



Research Article

Prevalence and Risk Factors Associated with Urinary Schistosomiasis among Residents of Mandarari Village, Konduga Local Government Area, Borno State, Nigeria

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ABSTRACT

Urinary schistosomiasis remains a major public health problem in many rural communities in Nigeria where access to safe water and sanitation is limited. This study determined the prevalence of urinary schistosomiasis and evaluated associated risk factors among residents of Mandarari Village, Konduga Local Government Area, Borno State, Nigeria. A community-based cross-sectional study was conducted among 300 participants of different age groups and both sexes. Demographic and exposure data were collected using structured questionnaires. Urine samples were screened for haematuria and proteinuria using reagent strips and examined microscopically for the presence of *Schistosoma haematobium* eggs using the centrifugation sedimentation technique. Data were analyzed using IBM SPSS version 26, and statistical significance was set at $p < 0.05$. Microscopy confirmed *S. haematobium* infection in 53 participants, giving an overall prevalence of 17.67%. Haematuria was detected in 54.67% of participants, proteinuria in 43.00%, and both abnormalities in 32.33%. Males had a significantly higher prevalence than females (24.83% vs. 10.59%; $\chi^2 = 10.45$, $p = 0.001$). Participants aged 20-29 years were at significantly higher risk of infection (OR = 4.61, 95% CI: 1.45–14.62, $p = 0.009$). Prevalence varied across locations, with B3ri recording the highest rate (37.03%). Fishermen (33.3%) and farmers (26.9%) had the highest occupational prevalence, although occupation was not significantly associated with infection ($p = 0.667$). The findings show that urinary schistosomiasis is moderately endemic in Mandarari Village and remains an important public health concern. Regular mass treatment with praziquantel, improved access to safe water, health education, and targeted interventions in high-risk areas are recommended to reduce transmission and prevent long-term complications.

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INTRODUCTION

Urinary schistosomiasis is a parasitic disease caused by the trematode *Schistosoma haematobium*. The infection occurs when people come into contact with freshwater containing cercariae released by infected freshwater snails of the genus *Bulinus*. The cercariae penetrate the skin, develop into adult worms, and reside in the venous plexus surrounding the urinary bladder. Female worms produce eggs that migrate through the bladder wall and are excreted in urine. Some eggs become trapped in tissues, causing inflammation, haematuria, fibrosis, and long-term damage to the urinary tract (Colley *et al.*, 2014).

Schistosomiasis remains one of the most important neglected tropical diseases worldwide. More than 250 million people require preventive treatment annually, with over 90% of the global burden occurring in sub-Saharan Africa. Nigeria carries one of the highest burdens of schistosomiasis in Africa due to widespread dependence on rivers, ponds, and irrigation canals for domestic and occupational activities (WHO, 2023).

Schistosoma haematobium is the predominant species responsible for urinary schistosomiasis in Africa and the Middle East. Common clinical manifestations include terminal haematuria, dysuria, increased urinary frequency, and proteinuria. Chronic infection may lead to bladder wall calcification, hydronephrosis, infertility, and squamous cell carcinoma of the bladder (Gryseels *et al.*, 2006). In endemic communities, haematuria and proteinuria are frequently used as rapid indicators of infection and can support field diagnosis.

The transmission of urinary schistosomiasis is strongly influenced by environmental and behavioral factors. People who engage in fishing, farming, swimming, irrigation, and other activities involving freshwater exposure are at increased risk. Children and young adults often show higher infection rates because of frequent contact with contaminated water and limited awareness of transmission pathways (Knopp *et al.*, 2013).

Northern Nigeria has numerous communities where access to safe water and sanitation is inadequate. In such areas, residents rely on natural water bodies for drinking, washing,

bathing, and agricultural activities. These conditions promote the persistence of the intermediate snail hosts and maintain transmission of *S. haematobium*. Several studies conducted in Nigeria have reported moderate to high prevalence of urinary schistosomiasis, particularly in rural communities where control measures are limited (Ekpo *et al.*, 2008; Dawaki *et al.*, 2016).

Borno State contains many rural settlements where insecurity, population displacement, and poor infrastructure have disrupted water and sanitation services. Mandarari Village in Konduga Local Government Area is one such community, where residents commonly depend on untreated surface water. Despite these risk factors, local epidemiological data on urinary schistosomiasis remain limited. Reliable prevalence data are needed to guide public health interventions such as mass drug administration with praziquantel, snail control, health education, and improved water supply.

Microscopic examination of urine remains the standard method for confirming *S. haematobium* infection by detecting characteristic terminal-spined eggs. Reagent strip testing for haematuria and proteinuria provides a simple screening approach and often correlates with infection intensity. Combining parasitological and urinalysis methods provides a more complete assessment of disease burden and associated morbidity.

This study investigates the prevalence of urinary schistosomiasis among residents of Mandarari Village and evaluates associations with sex, age, occupation, and place of residence. The study also examines haematuria and proteinuria as indicators of infection.

MATERIALS AND METHODS

Study Design

A community-based descriptive cross-sectional study was conducted to determine the prevalence of urinary schistosomiasis and its associated risk factors among residents of Mandarari Village, Konduga Local Government Area, Borno State, Nigeria. The study combined questionnaire-based data collection, urinalysis, and microscopic examination of urine samples for the detection of *Schistosoma haematobium* eggs.

Study Area

The study was carried out in Mandarari Village, located in Konduga Local Government Area of Borno State, northeastern Nigeria. Konduga lies approximately at latitude 11°40' N and longitude 14°24' E. The area is characterized by a semi-arid climate with seasonal rainfall and several ponds and streams used for domestic, agricultural, and recreational activities. These water bodies provide suitable habitats for freshwater snails that serve as intermediate hosts of *S. haematobium*. Laboratory analyses were performed at the Molecular Biology Laboratory, Centre for Biotechnology, University of Maiduguri, Borno State.

Study Population

The study population comprised children, adolescents, and adults residing in Mandarari Village for at least six months prior to the study. Both males and females were eligible to participate.

Sample Size Determination

The minimum sample size was determined using the single population proportion formula described by Cochran (1977):

$$n = \frac{Z^2 pq}{d^2}$$

where:

- n = minimum required sample size
- Z = standard normal deviate at 95% confidence level (1.96)
- p = estimated prevalence of urinary schistosomiasis from a previous study (13.9776% = 0.139776)
- $q = 1 - p = 0.860224$
- d = margin of error (0.05)

Substituting the values into the formula:

Since:

$$(1.96)^2 = 3.8416$$

and

$$0.139776 \times 0.860224 = 0.12015$$

therefore:

$$n = \frac{3.8416 \times 0.139776}{0.0025} = \frac{0.53696}{0.0025} = 214.78$$

The calculated minimum sample size was 214.78, which was rounded up to 215 participants. To increase statistical power and compensate for possible non-response, a total of 300 participants were enrolled in the study.

Sampling Technique

Convenience sampling was employed. Eligible participants who were available and willing to participate during the study period were recruited after informed consent was obtained.

3.6 Inclusion Criteria

Participants were included if they:

1. Were residents of Mandarari Village.
2. Were male or female of any age.
3. Provided written informed consent (or assent with parental consent for minors).
4. Were willing to provide urine samples and complete the questionnaire.

Exclusion Criteria

Participants were excluded if they:

1. Declined to provide informed consent.
2. Had received praziquantel treatment within the preceding six months.
3. Were unable to provide urine samples.
4. Were seriously ill at the time of sample collection.

Ethical Considerations

Ethical approval was obtained from the Borno State Ministry of Health Research Ethics Committee (SHREC No. 150/2024). Community entry was facilitated through advocacy visits to the village leaders. The objectives and procedures of the study were explained to all participants in their local language. Written informed consent was obtained from adults, while parental consent and child assent were obtained for participants younger than 18 years. Confidentiality of all collected information was maintained throughout the study.

Data Collection

Questionnaire Administration

A structured questionnaire adapted from standard epidemiological survey tools was used to collect demographic and risk factor information (Creswell & Creswell, 2018). Information obtained included age, sex, occupation, educational level, source of water, history of haematuria, swimming habits, fishing activities, farming, and previous treatment for schistosomiasis.

Urine Sample Collection

Each participant provided approximately 10 mL of terminal urine between 10:00 a.m. and 2:00 p.m., the period during which *S. haematobium* egg excretion is highest (Cheesbrough, 2005). Samples were collected in sterile, screw-capped

universal containers labeled with unique identification numbers and transported to the laboratory for analysis within 24 hours.

Laboratory Analysis

Urinalysis for Haematuria and Proteinuria

Urine samples were screened using URS-9 reagent strips (ABBON Healthcare, United Kingdom) according to the manufacturer's instructions. The test strip was immersed briefly in the urine sample, excess urine was removed, and the resulting color changes were compared with the reference chart on the container. The presence and degree of haematuria and proteinuria were recorded as trace, small (+), medium (++), or large (+++).

Microscopic Detection of *Schistosoma haematobium*

The centrifugation sedimentation technique described by Cheesbrough (2005) was used for parasitological diagnosis. Ten milliliters of well-mixed urine were transferred into centrifuge tubes and centrifuged at 1,500-2,000 rpm for 5 minutes. The supernatant was discarded, and the sediment was resuspended. One to two drops of the sediment were placed on a clean glass slide, covered with a coverslip, and examined under a light microscope using $\times 10$ objective lens, with confirmation under $\times 40$ objective lens when necessary. Characteristic terminal-spined eggs of *S. haematobium* were identified and recorded as positive.

Outcome Measures

The primary outcome was the presence of *S. haematobium* eggs in urine samples. Secondary outcomes included the occurrence of haematuria and proteinuria and their association with demographic and behavioral factors.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize demographic characteristics and prevalence rates. Associations between categorical variables were assessed using Pearson's chi-square test or Fisher's exact test where appropriate. Binary logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for potential risk factors. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Among the 300 urine samples analyzed, 164 (54.67%) were positive for haematuria, 129 (43.00%) were positive for proteinuria, and 97 (32.33%) showed both haematuria and proteinuria simultaneously (Table 1). These findings indicate that more than half of the study participants had detectable blood in urine, while nearly one-third exhibited combined urinary abnormalities suggestive of significant urinary tract pathology.

The high frequency of haematuria observed in this study is consistent with the characteristic pathology of urinary schistosomiasis. Adult *Schistosoma haematobium* worms inhabit the vesical venous plexus and release eggs that migrate through the bladder wall. The movement of these eggs causes mechanical damage to capillaries and surrounding tissues, resulting in bleeding into the urinary tract and the appearance of blood in urine (Gryseels *et al.*, 2006). Proteinuria may arise from inflammatory damage to the urothelium and increased permeability of the glomerular and bladder mucosa.

The proportion of participants with haematuria was substantially higher than the microscopy-confirmed prevalence of *S. haematobium* infection (17.67%) (Table 1). This difference suggests that haematuria, although highly sensitive, is not completely specific for schistosomiasis. Other conditions, including urinary tract infection, kidney stones, trauma, and menstruation, can also produce blood in urine. Nonetheless, in endemic communities, reagent strip-detected haematuria remains a practical and cost-effective screening tool, especially where microscopy facilities are limited (King *et al.*, 2005).

The high prevalence of urinary abnormalities indicates that a considerable proportion of the Mandarari population may be suffering from urinary tract inflammation and chronic morbidity associated with schistosomiasis. If untreated, these lesions may progress to fibrosis, obstructive uropathy, and increased risk of bladder carcinoma. These findings highlight the need for regular community-based screening, prompt treatment with praziquantel, and health education on reducing contact with contaminated water.

Comparable studies in Nigeria have reported similar findings. Dawaki *et al.* (2016) documented a strong association between haematuria and urinary schistosomiasis in Kano State, while Nmorsi *et al.* (2001) reported high

rates of haematuria among infected schoolchildren in Edo State. The present results confirm that urinalysis remains an important field-based method for identifying communities with ongoing transmission.

Table 1: Prevalence of Haematuria and Proteinuria among Study Participants in Mandarari Village, Konduga Local Government Area, Borno State

Parameter	Total examined, n	Positive, n (%)	Negative, n (%)
Haematuria	300	164 (54.67)	136 (45.33)
Proteinuria	300	129 (43.00)	171 (57.00)
Both haematuria and proteinuria	300	97 (32.33)	203 (67.67)

Among participants with haematuria, males and females contributed equally, with 82 cases each. Most cases were classified as small (+) intensity, accounting for 60.4% of all haematuria-positive samples (Table 2). Medium (++) and large (+++) intensities accounted for 25.0% and 14.0%, respectively. For proteinuria, males contributed 73 (56.9%) cases and females 56 (43.4%) cases. Small (+) proteinuria was also the most common category, representing 68.2% of positive cases.

When both haematuria and proteinuria occurred together, 49 cases (50.5%) were male and 48 cases (49.5%) were female. Most combined cases were of small (+) intensity (61.9%), followed by medium (++) intensity (30.9%). Only 7.2% of combined cases were severe (+++) (Table 2).

The predominance of mild urinary abnormalities suggests that many infections were either early or of moderate intensity. This pattern is typical in endemic communities where repeated low-

level exposure occurs over time. Although mild abnormalities may appear clinically insignificant, persistent infection can lead to cumulative tissue damage and chronic complications.

The slightly higher number of proteinuria cases among males may reflect greater engagement in water-related activities such as fishing, irrigation, and livestock rearing. However, the similar distribution of haematuria and combined abnormalities between males and females suggests that both sexes are substantially exposed to transmission sites.

Studies in endemic regions have also shown that most urinary abnormalities associated with schistosomiasis are of mild to moderate intensity. Such findings indicate ongoing but relatively stable transmission rather than explosive outbreaks. Early detection and treatment at this stage can prevent progression to severe urinary tract disease.

Table 2: Sex-Based Distribution and Severity of Haematuria and Proteinuria among Participants with Positive Urinalysis Findings

Urinalysis parameter	Sex	Trace, n (%)	Small (+), n (%)	Medium (++) , n (%)	Large (+++), n (%)	Total, n (%)
Haematuria	Male	1 (1.2)	44 (53.7)	25 (30.5)	12 (14.6)	82 (50.0)
	Female	0 (0.0)	55 (67.1)	16 (19.5)	11 (13.4)	82 (50.0)
	Total	1 (0.6)	99 (60.4)	41 (25.0)	23 (14.0)	164 (54.67)
Proteinuria	Male	1 (1.4)	52 (71.2)	11 (15.1)	9 (12.3)	73 (56.9)
	Female	0 (0.0)	36 (64.3)	15 (26.8)	5 (8.9)	56 (43.41)
	Total	1 (0.76)	88 (68.2)	26 (20.2)	14 (10.9)	129 (43.0)
Both haematuria and proteinuria	Male	0 (0.0)	31 (63.3)	13 (26.5)	5 (10.2)	49 (50.51)
	Female	0 (0.0)	29 (60.4)	17 (35.4)	2 (4.2)	48 (49.49)
	Total	0 (0.0)	60 (61.9)	30 (30.9)	7 (7.2)	97 (32.33)

No statistically significant association was observed between sex and the degree of haematuria ($\chi^2 = 4.241$, $p = 0.237$), proteinuria ($\chi^2 = 3.488$, $p = 0.322$), or combined haematuria and proteinuria ($\chi^2 = 1.876$, $p = 0.391$) (Table 3). These results indicate that the severity of urinary abnormalities did not differ significantly between males and females. Both sexes appear to experience similar levels of morbidity once exposed to infection. This suggests that biological sex alone is not a major determinant of lesion severity in this community.

The lack of significant association may reflect shared exposure patterns. In rural communities, males and females often use the same ponds and streams for bathing, washing, and fetching water. Similar exposure intensities may therefore produce comparable disease manifestations.

Comparable observations have been reported in other Nigerian studies, where sex influenced prevalence but not necessarily the severity of urinary lesions. This finding underscores the importance of including both males and females in schistosomiasis control programs.

Table 3: Association Between Sex and Severity of Urinary Abnormalities among Study Participants

Urinalysis parameter	Chi-square (χ^2)	df	p-value
Haematuria	4.241	3	0.237
Proteinuria	3.488	3	0.322
Both haematuria and proteinuria	1.876	2	0.391

Binary logistic regression showed that males had 1.71 times higher odds of haematuria compared with females (95% CI: 0.91–3.23) (Table 4). However, the confidence interval included unity, indicating that the association was not statistically significant. For proteinuria, males had lower odds than females (OR = 0.69, 95% CI: 0.33–1.47). For combined haematuria and proteinuria, the odds ratio was 0.89 (95% CI: 0.39–2.01).

These results confirm that sex was not an independent predictor of urinary morbidity.

Although males showed a tendency toward higher haematuria, the wide confidence intervals suggest substantial variability and limited statistical certainty.

The findings imply that prevention efforts should target all members of the community rather than focusing exclusively on one sex. Control interventions based solely on gender would overlook a significant proportion of at-risk individuals.

Table 4: Binary Logistic Regression Analysis of the Association Between Sex and Urinary Abnormalities

Condition	Odds Ratio (Male vs Female)	95% Confidence Interval
Hematuria	1.71	0.91 – 3.23
Proteinuria	0.69	0.33 – 1.47
Hematuria and Proteinuria	0.89	0.39 – 2.01

Microscopic examination detected *S. haematobium* eggs in 53 of 300 participants, giving an overall prevalence of 17.67% (95% CI: 13.52–22.46). Males had a significantly higher prevalence (24.83%) than females (10.59%). The association between sex and infection was statistically significant ($\chi^2 = 10.45$, $p = 0.001$) (Table 5).

The higher prevalence among males is likely related to greater participation in fishing,

irrigation, swimming, and other water-based activities that increase exposure to cercariae. This pattern has been reported consistently across endemic areas in Nigeria and elsewhere. According to World Health Organization criteria, a prevalence between 10% and 50% indicates moderate endemicity, warranting periodic preventive chemotherapy with praziquantel for at-risk groups. The observed prevalence confirms that urinary schistosomiasis

remains an important public health problem in Mandarari Village.

The significant gender difference indicates that behavioral factors play a major role in transmission. Tailored health education targeting boys and young men may therefore reduce

infection rates, although treatment should remain community-wide.

Similar male predominance has been reported by Dawaki *et al.* (2016) in Kano State and Ekpo *et al.* (2008) in southwestern Nigeria, supporting the conclusion that occupational and recreational water contact strongly influences infection risk.

Table 5: Sex-Specific Prevalence of *Schistosoma haematobium* Infection Determined by Urine Microscopy

Gender	Number examined, n	Positive cases, n (%)	95% CI for positivity	Negative cases, n (%)
Male	149	37 (24.83)	18.13–32.57	112 (75.17)
Female	151	16 (10.59)	6.18–16.64	135 (89.40)
Total	300	53 (17.67)	13.52–22.46	247 (82.33)
χ^2 (df)	10.45 (1)	p-value	0.001	Significant

Using children aged 0-9 years as the reference group, participants aged 20–29 years had significantly higher odds of infection (OR = 4.61, 95% CI: 1.45–14.62, $p = 0.009$). No significant associations were observed for other age groups (Table 6).

The elevated risk among young adults likely reflects increased occupational exposure through farming, fishing, irrigation, and other activities requiring prolonged freshwater contact. This age group represents the economically active segment of the population and may spend considerable time at transmission sites.

The absence of significant associations in older age groups may be due to acquired partial immunity, behavioral changes, or reduced exposure over time. The unstable estimates observed in some age groups suggest small sample sizes and low event counts.

These findings differ from many studies that report peak prevalence in school-aged children, indicating that in Mandarari, occupational exposure among young adults is a particularly important driver of transmission. Control programs should therefore extend beyond school-based treatment to include adults engaged in high-risk occupations.

Table 6: Age-Related Risk Factors for *Schistosoma haematobium* Infection Based on Binary Logistic Regression Analysis

Age Group (years)	Odds Ratio (OR)	95% CI (Lower–Upper)	p-value
0–9	1.00	Reference	–
10–19	1.54	0.77–3.08	0.218
20–29	4.61	1.45–14.62	0.009
30–39	0.31	0.04–2.51	0.272
40–49	0.00	0.00–∞	1.000
50–59	0.00	0.00–∞	0.999
≥60	0.59	0.07–4.97	0.623

Prevalence varied markedly across the six surveyed locations. B3ri recorded the highest prevalence at 37.03%, more than double the overall prevalence of 17.67%. Other locations ranged from 11.11% to 14.00% (Table 7).

The elevated prevalence in B3ri suggests localized transmission hotspots. Possible contributing factors include closer proximity to infested water bodies, poor sanitation, higher snail density, and more frequent water contact.

Such spatial heterogeneity is a well-recognized feature of schistosomiasis transmission.

The identification of a high-risk location has practical implications for targeted interventions.

Snail control, environmental modification, and intensified health education should be prioritized in B3ri to interrupt transmission more efficiently.

Table 7: Spatial Distribution and Prevalence of *Schistosoma haematobium* Infection Across Study Locations in Mandarari Village

Location	Number Tested	Positive	Negative	Total Positive (%)
BM	60	8	52	13.33
BME	73	10	63	13.70
B3ri	37	19	18	37.03
Bk	50	7	43	14.00
M	53	6	47	11.32
MA	27	3	24	11.11
Total	300	53	247	17.67

The highest prevalence was observed among fishermen (33.3%), followed by farmers (26.9%), Sangaya students (23.1%), regular students (23.0%), and tailors/weavers (20.0%). Civil servants had no detected infection (Table 8).

The high prevalence among fishermen and farmers is biologically plausible because these occupations require prolonged contact with rivers, ponds, and irrigation canals. Sangaya

students and schoolchildren may also engage in swimming and domestic water collection.

Although occupational categories showed substantial variation, some groups contained few participants, which may limit the precision of prevalence estimates.

Comparable studies have consistently reported elevated infection among individuals whose occupations involve direct freshwater exposure. These findings reinforce the role of occupational behavior in sustaining transmission.

Table 8: Occupational Distribution and Prevalence of *Schistosoma haematobium* Infection among Study Participants

Occupation	Total Tested n (%)	Positive n (%)	Prevalence (%)
Fishermen	12 (4.0)	4 (7.5)	33.3
Farmer	26 (8.7)	7 (13.2)	26.9
Trader	44 (14.7)	6 (11.3)	13.6
Capsewer	19 (6.3)	2 (3.8)	10.5
Student	53 (17.7)	7 (13.2)	23.0
Sangaya Student	52 (17.3)	12 (22.6)	23.1
House wife	10 (3.3)	1 (1.9)	10.0
Tailor / Weaving	10 (3.3)	2 (3.8)	20.0
Civil Servant	3 (1.0)	0 (0.0)	0.0
Artisan	11 (3.7)	2 (3.8)	18.1
NA / Unemployed	60 (20.0)	10 (18.9)	

There was no statistically significant association between occupation and infection (Pearson $\chi^2 = 7.61$, $df = 10$, $p = 0.667$; Fisher's exact test $p = 0.67$) (Table 9).

This result indicates that, despite apparent differences in prevalence, occupation was not an

independent predictor of infection in this dataset. The lack of significance may reflect small sample sizes in several occupational groups and overlap in water-contact behaviors across occupations.

In Mandarari, many residents share the same water sources regardless of occupation. Domestic activities such as bathing, washing clothes, and fetching water may contribute as much to exposure as formal occupation.

The implication is that schistosomiasis is a community-wide problem rather than one

confined to specific occupational groups. Preventive chemotherapy and health education should therefore be implemented broadly across the population rather than limited to selected professions.

TABLE 9: Statistical Association Between Occupation and *Schistosoma Haematobium* Infection

Test	Value	df	p-value (Sig.)
Pearson Chi-Square	7.61	10	0.667
Likelihood Ratio	8.02	10	0.628
Fisher's Exact Test (Monte Carlo)	—	—	0.67
N of Valid Cases	300		

Pearson Chi-square $\chi^2(10) = 7.61$, $p = 0.667$; Fisher's Exact Test (Monte Carlo) $p = 0.67$.

CONCLUSION

This study demonstrated that urinary schistosomiasis is still actively transmitted in Mandarari Village, with an overall prevalence of 17.67%, indicating moderate endemicity according to World Health Organization criteria. More than half of the participants had haematuria and a large proportion had proteinuria, showing that schistosomiasis-associated urinary tract morbidity is common in the community.

Male participants were significantly more infected than females, and individuals aged 20-29 years had the highest risk of infection. The marked variation in prevalence across locations, particularly the high burden observed in B3ri, indicates the presence of localized transmission hotspots. Fishermen and farmers had the highest occupational prevalence, reflecting the role of frequent contact with contaminated water.

The results confirm that urinary schistosomiasis remains a major health problem in Mandarari Village and may lead to chronic complications if left untreated. Community-wide praziquantel treatment, improvement of water and sanitation facilities, health education on avoiding unsafe water contact, and focused interventions in high-risk locations are necessary to reduce the burden of infection and protect the health of the population.

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