova load is greatest. Each container was labeled with the sex, age and number of the participant as provided in the questionnaire form. Fresh urine samples collected were examined macroscopically for presence of blood (haematuria). The samples were then preserved by adding 5 mL of dilute (0.3%) carbol-fuchsin solution to each 10 mL of urine, and taken to the laboratory with an ice-pack.

Microscopic examination was carried out where drop of the sediment is taken from the container and placed on a glass slide. A cover slip is placed over the sample, and the slide is observed under a microscope. The microscopic examination involves searching for the characteristic eggs of Schistosoma haematobium. The eggs are oval-shaped and have a characteristic spine at one end. They are usually brownish in color and measure about 100-180 micrometers in length. The number of eggs seen under the microscope was used to estimate the intensity of infection. The information is important for determining appropriate treatment strategies.

Statistical Analysis

The data obtained was entered in Microsoft Excel and Predictive Analysis Software version 20.0 to perform data analysis. The Pearson chi-square was used to compare differences in prevalence between sex and age groups and location of the study, while Association between water contact activities and prevalence of infection was determined using univariate analysis.

RESULTS AND DISCUSSION

The researcher state that, the study involve pre-school and school aged children in Katsina south senatorial zone, Katsina state of Nigeria, the analysis of the data obtained is presented below.

Prevalence of Schistosomiasis

Table 1: Demographic characteristics of participant

Variables	N	Percent%
Age		
1 - 5 yrs	36	12.0
6 - 10yrs	124	64.0
11 - 15 yes	56	18.7
15 and above	16	5.3
Sex		
Male	174	58.0
Female	126	42.0
Health status		
Positive	44	14.7
Negative	256	85.3
Family Size		
Less than 10	124	41.3
More than 10	176	58.7
Parent Education Level		
Educated	176	58.7
Non-educated	124	41.3
Location		
Funtua	100	33.3
Malumfashi	100	33.3
Musawa	100	33.3

The demographic characteristics of the participants are shown in Table 4.1. 300 individuals 174(58.0%) are males and 126(42.0%) are females, out of the total 300 participant 36(12.0%) of them are 1-5 years, 124(64.0%) are between 6 – 10, 56(18.7%) are 11 – 15 years while 16(5.3%) are 15 and above years. According to the laboratory analysis of the random samples taken from some of the participant 44(14.7%) were found positive while 256(85.3%) were negative. Next is the family size of the participant which result to 124(41.3%) were less than 10 persons in their size while 176(58.7%) were more than 10 people. Meanwhile the majority of the students' parents are educated 176(58.7%) while a very good number 124(41.3%) are still found uneducated. Finally 100 participants were chosen to represent each of the location selected among the local government area.

Table 2: Prevalence and distribution of Schistosomiasis among the participants according to age, gender and Parent educational level

		Health Status		
		Positive	**Negative**	**Total**
Age	1 - 5 yrs	8	28	36
		22.2%	77.8%	100.0%
	6 - 10yrs	30	162	192
		15.6%	84.4%	100.0%
	11 - 15 yes	6	50	56
		10.7%	89.3%	100.0%
	15 and above	0	16	16
		0.0%	100.0%	100.0%

Sex * Health Status Crosstabulation

		Health Status		
		Positive	**Negative**	**Total**
Sex	**Male**	28	146	174
		16.1%	83.9%	100.0%
	Female	16	110	126
		12.7%	87.3%	100.0%

Parent Educational Level * Health Status Crosstabulation

		Health Status		**Total**
		Positive	**Negative**	
Parent Educational Level	Educated	18	106	124
		14.5%	85.5%	100.0%
	Non-educated	26	150	176
		14.8%	85.2%	100.0%

Univariate analysis on prevalence of the disease

The highest prevalence of infection by age was 30(15.0%) amongst students aged 6–10 years, followed by those aged 1–5 years *8* (22.2%), whereas students aged 11 – 15 years had the lowest 6(10.5%). While Students aged above 15 years had a lower prevalence rate of 0(0%).

The highest prevalence of infection by gender (n = 28; 16.1%) was found amongst male students while (n = 16; 12.7%) was found amongst female students.

Likewise students whose parents or guardians were educated were the least infected (n = 18; 14.5%), whilst children who's guidance or parents are non-educated (n = 26; 14.8%). Therefore a prevalence was found amongst children whose parents or guardians were illiterates, widely spread among the male child within the age limit of 6 – 10 years.

Table 3: Prevalence of urinary schistosomiasis in some location of south senatorial zone of Katsina state

Prevalence of urinary schistosomiasis in the following locations of south senatorial zone of Katsina state

Location	**Participant**	**No. Infected**	***P****
Funtua	100	14	
Malumfashi	100	15	
Musawa	100	15	

Chi-square test for the location

Does you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?

Table 4: Activities that may increase the risk of schistosomiasis transmission.

		Health Status		
		Positive	Negative	Total
Swimming or bathing in freshwater bodies (lakes, rivers, ponds, etc.	Count	10	14	24
	% within Do you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?	41.7%	58.3%	100.0%
	% within Health Status	22.7%	5.5%	8.0%
Using unsafe water sources for drinking or washing	Count	10	68	78
	% within Do you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?	12.8%	87.2%	100.0%
	% within Health Status	22.7%	26.6%	26.0%
Walking barefoot in areas with contaminated water or soil	Count	22	170	192
	% within Do you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?	11.5%	88.5%	100.0%
	% within Health Status	50.0%	66.4%	64.0%
None of the above	Count	2	4	6
	% within Do you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?	33.3%	66.7%	100.0%
	% within Health Status	4.5%	1.6%	2.0%
Total	Count	44	256	300
	% within Do you or your child engage in any of the following activities that may increase the risk of schistosomiasis transmission?	14.7%	85.3%	100.0%
	% within Health Status	100.0%	100.0%	100.0%

* Health Status Crosstabulation

Table 5: Chi-square test base on Activities that may increase the risk of schistosomiasis transmission

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.441[a]	3	.001
Likelihood Ratio	13.448	3	.004
Linear-by-Linear Association	9.828	1	.002
N of Valid Cases	300		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .88.

The table above shows that the highest rate of infection (n = 22; 11.4%) was found amongst students who walk barefoot in areas with contaminated water or soil. Infection rates of 22.7%
(n = 10) were found amongst those that are swimming or bathing in freshwater bodies (lakes, rivers, ponds) and .those using unsafe water sources for drinking or washing, 5.3% (n = 57) for river water, and 4.4% (n = 45) for well water.
The Pearson Chi-square value or the test statistics calculated for the above location table was calculated to have a p-value of 0.974 which shows that there's no significant relationship between location of the study and the widespreading of the disease while the second the second table for risk factors identify 17.441[a] at 3 degrees of freedom, the asymptotic significance value or the on one we call it p-value is .001 which is less than the significance level 0.05, this indicates that we reject the null hypothesis that states there is no association between infection and risk factors. We can conclude that we are 95% confident that **schistosomiasis** and the factors that leads to **Schistosomiasis infection** are dependent.

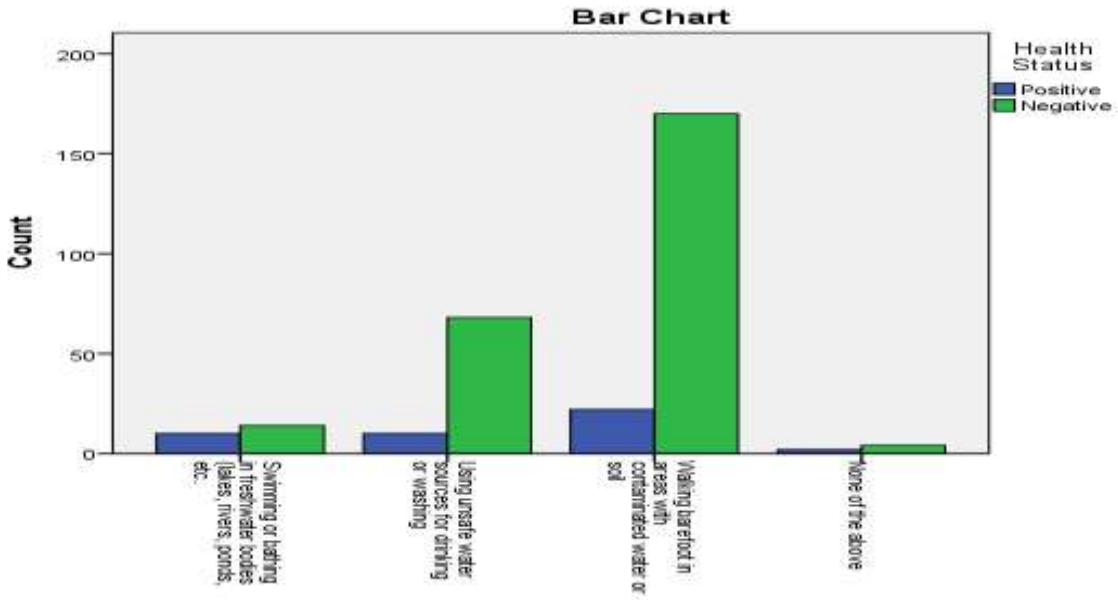

Figure 1: Chart presenting Activities that may increase the risk of schistosomiasis transmission.

south Senatorial zones (Funtua, Malumfashi and Musawa) are considered, which represent the 11 local governments from the zone with a prevalence of 44 (14.7%) schistosomiasis cases in the study areas representing the zones.

The low prevalence rate of the disease found in the present study could, firstly, be attributed to the impact of a preventive praziquantel-treatment programme, initiated by the World Health Organization in 2014, for school-aged children and special risk groups in the area.

Secondly, development of private borehole water facilities often for commercial purposes is trending in some communities of this locality. Although not accessible or affordable to a large segment of this rural population for patronage, access to this source of water by some residents, mainly for domestic uses, may have drastically reduced the risk of contact with parasite-infested water sources. This study found a higher prevalence of infection in communities without such facilities. Based on such a finding, it would be rather surprising that the disease prevalence was lower in Katsina state, which has a close proximity to infrastructural and healthcare facilities in most of the communities. Access to such amenities by the inhabitants of these communities should essentially impact positively on their living conditions, with a likelihood of reducing the prevalence level of the schistosomiasis. Nevertheless, the association between schistosomiasis and it risk factors in this study was statistically significant (p = .001). Previous studies in some parts of Nigeria had reported high prevalence rates of 48.8% (Bauchi State), 44% (Adamawa State), 55.7% (Cross River State), and 21.5% (Ebonyi State), which were associated mainly with the predominant occupation of the indigenes, such as fishing and farming.

This agrees with the finding of Okoli and Odaibo in a previous study that attributed higher infection rates of urinary schistosomasis amongst school boys in Ibadan to to a greater involvement in outdoor activities, such as swimming, washing, paddling of canoes, and irrigation. However, persons who have greater contact with the snail breeding loci are more likely to acquire the infection, regardless of their sex. Based on thus study most students in primary school classes are in the 6–10-year age bracket, and therefore it was not surprising that this age group had the highest prevalence of infection, perhaps on account of greater involvement in water-related activities compared with other groups, and not necessarily due to increased vulnerability. Children are generally known to be vulnerable to urinary schistosomiasis, because of their strong tendency to play in water, and walking barefooted which predisposes them to the infection.

CONCLUSION

This research was conducted in Katsina South senatorial district which has 11 local government areas. Based on current records from the local governments' hospitals, clinics and health centres, the area is reported to be endemic for urinary *Schistosomiasis*. Reports obtained from the interviews of the population and several health officials revealed that neither epidemiological survey nor control intervention was undertaken in the area. This study was therefore undertaken to determine the prevalence and intensity of infection and the risk factors associated with the disease in pre-school and school aged children known as the vulnerable groups. This can be used as baseline data to later expand the study and plan strategies for control program in accordance to the World Health Organization (WHO) recommendations

RECOMMENDATION

Based on the study, the following recommendations can be made especially to the local government authority and state government to prevent and control the disease:

1. Health Education and Awareness:

i. Implement comprehensive health education programs targeting children, parents, teachers, and community members to increase awareness about urinary schistosomiasis, its transmission, and preventive measures.

ii. Promote the importance of basic hygiene practices such as regular handwashing with soap and clean water, safe water handling, and proper use of sanitation facilities.

2. Access to Safe Water and Sanitation:

i. Improve access to safe drinking water sources, such as protected wells or boreholes, to minimize waterborne transmission of schistosomiasis.

ii. Implement and maintain proper sanitation facilities, including the construction and maintenance of latrines, to reduce contamination of water sources with schistosome eggs.

3. Mass Drug Administration (MDA):

i. Implement periodic mass drug administration campaigns using praziquantel, the recommended drug for treating schistosomiasis, targeting pre-school and school-aged children in the study area.

ii. Ensure proper distribution, administration, and monitoring of praziquantel to achieve high treatment coverage and compliance rates.

4. School-Based Interventions:

i. Integrate schistosomiasis prevention and control activities into the school curriculum, including hygiene promotion, water and sanitation facilities improvement, and regular deworming campaigns.

ii. Provide adequate facilities, such as clean water sources, handwashing stations, and sanitary latrines, in schools to promote a healthy environment.

5. Collaboration and Partnerships:

i. Foster collaboration among various stakeholders, including government agencies, non-governmental organizations, community leaders, and healthcare providers, to develop and implement integrated schistosomiasis control programs.

ii. Seek support from international organizations and donor agencies to provide resources, technical assistance, and funding for schistosomiasis control efforts.

6. Monitoring and Evaluation:

i. Establish a surveillance system to monitor the prevalence and intensity of schistosomiasis infections in the study area, enabling timely intervention and evaluation of control measures.

ii. Conduct regular monitoring and evaluation of the implemented interventions to assess their effectiveness and identify areas for improvement.

It is crucial to tailor these recommendations to the specific context and needs of the Katsina South Senatorial Zone, considering cultural practices, socio-economic factors, and available resources.

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