

Intestinal Schistosomiasis as a Public Health Threat to School Children Aged 0 – 14 Years: A Case Study in Bassa LGA, Plateau State, Nigeria

^{1,2}Dorcas Manasseh Dayom, ^{*1}Felix Idoko, ¹Kennedy Musa Samdi, ¹Ifeoma Augusta Ugwunna, ³Newman Anagumba Chindidu, ¹Adeyinka Jeremy Adedeji, ¹Ijeoma Nwagbo, ²Blessing Cabala Mwasara

¹Virology Division, National Veterinary Research Institute, Vom, Plateau State, Nigeria

²Federal College of Animal Health and Production Technology, Vom, Plateau State, Nigeria

³Department of Biochemistry, Abubakar Tafawa Balewa University, Bauchi State, Nigeria

*Corresponding authors' email: idokoadah.f@gmail.com Phone: +2349037143559

ABSTRACT

Schistosomiasis is an infectious, zoonotic, neglected tropical disease condition of public health concern, caused by blood flukes of the genus *Schistosoma*. In developing countries, it causes serious morbidity and mortality. It leads to chronic infection affecting health and learning especially among school children having contact with snail-infested water bodies. Thus, this cross-sectional school-based study was carried out to determine the detection rate of Intestinal Schistosomiasis among primary school pupils in Miango, Plateau State, Nigeria. A total of 94 stool samples were collected and analyzed using the Formol-ether concentration method. Questionnaires were administered to 104 pupils to assess risk factors for clinical presentations common to schistosomiasis. Findings revealed an overall detection rate of 3.20%, with a higher rate among males (6.30%) compared to females (1.60%). Pupils aged 10 - 14 years exhibited the highest rate of intestinal schistosomiasis infection (6.70%). However, no statistically significant differences were observed across sex ($p = 0.228$) or age groups ($p = 0.576$). Swimming was strongly and significantly ($P=0.0009$) associated with presence of mucous and blood in stool. These results portray the presence of intestinal schistosomiasis among pupils in Miango. Despite the low Detection rate observed, schistosomiasis remains a public health threat, warranting continued efforts in prevention and control - public enlightenment, provision of safe water sources, and ensuring regular distribution of antiparasitic interventions.

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INTRODUCTION

Schistosomiasis is an infectious zoonotic disease caused by species of blood flukes of the genus *Schistosoma*. Humans are infected mainly by three species, *Schistosoma haematobium*, *S. japonicum*, and *S. mansoni* (Condo *et al.*, 2022; Wang *et al.*, 2024). *S. haematobium* is also reported in cattle (Juhász *et al.*, 2024). It is a destructive disease globally, causing serious morbidity and mortality in developing countries. In Africa, the disease is predominantly due to the infection of *S. mansoni* - intestinal schistosomiasis, and *S. haematobium* - urinary schistosomiasis. *S. mansoni* as the most common and widespread among all the species of *Schistosoma* (Aishatu *et al.*, 2026; CDC, 2024).

Fresh water snails get infected by this parasite in the course of its life cycle, and humans that come into contact with such infested fresh water are at risk for infection. *Schistosoma* species have two different life cycles (human and fresh water snails) (Colley *et al.*, 2014). Microscopic examination of excreta for the detection of the egg remains the gold standard for schistosomiasis diagnosis (Dawet *et al.*, 2019).

Seven hundred million people in 74 countries are at risk, and over 200 million are already infected, most of whom are children (Osakunor *et al.*, 2018). Schistosomiasis ranks second after malaria as the commonest parasitic disease, and is the deadliest NTD (Mohammed *et al.*, 2018; Siddique *et al.*, 2023). The disease is prevalent in tropical and subtropical countries, especially in poor communities lacking access to potable water and adequate sanitation (WHO, 2026). According to estimates, at least 253.7 million people required preventive treatment in 2024 and at least 93.9 % of those who

require treatment for schistosomiasis live in Africa (WHO, 2026).

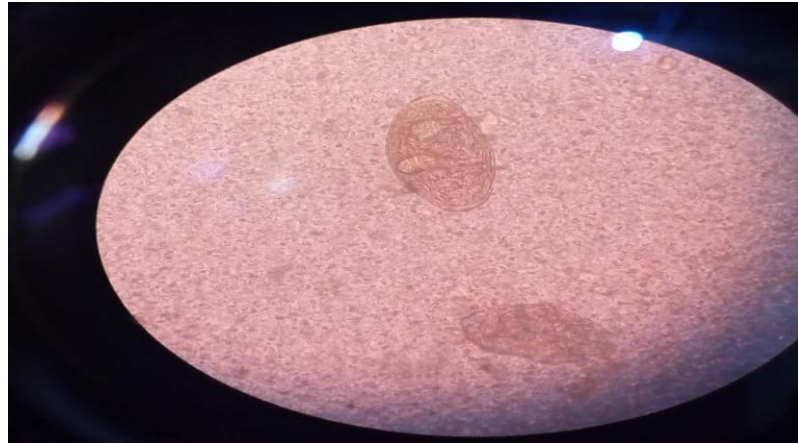
School-age children who live in these areas, and are exposed to contaminated freshwater, are often mostly at risk because they tend to spend time swimming or bathing in water containing infectious cercariae. The disease can affect all aspects of a person's health (Dawet *et al.*, 2019). Children who are infected can develop learning difficulties due to problems with cognitive development and overall poor development (Kasambala *et al.*, 2022). After years of infection, the parasite can also damage the liver, intestine, spleen, lungs, and bladder (CDC, 2024).

Therefore, it is very important to carry out this research among School children to determine the presence of *Schistosoma* in Miango, Plateau State, Nigeria. This will help to create awareness of the disease in the community and also help in the control and prevention measures of the disease in Nigeria. Thus, this school-based study was carried out to determine the detection rate of intestinal schistosomiasis among primary school pupils in Miango, Plateau State, Nigeria.

MATERIALS AND METHODS

Study Area

The research was conducted at Miango, Bassa Local Government Area, Plateau State (Plate I), North-Central Nigeria. Miango, Bassa LGA is located on longitude 8.701495° E and latitude 9.854484° N, bordering Bauchi and Kaduna States to the North (Nanzing *et al.*, 2022). It has a temperature range of 14.0°C to 32.9°C; relative humidity

Plate II: Ova of *Schistosoma mansoni* Detected by Formol-ether Concentration Method**Table 1: Detection of *Schistosoma Mansonii* Among Pupils According to Sex and Age Grade (N=94)**

Variables	Number examined	Number positive%	X ²	P-value
Sex				
Male	32	2(6.3)	1.469	0.228 ^{ns}
Female	62	1(1.6)		
Total	94	3(3.2)		
Age				
0-5	16	0 (0.0)	0.5757 ^{ns}	
6 -9	48	1 (2.1)		
10-14	30	2 (6.7)		
Total	94	3(3.2)		

ns= No Significant difference at (p>0.05)

Risk Factors to Clinical Presentation Associated with Schistosomiasis

Based on sex distribution, 69.23% (72/104) of respondents were male, while female was 30.77% (32/104). Over 88% of respondents reported using borehole as water source, while less than 12% use either well or river (Figure 1). Approximately, 46.0% (48/104) of the pupils participate in swimming and 82.0% (85/104) reported to have walked barefoot. Over 86% (90/104) and 75% (78/104) have

experienced stomach pain and stool with blood/mucous, respectively, indicating that these gastrointestinal conditions are common among school pupils. There was a strong and significant association between swimming and mucoid/bloody faeces (OR = 7.12, P = 0.0009), whereas none of the exposures (swimming, walking barefoot or water source) show a statistically significant association with stomach pain (Table 2).

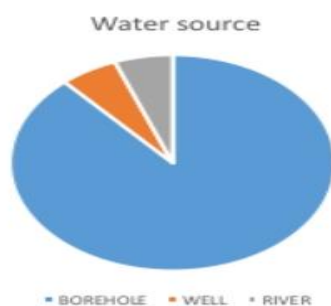


Figure 1: Distribution of Respondents based on Water Source (N=104)

Table 2: Risk Factors to Common Clinical Presentations of Intestinal Schistosomiasis

Variable	Category	Stool with blood/mucous			Stomach pain			
		Yes/No (n=104)	OR (95% CI)	P value	Yes/No (n=104)	OR (95% CI)	P value	
Swimming	Swimmer	44/4	7.12 (2.21–22.88)	0.0009	42 / 6	1.17 (0.37–3.68)	0.7904	
	Non-swimmer	34/22		—	48 / 8		—	
Walking Barefoot	Yes	66/19	2.03(0.71–5.82)	0.1927	75 / 10	1.00(0.55–1.81)	0.2905	
	No	12/7		—	15 / 4		—	

Variable	Category	Stool with blood/mucous			Stomach pain		
Water Source	Borehole	69/23	—	0.8007 ($X^2=$ 0.444)	80 / 12	—	0.9419 ($X^2=$ 0.120)
	Well	4/2	—	—	5/1	—	—
	River	5/1	—	—	5/1	—	—

OD=Odds ratio; C.I=Confidence interval; X^2 =Chi square statistics

Discussion

Schistosomiasis is an important public health concern in Nigeria (Eze *et al.*, 2026). It is also an occupational disease within the tropics, responsible for huge mortality in Africa across different groups and ethnicities (CDC, 2024), with the highest detection rate in White Nile State, Sudan (Tamomh *et al.*, 2018).

The world Health Assembly adopted the Neglected tropical diseases (NTD) road map (2021–2030), with goals of eliminating schistosomiasis as a public health problem in all endemic countries (WHO, 2026). From this study, schistosomiasis is still endemic among pupils in Miango, Plateau State, albeit, with low detection rate of 3.20%, indicating the need for maintaining and up-scaling the intensity of current control programmes. Similar low prevalence (7.0%) was reported by Aishatu *et al.* (2026) for urinary schistosomiasis. Contrariwise, Dawet *et al.* (2018), in his study among school children in Pilgani District, Langtang North LGA, Plateau State, found that 24.65% were infected with the disease - a higher detection rate among school pupils than our result. This might be due to difference in environmental contamination level. It might also be due to the drinking water source (borehole) used by a vast majority of pupils in the current study at Miango, Bassa LGA, Plateau State. Also, during our interview for sample collection using our standard questionnaires, the pupils testified to the intervention of donations of albendazole and praziquantel by a non-governmental organization (NGO) in our study area for the control of schistosomiasis. Praziquantel, at the appropriate dosage, is the cornerstone of treatment against *Schistosoma* trematodes as recorded by Condeng *et al.*, 2024. Such interventions could be replicated other parts of the country.

Highest detection rate was in pupils between the ages 10 - 14 years old. This age group are most active with high risk activities like swimming which was found to be significantly associated with mucoid or bloody faeces, a clinical presentation common to schistosomiasis. This could be responsible for the higher infection prevalence of *Schistosoma* spp noted within this age group. Eze *et al.* (2026), in a study involving secondary students, also showed that the highest prevalence of urogenital schistosomiasis was in students aged 11-20 years. Susceptibility to schistosomiasis is influenced by age (Ogunlakin *et al.*, 2025). However, we cannot confirm categorically if the reported gastrointestinal symptoms reported were solely linked to schistosomiasis. Effective schistosomiasis programme should factor in this age-grade as well as younger and pre-schooled children (Lim *et al.*, 2020).

The high rate of persons (75%) reporting mucus and blood in stool coupled with widespread gastrointestinal upset (86.5% reporting stomach pain) is note-worthy in view of the environmental exposure variables which include the high rates of walking barefoot and swimming activities. This suggests an outbreak or endemic cluster of either a waterborne or soil-transmitted pathogen or both. This is in agreement with the position of Shuja *et al.* (2018) that abdominal pain is one of the most common reasons for

outpatient visits, and schistosomiasis should be considered as a differential diagnosis in such patients especially when exposed to the risk factors. This study has a number of limitations: I. Usage of small sample size II. The study area had previously received praziquantel intervention which could have impacted the detection rate.

CONCLUSION

Schistosomiasis is a disease of public health importance which is still present in Bassa LGA, Plateau State. The study recorded a low intestinal schistosomiasis detection rate of 3.20% among school pupils in Miango. A large number of persons reported experiencing abdominal pain and presence of blood and mucous in faeces - important clinical presentations in cases of schistosomiasis. There is the need for continued interventions through proper hygiene, good source of water, and public enlightenment for the control of intestinal schistosomiasis. Pupils should be enlightened and cautioned against high risk behaviour such as swimming in untreated water and walking barefoot.

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AUTHORS CONTRIBUTION

DDM and MBC conceptualized and designed the study. DDM participated in fieldwork and data collection. IF and DDM performed the data analysis; DDM, MBC and IF interpreted the data. IF and DDM prepared the first draft of the manuscript; manuscript was reviewed by IF, AAJ, NI, SKM, UIA and CAN. All authors contributed to the development of the final manuscript and approved its submission.

DISCLOSURE OF CONFLICT OF INTEREST

The authors do not have any conflicting interest to declare

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