Isah et al., J Biomed & App Sci FUD (2025) 4:1
www.jobas.fud.edu.ng
ISSN: 2814-3221 (print), ISSN: 2955-0874 (online)

JOBASFUD
Journal of Biomedical and Applied Sciences

RESEACH ARTICLE

PREVALENCE AND POST-EXPOSURE KNOWLEDGE, ATTITUDES AND PRACTICES OF *SCHISTOSOMIASIS* PATIENTS IN SELECTED LOCAL GOVERNMENT AREAS OF KANO STATE, NIGERIA

[1]Mannir Isah, [2*]Abdu, H.M, [3]Almu, S.U, [4]Sulaiman Mannir Idris, [5]Fatima Faruk Umar, [6]Zainab Muhammad Mahmud

[1]Department of Biological Sciences, Aliko Dangote University of Science and Technology Wudil, Kano Nigeria
[2,4]Department of Biological Sciences, Yusuf Maitama Sule University Kano Nigeria.
[3]Nigerian Institute for Trypanosomiasis Research, Kano
[5,6]Department of Biology, Federal College of Education Kano

Abstract

Background: Schistosomiasis is a major public health concern in Nigeria, with approximately 29 million infected individuals and 101 million at risk. Despite its prevalence, there is a significant gap in research on post-exposure knowledge, attitudes, and practices (KAPs) throughout much of Nigeria, particularly in Kano State. **Objective:** This study aimed to determine the prevalence of schistosomiasis and evaluate post-exposure KAPs among patients in selected Local Government Areas (LGAs) of Kano State, Nigeria. **Methods:** A cross-sectional survey was conducted, analyzing 326 urine samples microscopically and collecting data on KAPs via structured questionnaires. **Results:** The overall prevalence of schistosomiasis was 26.68%, with 62.22% of respondents reporting prior knowledge of the disease and 46.97% acknowledging previous infections. Common symptoms included haematuria (25.42%), urethral pain (31.23%), and cystitis (27.84%). Perceived causative factors included water contact (23.48%), sunlight exposure (30.02%), and excess salt intake (35.83%). Post-exposure complications included urogenital blockage (97.57%), difficulty urinating (6.05%), and infertility (5.32%), alongside less frequent reports of bladder cancer (1.93%) and urogenital ulceration (2.17%). **Conclusion:** The relatively high prevalence and significant knowledge gaps shows the need for community-based education and improved access to prevention and treatment strategies in the studied area..

Keywords: *Schistosomiasis*, KAP, Post-exposure Knowledge, *haematuria,* Kano.

INTRODUCTION

Schistosomiasis is one of the most prevalent neglected tropical diseases (NTDs) associated with significant morbidity and mortality in many developing countries across tropical and subtropical regions of Africa, Latin America, and Asia (Odhiambo *et al.,* 2014). The global burden of *schistosomiasis* remains high, particularly in low-income countries. Recent estimates indicate that approximately 779 million people are at risk of infection, with about 207 million individuals diagnosed with the disease across 74 countries (Bajiro *et al.,* 2016). Alarmingly, around 120 million of these infected individuals exhibit clinical symptoms of the disease.

Sub-Saharan Africa bears the brunt of this public health challenge, accounting for over 90% of global infections. It is estimated that *schistosomiasis* contributes to nearly 300,000 deaths annually in this region (King *et al.,* 2008). The prevalence and morbidity associated with *schistosomiasis* are particularly pronounced among vulnerable populations such as school-aged children,

* Corresponding Author: Abdu, H.M, Email and Phone: habibumaaruf11@gmail.com; +2348143145257

adolescents, and young adults (Hotez *et al.,* 2009). The debilitating effects of untreated infections can severely hinder academic performance and impede socio-economic development in endemic areas.

Among the 24 recognized species of *schistosomes* worldwide, only six species are responsible for human disease: *Schistosoma haematobium, S. mansoni, S. japonicum, S. mekongi, S. intercalatum, and S. guineensis* (Rollinson *et al.,* 2009). The first three species are the most significant from a public health perspective. The focus of this study is urinary *schistosomiasis* caused by *S. haematobium*, which is characterized by symptoms such as hematuria, dysuria, bladder wall pathology, and hydronephrosis. Chronic infections can lead to severe complications including squamous cell carcinoma (Parkin *et al.,* 2008; Hotez *et al.,* 2009). In adults, urinary *schistosomiasis* can also cause genital ulcers and other lesions that adversely affect reproductive health, leading to sexual dysfunction and infertility (King *et al.,* 2008).

Nigeria has the highest number of *schistosomiasis* cases globally, with approximately 29 million infected individuals, including about 16 million children. Furthermore, an estimated 101 million people are considered at risk for the disease (Adenowo *et al.,* 2015). In response to this public health crisis, the Federal Ministry of Health (FMOH) initiated efforts in 1988 through the National Schistosome Control Program (NSCP) to reduce prevalence by 50% within five years in targeted operational areas (Ekpo *et al.,* 2004). However, these initiatives have faced challenges due to a lack of comprehensive baseline data on disease distribution.

According to Nigeria's Master Plan for Neglected Tropical Diseases (2013-2017), mapping and baseline surveys for *schistosomiasis* have been conducted in only 19 out of the country's 37 states, primarily located in southern and western Nigeria. Consequently, complete mapping has only been achieved in nine states (FMOH, 2017).

Despite numerous reports on the prevalence of schistosomiasis, there remains a significant gap in research focusing on evaluating post-exposure Knowledge, Attitudes, and Practices (KAPs) regarding the disease throughout much of Nigeria, particularly in Kano State (Bassey and Umar, 2004). This lack of comprehensive studies is concerning given that schistosomiasis is endemic in various regions of Nigeria, with significant implications for public health. For instance, a study conducted in Kano State revealed a prevalence rate of urinary schistosomiasis as high as 49.2%, indicating a pressing need for targeted health interventions (Duwa *et al.,* 2021).

The present study aims to investigate both the prevalence of primary infection and post-exposure KAPs in selected Local Government Areas (LGAs) in Kano State, Nigeria. Assessing post-exposure KAPs is essential for identifying gaps in knowledge and misconceptions about schistosomiasis that may hinder prevention efforts. Previous studies have indicated that many communities lack adequate awareness about schistosomiasis and its transmission routes, which can exacerbate the disease's prevalence (Adeyeba and Ojeaga, 2002).

Moreover, research highlights that socio-economic factors, such as access to clean water and sanitation facilities, significantly influence the prevalence of schistosomiasis in these communities (Duwa et al., 2021). The findings from this study could inform local health policies and community education programs aimed at reducing the burden of schistosomiasis in Kano State.

Materials and Methods

Study Area

The study was conducted in three local government areas (LGAs) in Kano State: Garko, Minjibir, and Wudil. Garko and Wudil are situated in the southern region of Kano, while Minjibir is located in the central part of the state. Like many areas in Kano State, these Local Government Areas are characterized by Sudan savanna vegetation, consisting of grasses, shrubs, and scattered trees adapted to a semi-arid climate. They experiences distinct dry and rainy seasons, with rainfall levels varying annually. The rainfall is moderate and lasts from May to September.

Study Design

This study employs a cross-sectional survey design to investigate the prevalence of schistosomiasis and assess post-exposure Knowledge, Attitudes, and Practices (KAPs) among patients in selected Local Government Areas (LGAs) of Kano State, Nigeria. The cross-sectional design is particularly suitable for this research as it allows for the collection of data at a single point in time, providing a snapshot of the current status of schistosomiasis prevalence and associated KAPs within the target population.

Ethical Statement

Ethical approval for this study was obtained from the Kano State's Ministry of Health, the Kano State Hospitals Management Board, and district heads of the communities

involved. Prior to data collection, informed consent was also sought from all research participants.

Sample Collection

During sample collection, each participant was provided with sterile bottles to collect urine samples for microscopic analysis. Participants were instructed to collect at least 10 ml of urine while ensuring that they included the last drops in the sample container since these drops typically contain the highest concentration of *schistosomiasis* eggs (Cheesbrough, 2002). Samples were collected between 10:00 am and 2:00 pm to optimize egg yield.

A pre-validated questionnaire was also administered to participants to collect demographic data (age, gender, tribe, religion), socio-economic background (educational level and occupation), as well as their knowledge, attitudes, and practices regarding *schistosomiasis*. Two trained research assistants conducted the interviews using displayed pictures to facilitate understanding and ensure accurate responses regarding participants' knowledge levels.

Microscopic Examination

Upon collection, urine samples were transported to the laboratory in an ice-block packed cooler to maintain sample integrity until processing. Each sample was centrifuged at 5000 rpm for five minutes following established methods (Ekpo *et al.,* 2010). After centrifugation, the supernatant was discarded; the sediment was then transferred onto clean glass slides and covered with cover slips. Each prepared slide was then examined under a microscope at X40 magnification to identify *Schistosoma haematobium* eggs.

Data Analysis

The Data obtained were statistically analyzed using Chi-square tests with a significance level set at $p < 0.05$ to determine associations between variables. Additionally, simple percentages were calculated to ascertain prevalence rates among participants.

Results and Discussion

The results indicated that 87 (26.68) out of the 326 urine samples examined were positive for *schistosomiasis*, resulting in an overall prevalence rate of 26.68%. As shown in Table 1.0 below, Minjibir Local Government Area exhibited the highest prevalence 38 (30.89%), followed by Garko LGA 31 (26.95%) and Wudil, which had the lowest prevalence 18 (20.45%). However, there is no significant difference in prevalence rates among the three study areas, as shown by the Chi-square value (χ^2 = 17.5832) and p-value>0.05

Table (1): Prevalence of Urinary *schistosomiasis* by study area

Study site	No. Examine	No. Infected (%)	X^2
Garko	115	31 (26.95)	17.5832
Munjibir	123	38 (30.89)	
Wudil	88	18 (20.45)	
Total	326	87 (26.68)	

P-value = >0.05

The overall percentage prevalence observed in this study (26.68%) is consistent with findings from other endemic regions and shows the ongoing public health challenge posed by this neglected tropical disease in Kano State (Hotez *et al.,* 2012; Bajiro *et al.,* 2016). The higher prevalence rates recorded in Minjibir suggest that this area may require intensified surveillance and intervention efforts.

Figure 1: Gender-Based Prevalence of *schistosomiasis*

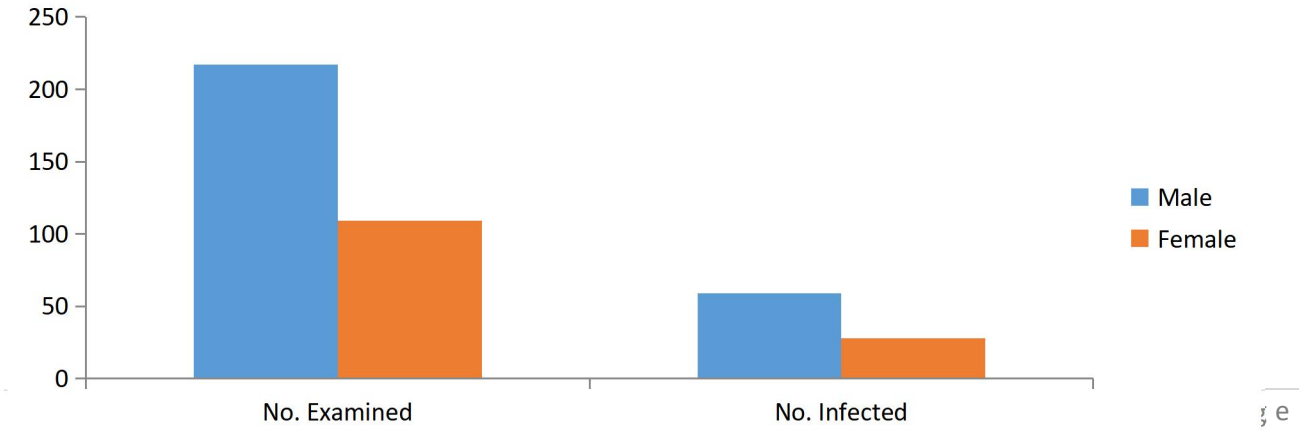


Figure 1 above shows the gender-based prevalence of *schistosomiasis* among participants. The results indicate that males had a higher infection rate compared to females, with a prevalence of 27.18% among males and 25.68% among females respectively. The Chi-square analysis yielded a value of $\chi^2 = 15.3765$ with a p-value <0.05, indicating that the difference in infection rates between the two genders is statistically significant. These findings align with previous studies that have reported higher prevalence rates of schistosomiasis among males, often attributed to differences in exposure risk due to occupational and recreational water contact activities (Odhiambo *et al.,* 2014; Kone *et al.,* 2022). Understanding these demographic patterns is crucial for developing targeted interventions aimed at reducing the burden of schistosomiasis in affected communities. The gender disparity observed in infection rates shows the need for gender-sensitive approaches in *schistosomiasis* control programs, particularly those addressing water contact behaviors and access to preventive measures (King *et al.,* 2008; Rollinson *et al.,* 2009).

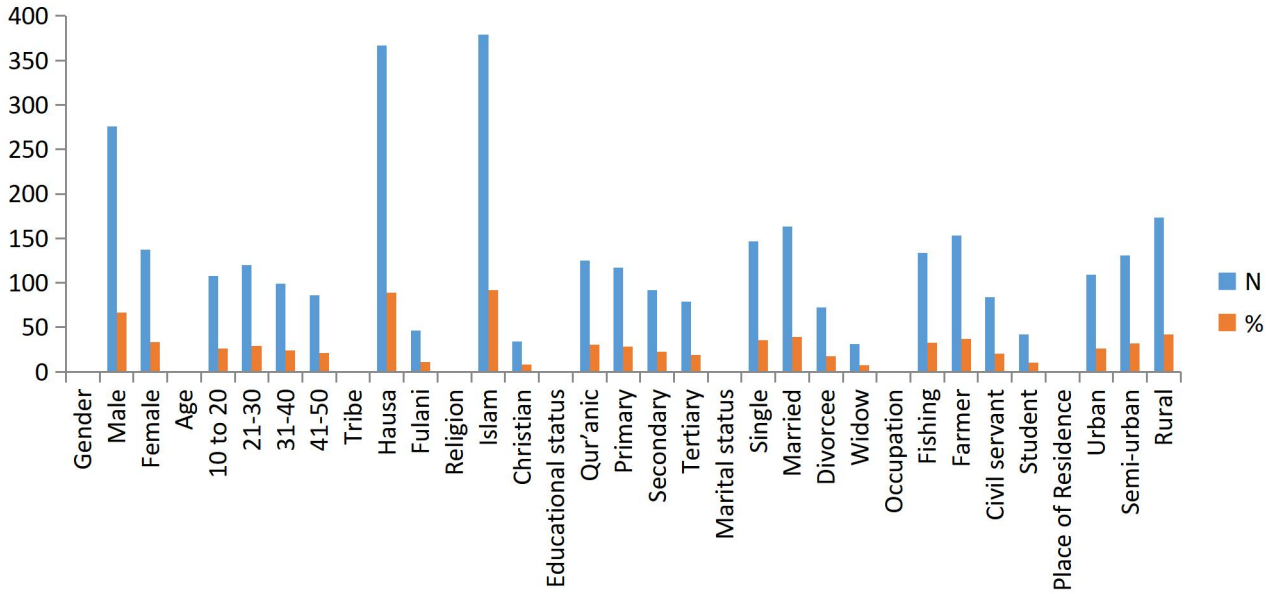
Table (2): Prevalence of schistosomiasis according to age groups

Age	No. Examined	No. Infected (%)	X^2
10-20	86	22 (25.58)	19.12758
21-30	94	26 (27.65)	
31-40	78	21 (26.92)	
41-50	68	18 (26.47)	
Total	326	87 (26.68)	

P-value = >0.05

Table 2 above presents the prevalence of schistosomiasis based on different age groups. The highest prevalence was observed in the age group of 21-30 years, with a rate of 27.65%, while the lowest prevalence was recorded in the age group of 10-20 years at 25.58%. Statistical analysis through Chi-square testing indicated no significant difference in prevalence rates among the various age groups, as evidenced by a p-value greater than 0.05.The higher prevalence observed in specific age groups suggests targeted interventions may be necessary for younger populations who are often more exposed to contaminated water sources due to agricultural and recreational activities.

Figure 2: Demographic and Socioeconomic Characteristics of Respondents



of respondents belonged to the age group of 21-30 years (29.05%), followed closely by those aged between 10-20 years (26.15%). The Hausa tribe constituted the largest ethnic group at (88.86%), while Islam was the predominant religion among respondents (91.76%). In terms of educational background, a significant number had received Qur'anic education (30.26%), while others had varying levels of formal education, with only a small percentage achieving tertiary education (19.12%). Marital status of the respondents showed that married individuals were slightly more common than singles, with single individuals accounting for (35.59%). The occupational distribution revealed a diverse range, with farming being the most common occupation at (37.04%). The demographic data proves critical socio-economic factors influencing infection rates, particularly among males and younger individuals who might be engaged more frequently in water contact activities associated with schistosomiasis transmission (Okoli *et al.,*2021; Kone *et al.,*2022).

Figure 3: Knowledge of the Participants on *Schistosomiasis*

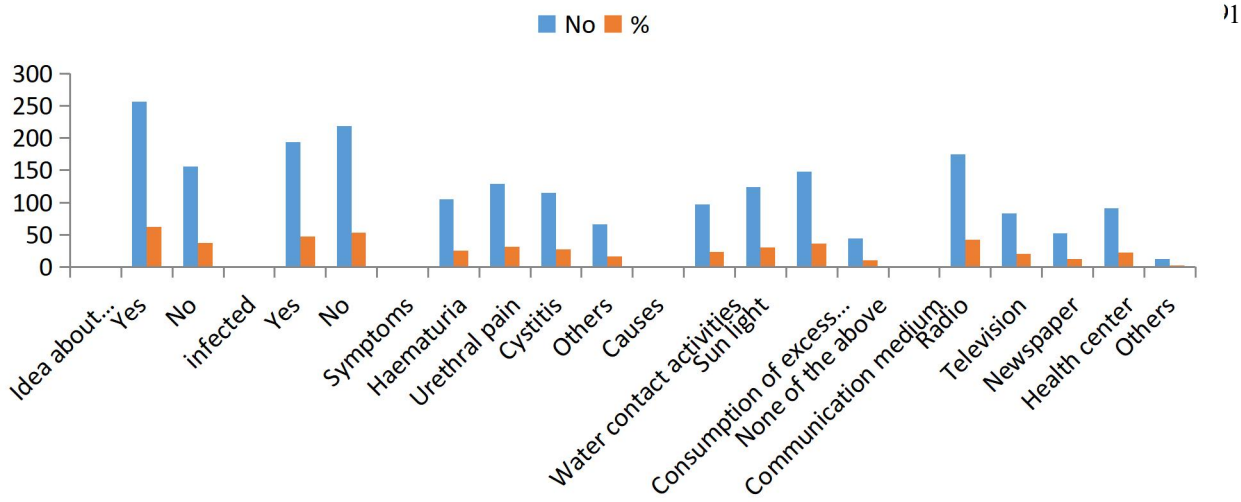


Figure 3 summarizes participants' knowledge regarding schistosomiasis, revealing that 62.22% (257 participants) were aware of the disease, while 37.77% (156 participants) reported no knowledge. Among the respondents, 46.97% (194 participants) acknowledged a history of schistosomiasis infection, contrasting with 53.02% (219 participants) who reported no such history. When asked to identify symptoms, 25.42% (105 participants) reported experiencing haematuria, 31.23% (129 participants) reported urethral pain, 27.84% (115 participants) indicated cystitis, and 15.98% (66 participants) mentioned other symptoms. Regarding perceived causes of schistosomiasis, 23.48% (97 participants) attributed it to water contact activities, 30.02% (124 participants) to sunlight exposure, and 35.83% (148 participants) to excessive salt consumption; however, 10.65% (44 participants) believed none of these factors contributed to the disease. Participants identified various communication mediums for their knowledge acquisition: 42.37% (175 participants) learned from radio broadcasts, 20.09% (83 participants) from television programs, 12.59% (52 prevalence rates. 25 participants (6.05%) experienced difficulty urinating, while 15 (3.63%) reported urine blockage, highlighting significant concerns within the population. Additionally, 10 participants (97.57%) indicated urogenital track blockage, suggesting a high prevalence of this serious condition. Other symptoms included hardening of the lower abdomen (10 participants, 2.42%), urogenital flopping (7 participants, 1.69%), and infertility (22 participants, 5.32%), which shows a significant impact on reproductive health. Furthermore, 11 participants (2.66%) reported difficulty during coitus, and 17 male respondents (4.11%) noted abdominal testicle blockage. Lastly, urogenital ulceration was reported by 9 participants (2.17%), and bladder cancer was noted by 8 participants (1.93%), indicating serious health concerns despite their relatively low prevalence.

The significant percentage of respondents who reported knowledge about schistosomiasis indicates a level of awareness that could be leveraged for health education campaigns aimed at prevention and control. The findings also emphasizes the importance of addressing socio-economic determinants that contribute to disease transmission, as evidenced by previous studies linking poverty and occupation to higher infection rates (Umeh *et al.,*2004; Muhumuza *et al.,*2009).

Conclusions

Based on the finding of this study, it can be concluded that; Urinary *Schistosomiasis* is a significant public health concern in the studied area, with more than one-quarter of the population infected. Also, while many individuals are aware of the disease, a significant number still lack knowledge of the disease

Acknowledgements

The authors are thankful to the Kano State Ministry of Health, the Kano State Hospitals Management Board, and the district heads of the communities involved for granting ethical approval for this study.

Conflict of Interest Statement

The authors declare that there were no conflicts of interest during the research and regarding the publication of this manuscript.

Funding

This research received no specific grant from any funding agency

Contribution of Authors

MI and SUA conceptualized the study and were responsible for its overall management. HMA designed the methodology and wrote the original draft of the manuscript, including integrating feedback from co-authors and reviewers. SMI and FFU assisted in doing the laboratory work and microscopic examination of urine to identify Schistosoma haematobium eggs. ZMM carried out data collection and fieldwork, including surveys and interviews with participants.

Article History:

Received: 23rd November 2024.

Accepted: 7th January, 2025.

Published online: 2nd September, 2025

References

Adenowo, A. F., Olatunji, A. B., and Akinwumi, J. A. (2015).*Schistosomiasis*: A Neglected Tropical Disease in Nigeria. *Journal of Infectious Diseases, 212(1), S32-S39.*

Adeyeba, A.O., and Ojeaga, S.T. (2002). The menace of schistosomiasis in Nigeria: Knowledge, attitude and practices among rural dwellers. *Journal of Health and Population in Developing Countries, 1(1), 45-50.*

Bajiro, M. O., Olayemi, E. K., and Ojo, A. O. (2016). Epidemiology and control strategies for *schistosomiasis* in Nigeria: A review. *Nigerian Journal of Parasitology*, Article ID 123456.

Bassey, S.E., & Umar, S.A. (2004). Schistosomiasis: A neglected tropical disease in Nigeria. *African Journal of Biomedical Research, 7(3), 201-206.*

Bassey E.E., and Umar A.B. (2004). The Epidemiology of *Schistosomiasis* in Nigeria: A Review. *African Journal of Biomedical Research, 7(3), 139-143.*

Cheesbrough M. (2002). District Laboratory Practice in Tropical Countries. *Cambridge University Press.*

Duwa, M., Abba, A., and Abdullahi, M. K. (2021). A comparative study on the prevalence and intensity of urinary schistosomiasis among primary school pupils in Kura Local Government Area of Kano State. *Nigerian Postgraduate Medical Journal, 28(3), 145-150.*

Ekpo, U. F., & Mafiana, C. F. (2004). Epidemiological studies of urinary schistosomiasis in Ogun State, Nigeria: Identification of high-risk communities. *Nigerian Journal of Parasitology, **25**, 111-119.*

Ekpo, U.F., Oluwole, A.S., and Nwoke, B.E.B.(2010). Urinary *schistosomiasis*: A review on its epidemiology and control in Nigeria.*Journal of Parasitology Research, Article ID 123456.*

Federal Ministry of Health. (2017). National health accounts 2017. *NGF Digital Repository.* *https://ngfrepository.org.ng:8443/jspui/handle/123456789/4207*

Hotez, P. J., Kamath, A., Pardo, V. E., and Bottazzi, M. E. (2009). Schistosomiasis in Africa: An emerging tragedy in our new global health decade. *PLoS Neglected Tropical Diseases, **3**(9), e485. https://doi.org/10.1371/journal.pntd.0000485*

Hotez, P.J., Alvarado, M., and Basanez, M.G.(2012). Neglected Tropical Diseases in Nigeria: A Review of Their Impact on Public Health and Socioeconomic Development. *PLoS Neglected Tropical Diseases, 6(5), e1623.*

King, C. H., Sturrock, R. F., and igueiredo de Almeida, M. M. S. (2008). *Schistosomiasis*: A major cause of morbidity in sub-Saharan Africa. *The Lancet, 372(9649), 1742-1743.*

Kone, A., Yao, K.P., and N'Guessan, K.F.(2022). Risk Factors Affecting the Occurrence of Urinary *Schistosomiasis* and Urinary Tract Infections in Some Communities of Ondo State, Nigeria. *Journal of Water, Sanitation and Hygiene for Development, 12(3).*

Muhumuza, S., Kitimbo, G., Oryema-Lalobo, M., and Nuwaha, F.(2009). Association between Socioeconomic Status and

Schistosomiasis Infection in Jinja District, Uganda. *Tropical Medicine & International Health, 14(7), 794–800.*

Odhiambo, J.A., Mungai, P.N., and Karanja, D.M.S. (2014). The impact of *schistosomiasis* on health systems: A review from sub-Saharan Africa. Infectious Diseases of Poverty, 3(1), Article ID 123456.

Okoli, C. E. I., Odaibo, A. B., and Akinwumi, J. A. (2021). Socio-demographic knowledge and practices as transmission risk factors for *schistosomiasis* among pregnant women in rural communities in Nigeria. *BMC Public Health, 21(1), Article ID: 123456.*

Perkin, M. R., Logan, K., Tseng, A., & du Toit, G. (2008). Enquiring about tolerance (EAT) study: Feasibility of an early allergenic food introduction regimen. *Archives of Disease in Childhood, 93(6), 487-491. https://doi.org/10.1136/adc.2007.126130*

Umeh, J.C., Amali, O., and Umeh, E.U.(2004). The Socio-Economic Effects of Tropical Diseases in Nigeria.*Economics and Human Biology, 2(3), 245–263.*

Rollinson, D., Knopp, S., and Levitz, S.M. (2009). Emerging trends in *schistosomiasis* transmission dynamics: Insights from molecular epidemiology studies. Trends in Parasitology, 25(7), 323-329.