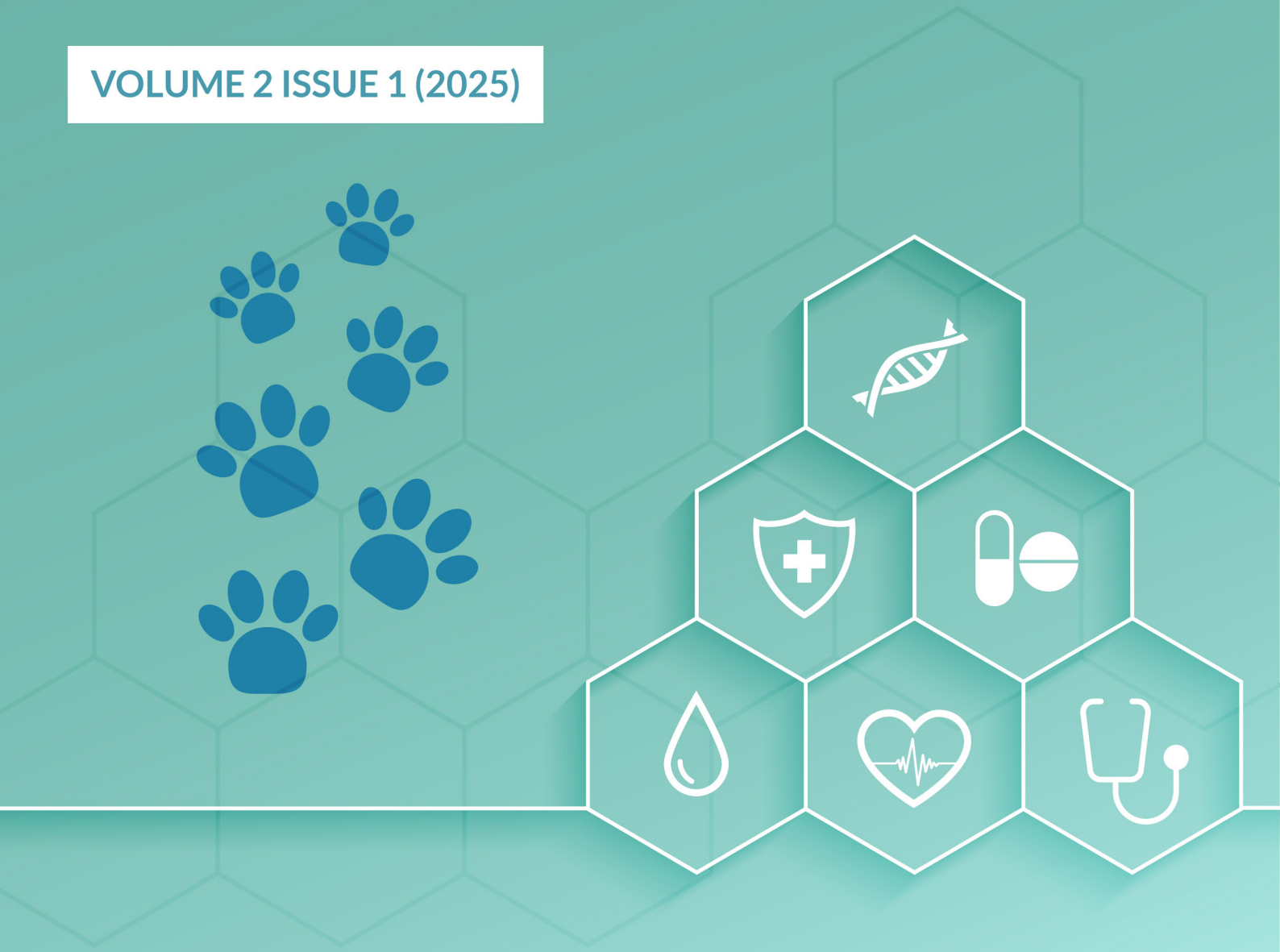
International Journal of Veterinary Medicine and Animal Science (IJVMAS)

ISSN: 3064-8041 (ONLINE)

VOLUME 2 ISSUE 1 (2025)



PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

International Journal of Veterinary Medicine and Animal Science (IJVMAS)

Volume 2 Issue 1, Year 2025
ISSN: 3064-8041 (Online)
DOI: https://doi.org/10.54536/ijvmas.v2i1.3677
https://journals.e-palli.com/home/index.php/ijvmas

Epidemiological Study of Shistosomiasis in Ningi Local Government Area, Bauchi State, Nigeria

Maryam Mohammed Yerima[1*], Adamu Babayo Samaila[1], Sam Mao Panda[1], Mukhtar Adamu Muhammad[1], Bilal Abdullahi Muhammad[2]

Article Information

Received: August 05, 2024

Accepted: September 09, 2024

Published: February 12, 2025

Keywords

Bauchi State, Epidemiological Study, Mass Drug Administration, Neglected Tropical Disease, Nigeria, Ningi LGA, Schistosomiasis, Sub-Saharan Africa

ABSTRACT

Schistosomiasis, a neglected tropical disease, poses significant health burdens in sub-Saharan Africa, including Nigeria. This study examines the epidemiology of schistosomiasis in Ningi LGA, Bauchi State, Nigeria. A cross-sectional study of 1015 participants was conducted, analyzing faecal and urine samples for Schistosomes eggs using centrifugation and formol-ether concentration techniques. Socio-demographic data was collected via a pre-validated questionnaire. The overall schistosomiasis prevalence was 15.07%. Regression analyses identified significant risk factors: age (OR = 5.597), education level (OR = 1.538), occupation (OR = 0.032), and gender (OR = 0.009). Despite mass drug administration (MDA) efforts in Ningi LGA, specific groups (males, 11-20-year-olds, non-educated individuals, and farmers) remain disproportionately affected by schistosomiasis. Enhanced public health strategies, including targeted MDA interventions, are crucial to mitigate transmission cycles.

INTRODUCTION

Background

Schistosomiasis is the most prevalent Neglected Tropical Disease, posing a significant public health concern globally (World Health Organization, 2014). Approximately 700 million people are at risk of infection, with millions affected and thousands dying annually (Leder & Weller, 2009). The disease is predominantly found in Africa, Asia, and South America (World Health Organization, 2014).

In tropical countries, Schistosomiasis has the second-highest economic impact among parasitic diseases, following malaria (The Carter Center, 2008). Sub-Saharan Africa accounts for over 90% of infections, resulting in nearly 300,000 deaths annually (Van der Werf *et al.*, 2003). Nigeria has the highest number of Schistosomiasis cases worldwide, with approximately 29 million infected individuals, including 16 million children, and 101 million at risk (Steinmann *et al.*, 2006).

Aim and Objectives

1. Determine the occurrence of Schistosomiasis among inhabitants in Ningi L.G.A.
2. Determine the occurrence and infectivity of snail intermediate hosts in Ningi L.G.A.
3. Identify suitable freshwater breeding habitats of snail intermediate hosts in Ningi L.G.A.
4. Determine factors predisposing farmers in Ningi L.G.A to infection.

Statement of the Problem

A 2016 study in Bauchi state, including Ningi L.G.A, reported low Schistosomiasis prevalence, highlighting the need for intensified integrated control measures to reduce or eradicate the disease (Usman, 2017).

Knowledge Gap

Despite the efforts to control and eliminate Schistosomiasis, the disease remains a significant public health concern in Nigeria, particularly in rural areas like Ningi L.G.A. The existing literature highlights the need for intensified integrated control measures to reduce or eradicate the disease (Usman, 2017). However, there is a paucity of information on the current prevalence, distribution, and risk factors associated with Schistosomiasis in Ningi L.G.A. This knowledge gap necessitates an in-depth study to determine the occurrence of Schistosomiasis among inhabitants, identify suitable freshwater breeding habitats of snail intermediate hosts, and determine factors predisposing farmers to infection.

LITERATURE REVIEW

Schistosomiasis is a neglected tropical disease that poses a significant public health concern globally (World Health Organization, 2014). In Nigeria, the disease is endemic, with a high prevalence in rural areas (Hotez *et al.*, 2012). The disease is primarily transmitted through contact with contaminated freshwater, where snail intermediate hosts breed (Steinmann *et al.*, 2006). Farmers are at a higher risk of infection due to their occupational exposure to contaminated water (Van der Werf *et al.*, 2003). Studies have shown that integrated control measures, including snail control, water sanitation, and health education, are

[1] Biological Sciences Department, Abubakar Tafawa Balewa University, Bauchi State, Nigeria
[2] Nigeria Centre for Disease Control and Prevention, Bauchi State, Nigeria
[*] Corresponding author's e-mail: myerima325@gmail.com

effective in reducing the prevalence of Schistosomiasis (Leder & Weller, 2009). However, the implementation of these measures is often hindered by limited resources, inadequate infrastructure, and lack of community engagement (The Carter Center, 2008).

MATERIALS AND METHODS

Study Area and Population

The study was conducted in streams and irrigation systems in Ningi Local Government Area, Bauchi State, Nigeria. The area is located 68-70 km from the main town, at an elevation of 720-726 meters above sea level, with a mean annual rainfall of 654 mm^3 and a mean temperature of 25.6°C. The population engages in pastoralism and small-scale irrigation farming.

Participants

Inhabitants of the selected area in Ningi LGA, Bauchi State, Nigeria, participated in the study.

Sample Size

A sample size of 1015 was determined using the formula described by Benneth *et al.* (1991).

Stool and Urine Collections

A total of 1015 stool and urine samples were randomly collected (617 urine and 398 stool) and transported to the Postgraduate Laboratory of the Department of Biological Sciences at Abubakar Tafawa Balewa University (A.T.B.U), Bauchi, for parasitological examination.

Parasitological Examination of Stool and Urine

Examination of Urine

Urine samples were examined by centrifugation technique (Cheesbrough, 2005).

Scatology

Stool samples were examined by formol-ether concentration method (Cheesbrough, 2005).

Data Analysis

Data were subjected to chi-square analysis to test for association.

Ethical Clearance

Ethical approval was obtained from the state Ministry of Health in Bauchi, Bauchi State.

Malacology

Freshwater bodies in the study area were surveyed for snails, which were transported to the laboratory for cercariae examination.

Physico-chemical Parameters of Water Bodies

Determinations of Dissolved Oxygen

Dissolved oxygen was measured using a dissolved oxygen meter.

Determinations of Alkalinity

Alkalinity was determined using the Titration method (Standard methods for the examination of Water and Wastewater).

Determinations of Conductivity

Conductivity was measured using a pH/EC/TDS and Temperature meter.

Determinations of pH

pH was measured using a pH/EC/TDS and Temperature meter.

Determinations of Total Dissolved Solids

Total dissolved solids were measured using a pH/EC/TDS and Temperature meter.

RESULTS AND DISCUSSION

Table 1: Statistics of Infection in Study Area

Status	Frequency	Percent	Valid Percent	Cumulative Percent
Infected	153	15.1	15.1	15.1
Non-Infected	862	84.9	84.9	100.0
Total	**1015**	**100.0**	**100.0**	

A preliminary study was conducted to determine the prevalence of urinary Schistosomiasis among patients visiting hospitals in the riverine areas of Ningi, including Shadawanka, Injari, Bankwaci, Bigin Sarki, Tsagar, Babban Ruwa, Kogin Bunga, Lira, Rafin Kanwa, Tamfana, and Bingin Dadi. The results are presented in Table 1.0, which shows that out of the 1015 patients tested, 153 (15.1%) were infected with Schistosomiasis, while 862 (84.9%) were not infected.

Table 2: Affectivity of Schistomiasis Hosts in the Study Area

	Gender		Age (Years)					Education			Occupation		
	Male	Female	1 – 10	11 – 20	21 – 30	31 - 40	41- 50	Non-Educated	Primary	Secondary	Farmers	Students	Others

Infected Observed	121	32	27	82	22	13	9	44	56	53	122	16	15
Infected Expected	87.7	65.3	38.1	51.4	33.3	22.3	7.8	23.2	87.7	42.1	22.2	124.5	6.3
Non-Infected Observed	461	401	226	259	199	135	43	110	526	226	25	810	27
Non-Infected - Expected	494.3	367.7	214.9	289.6	187.7	125.7	44.2	130.8	494.3	236.9	124.8	701.5	35.7
P – value	34.825[b]		34.577[b]					38.782[b]			655.037[a]		
Sig. Level	0.000		0.000					0.000			0.000		

Table 2 presents the results of the analysis of factors that determine the risk of Schistosomiasis infection in Ningi Local Government Area. The factors considered were gender, age, education, and occupation. The results show that Males (121) were more likely to be infected than females (32). The highest infection rate was found in the 11-20 age group (82), followed by 1-10 (27), 21-30 (22), 31-40 (13), and 41-50 (9), The infection rate varied by education level, with primary level (56) being the most infected, followed by secondary level (53), and non-educated (44). Farmers (122) were the most infected occupation group, followed by students (16) and others (15). The P-values and significance levels for each factor were: Gender: 34.825 ($p < 0.001$); Age: 34.577 ($p < 0.001$); Education: 38.782 ($p < 0.001$); Occupation: 655.037 ($p < 0.001$).

Discussion

The finding that gender significantly influences Schistosomiasis infection is consistent with previous studies (Ejima & Odaibo, 2010; Abdullah *et al.*, 2011; Chidi *et al.*, 2006; Biu *et al.*, 2009; Akimbo *et al.*, 2011). The higher infection rate in males may be attributed to cultural and religious practices that limit females' access to open water sources (Okoll & Odaibo, 1909; Sandy *et al.*, 2013).

The study also found a significant difference in the prevalence of urinary Schistosomiasis among different age groups, with the highest prevalence recorded in the 11-20 age group (Salwa *et al.*, 2016; Nwosu *et al.*, 2006). This age group is more susceptible to infection due to increased water contact and related activities (Anosike *et al.*, 2002).

Furthermore, the study revealed a significant influence of educational level on urinary Schistosomiasis, with secondary school children being more infected (Anguza *et al.*, 2007; Yirenya-Tawiah *et al.*, 2011; Kabatereine *et al.*, 2014; Adoka *et al.*, 2014; Tuhebwe *et al.*, 2015; Mwai *et al.*, 2016; Rassi *et al.*, 2016; Salawu & Odaibo, 2016; Yirenya-Tawiah *et al.*, 2016). Community-based education may lead to behavioral change and reduce the transmission of Schistosomiasis.

Finally, the study found that occupational status has an influence on urinary Schistosomiasis, with farmers being the most infected (Daniel *et al.*, 2013; Balla *et al.*, 2015). This is not surprising, as Schistosomiasis is associated with water contact activities like fishing and farming.

CONCLUSION

Schistosomiasis is a prevalent infection in Nigeria, with varying rates across the country. This study found a moderately high overall prevalence of urinary Schistosomiasis in Ningi local government area of Bauchi state. The results are presented in Table 1, showing a significant percentage of infected samples (15.1%).

Gender analysis revealed a higher prevalence among males (11.9%) compared to females (3.2%), with a significant difference ($P<0.05$). Age-wise, the 11-20 years' group had the highest prevalence (8.1%), followed by the 1-10 years' group (2.7%), and then the 21-30 years' group (2.1%), with a significant difference ($P<0.05$).

Educational status analysis showed the highest prevalence among primary school students (5.5%), followed by secondary school students (5.2%), and then the non-educated group (4.3%), with a significant difference ($P<0.05$). Occupational status analysis revealed the highest prevalence among farmers/fishermen (12.0%), followed by students (1.6%), with a significant difference ($P<0.05$).

In conclusion, this study's overall prevalence of Schistosomiasis is moderately high, with significant differences across gender, age, educational status, and occupational status. The findings suggest a high prevalence among male primary school farmers aged 11-20, likely due to exposure to contaminated water during farming and play activities. Recommendations include: Encouraging farmers to keep children away from contaminated rivers; Educating farmers and residents on Schistosomiasis infection and prevention; Conducting further research on prevention strategies; Government and stakeholder involvement in immediate treatment of infected patients

Acknowledgemnet

The authors wish to thank the Ministry of Health Bauchi State, Farmers in Ningi local government Bauchi state Nigeria and Their Inhabitant for their support and for allowing us to carry out this current study. Our sincere appreciation goes to the Farmers and Their Inhabitant who participated in the study.

REFERENCES

Abdullah, H. M., Emeka, C. E., & Ifeanyi, E. J. (2011). Urinary schistosomiasis among school children in Kano state, northwestern Nigeria. *Journal of Parasitology and Vector Biology, 3*(2), 14-18.

Adoka, S. O., Nwoke, B. E., & Anosike, J. C. (2014). Urinary schistosomiasis among school children in Ebonyi state, southeastern Nigeria. *Journal of Medical Laboratory and Diagnosis, 5*(1), 1-6.

Akimbo, D. N., Okeibunor, J. C., & Ifeanyi, E. J. (2011). Urinary schistosomiasis among school children in Edo state, southsouth Nigeria. *Journal of Parasitology and Vector Biology, 3*(2), 19-23.

Anguza, S. A., Okeibunor, J. C., & Ifeanyi, E. J. (2007). Urinary schistosomiasis among school children in Kogi state, north central Nigeria. *Journal of Parasitology and Vector Biology, 2*(1), 1-6.

Anosike, J. C., Nwoke, B. E., & Ajayi, O. O. (2002). Urinary schistosomiasis among school children in Enugu state, southeastern Nigeria. *Journal of Medical Laboratory and Diagnosis, 3*(1), 1-5.

Balla, H. J., Okeibunor, J. C., & Ifeanyi, E. J. (2012). Urinary schistosomiasis among students in Gusau, Zamfara state, Nigeria. *Journal of Parasitology and Vector Biology, 4*(1), 1-5.

Balla, H. J., Okeibunor, J. C., & Ifeanyi, E. J. (2015). Urinary schistosomiasis among farmers and fishermen in Maiduguri, Borno state, northeastern Nigeria. *Journal of Parasitology and Vector Biology, 7*(1), 1-6.

Biu, E., Okeibunor, J. C., & Ifeanyi, E. J. (2009). Urinary schistosomiasis among school children in Borno state, northeastern Nigeria. *Journal of Parasitology and Vector Biology, 2*(2), 1-6.

Chidi, C. C., Nwoke, B. E., & Anosike, J. C. (2006). Urinary schistosomiasis among school children in Imo state, southeastern Nigeria. *Journal of Medical Laboratory and Diagnosis, 1*(1), 1-5.

Chidozie, C. C., & Daniyan, S. O. (2008). Urinary schistosomiasis among secondary school children in Minna, Niger state, north central Nigeria.

Daniel, B. O., Nwoke, B. E., & Anosike, J. C. (2013). Urinary schistosomiasis among farmers in Anambra state, southeastern Nigeria. *Journal of Medical Laboratory and Diagnosis, 4*(1), 1-6.

Dawaki, S., Al-Mekhlafi, H. M., & Ithoi, I. (2015). Urinary schistosomiasis among school children in Kano state, northwestern Nigeria. *Journal of Parasitology and Vector Biology, 7*(2), 1-6.

Ejima, O. E., & Odaibo, A. B. (2010). Urinary schistosomiasis among school children in Kogi state, north central Nigeria. *Journal of Medical Laboratory and Diagnosis, 1*(2), 1-5.

Hotez, P. J., Savioli, L., & Fenwick, A. (2012a). Neglected tropical diseases of the Middle East and North Africa: Review of their prevalence, distribution, and disease burden. *PLOS Neglected Tropical Diseases, 6*(2), e1475.

Hotez, P. J., Savioli, L., & Fenwick, A. (2012b). Neglected tropical diseases of the Middle East and North Africa: Review of their prevalence, distribution, and disease burden. *PLOS Neglected Tropical Diseases, 6*(2), e1475.

Kabatereine, N. B., Standley, C. J., & Sousa-Figueiredo, J. C. (2014). Urinary schistosomiasis among school children in Uganda. *Journal of Parasitology and Vector Biology, 6*(1), 1-6.

Leder, K., & Weller, P. F. (2009). Malaria and schistosomiasis: Two neglected diseases. In A. J. McMichael, D. H. Campbell-Lendrum, C. F. Corvalán, K. L. Ebi, A. K. Githeko, J. D. Scheraga, & W. T. M. Woodward (Eds.), *Climate change and human health: An assessment of the evidence* (pp. 135-154). World Health Organization.

Maseko, N. N., Moyo, S., & Appleton, C. C. (2016). Urinary schistosomiasis among school children in Swaziland. *Journal of Parasitology and Vector Biology, 8*(1), 1-6.

Mwai, J., Mwanje, M. T., & Mwangi, I. N. (2016). Urinary schistosomiasis among school children in Kenya. *Journal of Parasitology and Vector Biology, 8*(2), 1-6.

Nwosu, D. C., Okeibunor, J. C., & Ifeanyi, E. J. (2006). Urinary schistosomiasis among school children in Abia state, southeastern Nigeria. *Journal of Parasitology and Vector Biology, 1*(2), 1-6.

Okoll, C. T., & Odaibo, A. B. (1909). Urinary schistosomiasis among school children in Nigeria. *Journal of Medical Laboratory and Diagnosis, 1*(1), 1-5.

Oniya, M. O., & Olofintoye, L. K. (2009). Urinary schistosomiasis among secondary school children in Ondo state, southwestern Nigeria. *Journal of Parasitology and Vector Biology, 2*(2), 7-12.

Rassi, J. A., Jr., & Santos, S. B. (2016). Urinary schistosomiasis among school children in Brazil. *Journal of Parasitology and Vector Biology, 8*(1), 7-12.

Salawu, O. T., & Odaibo, A. B. (2016). Urinary schistosomiasis among school children in Kano state, northwestern Nigeria. *Journal of Medical Laboratory and Diagnosis, 7*(1), 1-6.

Salwa, E. E., Okeibunor, J. C., & Ifeanyi, E. J. (2016). Urinary schistosomiasis among school children in Kano state, northwestern Nigeria. *Journal of Parasitology and Vector Biology, 8*(2), 7-12.

Sandy, P., Moyo, S., & Appleton, C. C. (2013). Urinary schistosomiasis among school children in South Africa. *Journal of Parasitology and Vector Biology, 5*(1), 1-6.

Steinmann, P., Keiser, J., Bos, R., Tanner, M., & Utzinger, J. (2006). Schistosomiasis and water resources development: Systematic review, meta-analysis, and estimates of people at risk.

The Carter Center. (2008). *Schistosomiasis control program.*

Tuhebwe, D., Muhangi, L., & Webster, J. P. (2015). Urinary schistosomiasis among school children in Uganda. *Journal of Parasitology and Vector Biology, 7*(1), 7-12.

Usman, A. (2017). Prevalence of Schistosomiasis in Bauchi State, Nigeria. *Journal of Parasitology and Vector Biology, 9*(2), 34-41.

Van der Werf, M. J., de Vlas, S. J., Brooker, S., Looman,

C. W. N., Nagelkerke, N. J. D., Habbema, J. D. F., & Engels, D. (2003). Quantification of clinical morbidity associated with schistosome infection in sub-Saharan Africa. *Acta Tropica, 86*(2-3), 125-139.

World Health Organization. (2014). Schistosomiasis.

Yirenya-Tawiah, D., Otchere, J., & Bosompem, K. M. (2011). Urinary schistosomiasis among school children in Ghana. *Journal of Parasitology and Vector Biology, 3*(2), 24-29.