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Analysis On The Prevalence And Risk Factors Of Urinary Schistosomiasis Among Secondary School Students In Katsina Local Government Area, Katsina State

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ABSTRACT
Schistosoma haematobium infection is a globally significant parasitic disease, impacting over 100 million individuals worldwide, with a predominant presence of more than 75% of cases in sub-Saharan Africa. This research aimed to assess the prevalence of urinary schistosomiasis among secondary school students and children aged less than 14 years in Katsina local government area of katsina state and identify associated risk factors. The highest prevalence, accounting for 26.7%, was observed among the students from Government Secondary Schools located in the rural area and children of the rural area of the local government. Within the age group of 6-14, there was a heightened prevalence of infection. Students relying on streams as their primary water source showed a substantial prevalence rate the lack of access to clean and portable water in both schools and homes in the research area children at a heightened risk of schistosomiasis exposure. The implications of this disease on children extend to socio-economic development within the state and country. Addressing these challenges the research apply a multifaceted approach, encompassing health awareness education, widespread chemotherapy and environmental measures Such comprehensive measures are essential for effective control and prevention of urinary schistosomiasis in the community.
Keywords: Prevalence, Urinary Schistosomiasis, Students

1.0 INTRODUCTION

Urinary Schistosomiasis, caused by the parasitic trematode *Schistosoma haematobium*, is a neglected tropical disease that affects millions of individuals worldwide, particularly in sub-Saharan Africa. This debilitating and often overlooked disease has profound implications for the health and well-being of affected populations, especially school-age children. In Katsina State, Nigeria, urinary schistosomiasis remains a considerable public health concern, with a significant burden on the local community, particularly among secondary school students. Schistosomiasis, a parasitic infection caused by blood trematode worms of the genus Schistosoma, stands as one of the most prevalent neglected tropical diseases (NTDs) and remains a significant public health challenge in approximately 77 developing countries situated in tropical and subtropical regions. It is estimated that more than 240 million

individuals are currently afflicted, while roughly 700 million people globally are at risk of contracting this disease. Notably, over 90% of schistosomiasis cases are concentrated in sub-Saharan Africa, with the region witnessing nearly 300,000 deaths attributed to schistosomiasis each year (Hotez and Kamath, 2009). The burden of schistosomiasis is most acute among schoolchildren, adolescents, and young adults. This concentration of cases among the youth has profound consequences, adversely impacting educational attainment and overall health. The untreated infections not only debilitate individuals but also undermine social and economic development in areas where the disease is endemic. Urogenital Schistosomiasis, primarily caused by *Schistosoma haematobium*, manifests as hematuria, dysuria, bladder wall damage, hydronephrosis, and has the potential to progress to squamous cell carcinoma. In adults, this infection may lead to genital ulcers and other lesions, resulting in compromised reproductive health, including sexual dysfunction and infertility. On the other hand, intestinal Schistosomiasis, associated with Schistosoma mansoni, presents with symptoms such as bloody diarrhea and bowel ulceration. Chronic infections can lead to hepatomegaly, periportal liver fibrosis, portal hypertension, and hematemesis. It's worth noting that S. intercalatum, another schistosome species, causes a distinct form of intestinal Schistosomiasis but is confined to West and Central Africa (Tchuem et al., 2003). The objectives of this study are multifaceted: to determine the extent of urinary schistosomiasis prevalence within this specific population, to identify areas with a higher disease burden, to assess knowledge and awareness about schistosomiasis, and to understand the risk factors that contribute to transmission. By achieving these objectives, we aim to provide valuable insights into the local context and support evidence-based strategies for disease control and prevention. Furthermore, the findings of this research have the potential to contribute to the broader discourse on schistosomiasis control in Nigeria and inform policies and interventions to reduce the disease's impact on the health and education of secondary school students in Katsina State.

1.1 Human schistosomiasis as bilharziasis due to Schistosoma haematobium

Human schistosomiasis, also referred to as bilharziasis due to Schistosoma haematobium, holds significant global importance, ranking second only to malaria in terms of socio-economic and public health impact in tropical and sub-tropical regions. It stands as the most prevalent among water-borne diseases, posing a substantial risk to the health of rural populations (Biu et al., 2000). Worldwide, schistosomiasis is a widespread concern, contributing to 56% of documented cases of bladder stone-associated calcifications. The most severe consequence of urinary schistosomiasis is the development of squamous cell carcinoma of the urinary bladder. In Nigeria, urinary schistosomiasis has been a longstanding issue, particularly affecting low-resource communities. With approximately 20% of sub-Saharan Africa's population, Nigeria has historically been one of the most heavily impacted countries in Africa by schistosomiasis (Njepuome et al., 2009). Young individuals, especially those in the age group of 11-15 years, exhibit the highest prevalence and intensity of infection (Sarkinfada et al., 2009). Both natural (McManus et al., 2011) and artificial water bodies (Duwa and Oyeyi, 2009).

1.2 Urinary schistosomiasis classified as a parasitic ailment

Urinary schistosomiasis is acknowledged as an endemic condition in nearly all rural areas of Nigeria, primarily attributed to widespread ecological and socio-economic factors associated with the disease (Umoh et al., 2020). This parasitic affliction prevalent in the tropics and sub-tropics results from the infection of humans with the trematode, Schistosoma haematobium, a parasitic flatworm. Despite being highly preventable, urinary schistosomiasis stands as the second most prevalent parasitic disease, following only malaria, and carries significant socio-economic implications in tropical and subtropical regions (CDC 2011, WHO 2013, Kazibwe et al., 2006). Globally, urinary schistosomiasis poses a formidable public health challenge, with an estimated 779 million people at risk in 2008 (Hotez, 2009). Notably, Nigeria bears the highest burden, reporting approximately 29 million cases and exposing around 101 million individuals to the risk of infection in 2010 (Hotez et al., 2012, WHO 2013). The elevated prevalence in Nigeria is attributed to the widespread distribution of *Bulinus* spp., the snail host of *S. haematobium*, and the unregulated release of urine containing S. *haematobium* eggs into water bodies inhabited by the snail host (Okolie, 2008). Numerous factors, including poor sanitation, poverty, lack of awareness, limited healthcare access, and social amenities, contribute to the heightened prevalence of

urinary schistosomiasis in developing nations (WHO 2016). Human infection occurs when individuals come into contact with water containing the infective stage of the parasites, known as free-swimming cercariae, which can penetrate the softened, intact skin during water-related activities like fishing, laundry, bathing, and swimming. The presence of intermediate snail hosts and increased human interaction with contaminated water bodies are pivotal factors favoring disease transmission. Children, due to their propensity for playing in water, are particularly susceptible to acquiring urinary schistosomiasis (WHO 2008). Early detection is crucial for disease control and prevention, with praziquantel therapy being a key intervention (WHO 2012). Parasitological diagnosis, involving microscopic examination of urine for parasite eggs, is the practical and widely-used method, while immunoserological diagnosis, detecting parasite antigens and antibodies through techniques like enzyme-linked immunosorbent assay, proves efficient, especially in early infections. School-age children represent an ideal target group for urinary schistosomiasis investigation in endemic communities due to their habits of poor hygiene and water play, facilitating parasite transmission. Data from this age group are valuable not only for justifying their inclusion in mass treatment programs but also for determining intervention needs. In some communities of Ebonyi State, south-east Nigeria, urinary schistosomiasis presents a serious public health challenge, emphasizing the need for contemporary prevention and control strategies (Uneke et al., 2006). This study evaluates the prevalence and risk factors in rural communities of the region, aiming to provide a current roadmap for effective strategies.

1.3 The prevalence of urinary schistosomiasis extends to both rural and urban communities.

In Nigeria, urinary schistosomiasis is pervasive in both rural and urban communities, with prevalence rates spanning from 2% to 90%, predominantly affecting the impoverished and marginalized populations. This condition has been reported in all 36 states of Nigeria, including the Federal Capital Territory. The prevalence is often associated with water resource development projects like dams and irrigation schemes, as well as slow-flowing and stagnant water bodies that provide a conducive environment for the breeding and survival of the snail intermediate host. Residents in communities around such water development projects, or those living in areas with constant contact with contaminated water, are at a heightened risk of contracting the disease, particularly school-aged children. The global burden of schistosomiasis is substantial, with an estimated 200 million infected people worldwide resulting in the loss of approximately 1.532 million disability-adjusted life years (DALY) annually, with 77% of these in sub-Saharan Africa (Lopez et al., 2006). If undertaken, these efforts are typically reactive, triggered by the occurrence of a cluster of cases. In the context of Katsina State, Nigeria, where schistosomiasis is a significant public health concern, research endeavors aim to comprehend the disease burden, including prevalence, distribution, and specific risk factors in the region. This information is crucial for designing targeted interventions such as mass drug administration campaigns, snail control programs, and health education initiatives. Evaluating the effectiveness of existing control measures and identifying novel approaches for disease elimination are also key research objectives. Ultimately, this research plays a pivotal role in improving public health outcomes and progressing toward the elimination of schistosomiasis in Nigeria. Addressing the root causes of disease prevalence requires a comprehensive approach that extends beyond the health sector. State governments should engage in socioeconomic development initiatives, including poverty alleviation, improving access to education, enhancing nutrition, and empowering communities. These efforts contribute to better health outcomes and reduce the overall burden of diseases in affected regions.

1.4 Schistosomiasis stands as a persistent and severe tropical ailment with chronic implications.

Schistosomiasis, a chronic and debilitating neglected tropical disease, is induced by waterborne digenetic trematodes belonging to the genus Schistosoma. Notably, the medically significant species include *Schisotosoma haematobium, S. mansoni, S. japonicum, S. mekongi, S. guineensis,* and *S. intercalatum* (Balogun et al., 2022), with the first three posing the most substantial global health concerns. Adult male and female schistosomes take residence in the blood system, specifically the vesical venous plexus of the bladder for S. haematobium or mesenteric vessels of the gastrointestinal tract for S. mansoni and S. japonicum. In these locations, mated female worms lay eggs, which are subsequently expelled via urine or feces into the environment (Nation et al., 2020). In freshwater, the eggs hatch, releasing miracidia that

seek out and penetrate intermediate snail hosts. Asexual reproduction within the snail leads to the development of sporocysts, ultimately producing cercariae. Upon exposure to sunlight, cercariae are released back into the water, penetrate human skin, and establish themselves in the systemic circulation as schistosomula. Maturation in the liver results in adult worms that inhabit blood vessels around the bladder or intestines, perpetuating the cycle (Gryseels et al., 2006; McManus et al., 2018). While S. haematobium causes urogenital schistosomiasis (UgS), S. mansoni and S. japonicum lead to intestinal schistosomiasis (IS). Both forms of the disease can instigate chronic and debilitating health issues, potentially contributing to low self-esteem and stigmatization. UgS is associated with hematuria in children and adults, haematospermia and painful ejaculation in adult males, and abnormal vaginal discharges and pelvic discomfort in females (Abdel-Naser et al., 2019; Colley et al., 2014; Kjetland et al., 2012; Zida et al., 2016). UgS and IS collectively pose major public health challenges, affecting over 230 million people in 54 tropical and sub-tropical countries, predominantly in rural regions (Amuta and Houmsou, 2014), with an estimated cost of 1.4 million disability-adjusted life years (DALYs) (GBD 2017 DALYs and HALE Collaborators). With over 25 million people infected, Nigeria bears the highest endemicity for schistosomiasis globally, with UgS being the predominant form (Ekpo et al., 2013). Schistosomiasis was initially documented in Nigeria in 1881 in the old Borno Empire, now part of Borno State, and has since been shown to be widespread across the country, albeit with varying prevalence by district (Ezeh et al., 2019). Despite mass chemotherapeutic programs with praziquantel (PZQ) aimed at reducing morbidity, the prevalence of the disease in Nigeria may be on the rise due to poverty, inadequate public health infrastructure, and low literacy levels (Ajakaye et al., 2016). Many communities, including those in Jigawa State, lack information on the prevalence or incidence of the disease, particularly among high-risk school-age children, posing a significant obstacle to control efforts. Therefore, this study investigates the prevalence and associated risk factors of UgS among primary school pupils in Jidawa and Zobiya, rural communities in Dutse Local Government Area of Jigawa State, Nigeria, which have not been previously examined for schistosomiasis. These communities, chosen for the study, feature a large earth dam used for agricultural purposes, including irrigation, fishing, and providing drinking water for livestock. Locals also utilize the dam water for bathing and domestic purposes, placing them at a heightened risk of infection by waterborne pathogens present in the reservoir. Reports indicate the contribution of agricultural dams to a high prevalence of schistosomiasis (Atalabi et al., 2016; Lund et al., 2021). Bara et al. (2021) revealed a high prevalence of Urinary Schistosomiasis among primary school pupils in Kirfi Local Government Area of Bauchi State, Nigeria. The infection affected both sexes, all age groups, and all schools, with the highest prevalence among subjects enrolled in two schools situated close to the river. Schistosomiasis, a tropical parasitic disease caused by blood-dwelling flukes of the genus Schistosoma, poses a significant public health concern in developing countries (Gryseels et al., 2006). The World Health Organization (WHO) recognizes schistosomiasis as the second most socioeconomically devastating parasitic disease globally, following only malaria, with hundreds of millions infected worldwide (WHO, 2006). Schistosomes, commonly known as blood-flukes, are unique among trematodes in their diacious nature, exhibiting distinct sexual dimorphism between males and females.

1.5 Objectives of the Study

The aim of this research is to investigate the prevalence of urinary schistosomiasis and identify the associated risk factors among secondary school students in Katsina Local Government Area, Katsina State. The specific objectives are: -

i. To identify the socio-demographic and behavioral risk factors associated with urinary schistosomiasis transmission and infection among the students.
ii. To investigate the water contact patterns of students, including activities that may expose them to schistosomiasis transmission.
iii. To assess the knowledge and awareness of urinary schistosomiasis among secondary school students.
iv. To raise awareness among the parents and the local community about the importance of preventing urinary schistosomiasis and the associated risk factors.

2.0 RESEARCH METHOD

2.1 Study Area

Katsina Local Government Area is a specific administrative region within Katsina State, Nigeria, where the study is conducted, Katsina State is a state in northwestern Nigeria, where the research is focused. It is important to note that geographical and demographic characteristics of the region may influence the prevalence and risk factors of urinary schistosomiasis. The widely disputed of the 2019 National bureau of statistics population, placed Katsina State at 9,300,382 created in 1987 and was carved out of the old Kaduna State.

2.2 Study Design

This study is retrospective in nature also utilize a cross-sectional research design. Secondary school students and children (aged 6-14 years) in the Katsina local government, Katsina State. Random selection of schools both public and private, within the Katsina local government. Adequate sample size was determined based on prevalence estimates, anticipated effect sizes and statistical power considerations.

2.3 Administration of data

Participants' information sought from the information obtained from the record department of the selected hospitals are age of the participant, Results of Schistosomiasis test, residence Contact with fresh water, amongst others. The participant data was from the record department of the hospital selected such as federal teaching hospital Katsina among others.

2.4 Statistical Analysis

The data obtained was entered in Microsoft Excel and import to the statistical package for social science Software (SPSS) version 23.0 to perform data analysis. Descriptive Analysis Summarize demographic data. Inferential Analysis logistic regression was Use to assess associations between risk factors and Schistosomiasis prevalence.

2.5 Ethical Considerations

Ethical constraints such as privacy concerns and the need for informed consent, limited certain aspects of the research methodology. The consents of Federal Teaching hospital Katsina has been seek for approved and ethical clearance form has been obtained before commencement of the research.

3.0 RESULT AND DISCUSSION

Table 1. Demographic profile of the respondents

Age of the children	Frequency	Percentage
6-10	60	51.7%
11-14	56	48.3%
Total	116	100%
Socio-economic status		
Low	31	26.7%
Middle	78	67.2%
High	7	6.0%
Total	116	100%
Result Schistosomiasis test		
Negative	85	73.3%
Positive	31	26.7%
Total	116	100.0
Contact with fresh water		
Yes	33	28.4%
No	83	71.6%
Total	116	100.0%

The personal data of the children recruited for the research collected were Age, Socio-economic status, Result Schistosomiasis and how they have Contact with fresh water in their respective environments.
Table 1 reveals that a slightly higher proportion of students aged 6-10 (51.7%) were included compared to those aged 11-14 (48.3%). This distribution suggests a relatively balanced representation of age groups among the secondary school students in Katsina Local Government Area. Understanding the age distribution is crucial for assessing the vulnerability of different age groups to urinary schistosomiasis, as susceptibility and exposure may vary across different developmental stages. Regarding socio-economic status, the majority of students were classified as middle class (67.2%), followed by those from low socio-economic backgrounds (26.7%), while only a small percentage belonged to high socio-economic status (6.0%). This distribution highlights the predominance of students from middle-class families within the study population. Socio-economic status can significantly impact access to healthcare, sanitation facilities, and education, all of which are factors that influence the risk of contracting and managing urinary Schistosomiasis. Analysis of Schistosomiasis test results from table 1 also reveals that 26.7% of the students tested positive for the disease, while 73.3% tested negative. This finding underscores the significant burden of urinary schistosomiasis among secondary school students in Katsina Local Government Area.

Table 2. Adequacy of sanitation facility and Access to safe water

Adequacy of sanitation facility	**Frequency**	**Percentage**
Inadequate	91	78.4%
Adequate	25	21.6%
Total	116	100.0%
Access to safe water		
Limited	26	22.4%
Unlimited	90	77.6%
Total	116	100.0%

Table 2 discuss the sanitation facilities among secondary school students and children in Katsina Local Government Area indicates a concerning trend, with the majority (78.4%) reporting inadequate sanitation facilities. This suggests a lack of proper sanitation infrastructure, which can have significant implications for hygiene and disease transmission. Inadequate sanitation facilities increase the risk of contamination of water sources with pathogens, including those responsible for urinary Schistosomiasis. Additionally, poor sanitation can contribute to the spread of other waterborne diseases and negatively impact overall public health outcomes. Access to safe water is another critical aspect of preventing and controlling urinary Schistosomiasis. However, the data reveals that a substantial proportion (22.4%) of the students have limited access to safe water. Limited access to safe water sources can force individuals to rely on contaminated water bodies, increasing their risk of contracting waterborne diseases such as Schistosomiasis. Improving access to safe water is essential not only for preventing urinary Schistosomiasis but also for promoting overall health and well-being among the student population. The disparities in access to adequate sanitation facilities and safe water highlight the need for targeted interventions to address the underlying determinants of urinary Schistosomiasis in Katsina Local Government Area. Efforts should focus on improving sanitation infrastructure, ensuring access to safe water sources, and promoting hygiene practices among students. Community-based initiatives, public-private partnerships, and government interventions are essential for implementing sustainable solutions to reduce the burden of urinary schistosomiasis and improve the health outcomes of the affected population.

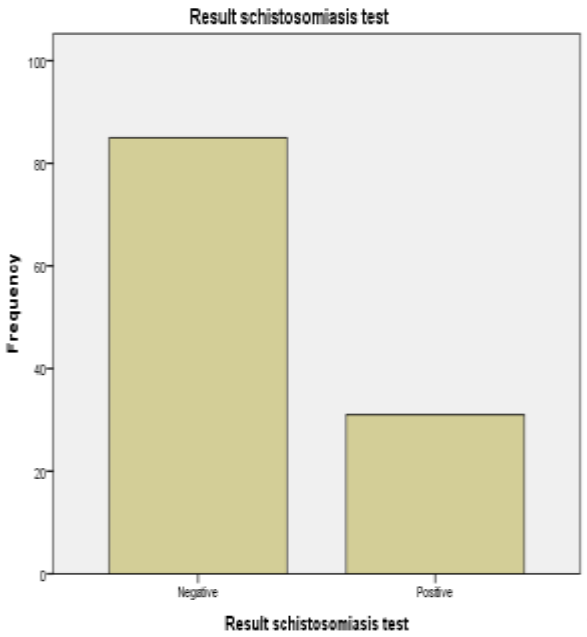

Fig. 1 barchart of the Result of schistosomiasis test for the recruited participant

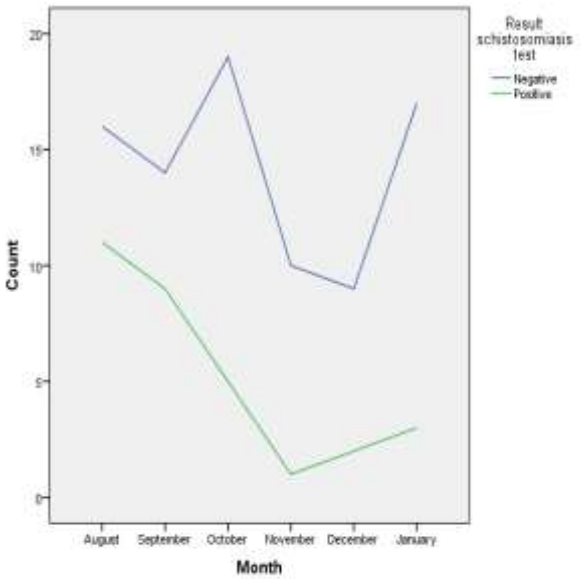

Fig. 2. Linechart of the of schistosomiasis trends for the couple months

Table 3. Classification table for weight effect of the total number of cases.

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	116	100.0
	Missing Cases	0	.0
	Total	116	100.0
Unselected Cases		0	.0
Total		116	100.0

Table 4a. Classification table for a Constant included in the model.

Classification Table[a,b]

Observed			Predicted		
			Result schistosomiasis test		Percentage Correct
			Negative	Positive	
Result schistosomiasis test		Negative	85	0	100.0
		Positive	31	0	.0
Overall Percentage					73.3

The cut value is .500

Table 4b. Variables in the Equation for the model.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-1.009	.210	23.111	1	.000	.365

Table 5. Variables not in the Equation of the model.

Variable not in the equation

		Score	df	Sig.
Variables	Contact_with_fresh_water	49.843	1	.000
	Adequacy_of_sanitation_facility	.026	1	.871
	Access_to_safe_water	16.412	1	.000
	Season	5.202	1	.023
	Immune_status	18.840	1	.000
Overall Statistics		64.722	5	.000

Table 6. Correlation Table of the model.

Correlations

		Result schistosomiasis test	Contact with fresh water	Adequency of sanitation facility	Access to safe water	Weather	Immune status
Result schistosomiasis test	Pearson Correlation	1	-.656**	.015	-.376**	-.212*	-.403**
	Sig. (2-tailed)		.000	.872	.000	.022	.000
	N	116	116	116	116	116	116
Contact with fresh water	Pearson Correlation	-.656**	1	-.088	.303**	.117	.139
	Sig. (2-tailed)	.000		.349	.001	.210	.136
	N	116	116	116	116	116	116
Adequency of sanitation facility	Pearson Correlation	.015	-.088	1	-.020	-.090	-.013
	Sig. (2-tailed)	.872	.349		.832	.339	.888
	N	116	116	116	116	116	116
Access to safe water	Pearson Correlation	-.376**	.303**	-.020	1	.061	.202*
	Sig. (2-tailed)	.000	.001	.832		.517	.029
	N	116	116	116	116	116	116
Weather	Pearson Correlation	-.212*	.117	-.090	.061	1	.154
	Sig. (2-tailed)	.022	.210	.339	.517		.099
	N	116	116	116	116	116	116
Immune status	Pearson Correlation	-.403**	.139	-.013	.202*	.154	1
	Sig. (2-tailed)	.000	.136	.888	.029	.099	
	N	116	116	116	116	116	116

Correlation is significant at the 0.01 level (2-tailed).

Table 7. model summary for a Snell R Square

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	61.893[a]	.466	.679

Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Table 9. classification table for model summary for a Snell R Square

Classification Table[a]

	Observed		Predicted		
			Result schistosomiasis test		Percentage Correct
			Negative	Positive	
Step 1	Result schistosomiasis test	Negative	76	9	89.4
		Positive	7	24	77.4
	Overall Percentage				86.2

The cut value is .500

Table 9 presents the estimated effect of each predictor variable on the log odds of the outcome (schistosomiasis test result). For example, a negative coefficient suggests a decrease in the odds of testing positive for schistosomiasis, while a positive coefficient indicates an increase in the odds. This is the standard deviation of the sampling distribution of the beta coefficient. It provides information about the precision of the estimated coefficient. This is the Wald statistic, which is calculated by dividing the square of the coefficient by its variance. It is used to test the null hypothesis that the coefficient is equal to zero. The degrees of freedom associated with the Wald statistic, indicating the number of independent pieces of information available for estimating a parameter. The table 9 also indicates the percentage of cases that were correctly classified by the model. These values help assess the significance and predictive power of the model, as well as the individual contribution of each predictor variable to the outcome of interest. The logistic regression analysis aimed to identify significant predictors of urinary schistosomiasis among secondary school students in Katsina Local Government Area. The model's overall statistical significance ($p < .500$) indicates that the included variables collectively have predictive power in determining schistosomiasis test results. This underscores the importance of understanding the factors influencing the prevalence of the disease and devising targeted interventions to mitigate its impact. By analyzing the coefficients of the predictor variables, we can discern their individual contributions to the likelihood of testing positive for schistosomiasis. Among the predictor variables entered into the model, contact with fresh water, access to safe water, and immune status emerged as significant predictors of schistosomiasis test results. Students who reported less contact with fresh water, better access to safe water, and stronger immune status were significantly less likely to test positive for the disease. These findings underscore the critical role of water-related factors and immune health in the transmission and susceptibility to urinary schistosomiasis. Efforts to improve water quality, promote hygiene practices, and enhance immune health could contribute to reducing the burden of schistosomiasis among the student population. However, it's noteworthy that adequacy of sanitation facility and season did not reach statistical significance as predictors of schistosomiasis test results in this model. While inadequate sanitation facilities and seasonal variations may still play a role in the transmission dynamics of the disease, their influence may be

overshadowed by other factors such as water contact behavior and immune status in this particular context. Nonetheless, addressing sanitation issues remains crucial for overall public health and should be integrated into comprehensive strategies aimed at controlling urinary schistosomiasis and improving the well-being of affected communities.

4.0 CONCLUSION

Our study strengthen out the significant burden of urinary schistosomiasis among junior secondary school students and children residing in Katsina Local Government Area, Through a comprehensive analysis of prevalence and risk factors, several important visions have emerged. We found that urinary schistosomiasis is prevalent among secondary school students and children in the area, with a considerable proportion of individuals testing positive for the disease. This highlights the urgent need for targeted interventions to control its spread and alleviate the suffering of affected individuals. Our research also identified several risk factors associated with urinary schistosomiasis transmission. These include frequent contact with contaminated water sources, inadequate access to clean water and sanitation facilities and low awareness of the disease and its preventive measures. Addressing these risk factors through multifaceted interventions is crucial for reducing the incidence of urinary schistosomiasis in the community. Furthermore, our geospatial analysis revealed spatial clustering of urinary schistosomiasis cases within the Katsina Local Government Area, suggesting the presence of localized transmission hotspots. Targeting resources towards these high-risk areas could maximize the impact of control efforts and lead to more effective disease management. By addressing the underlying risk factors and enhancing disease control measures, we can mitigate the impact of urinary schistosomiasis on the health and well-being of children in the Local Government Area, contributing to the overall improvement of public health in the region

5.0 RECOMMENDATION

Based on the analysis of results, several recommendations can be made to address the findings and mitigate the impact of the disease. Here are some possible recommendations to the stake holders:

1. Implement comprehensive health education programs in secondary schools and rural communities, aimed at increasing awareness about urinary schistosomiasis, its transmission routes, symptoms and preventive measures.
2. Stake holder should collaborate with local authorities to improve access to clean water sources and sanitation facilities in the Katsina local community. Such as construction of boreholes, wells, and latrines, as well as the promotion of hygiene practices.
3. Establish regular screening and treatment programs for urinary schistosomiasis among secondary school students and children in collaboration with healthcare providers.
4. Implement vector control measures to reduce the population of snails, the intermediate hosts of Schistosoma parasites, in water bodies frequented by secondary school students.
5. Engage local communities through participatory approaches to foster ownership and sustainability of interventions.

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