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Urogenital Schistosomiasis Knowledge, Attitudes, and Practices among the Community Members in Lindi, Tanzania: A Qualitative Study

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ABSTRACT

Background: Urogenital schistosomiasis caused by *Schistosoma haematobium* (*S. haematobium*), remains a public health problem in Lindi region. Despite twelve rounds of praziquantel preventive chemotherapy. There is a scarcity of information on the factors perpetuating the transmission of *S. haematobium* in Lindi. Therefore, this study aimed to explore the urogenital schistosomiasis knowledge, attitudes, and practices among the community members in Mtama district in the Lindi region of Tanzania.

Methodology: A cross-sectional study employing a qualitative approach was conducted in Mtama, Lindi in May 2021. The respondents were purposively sampled, and a total of 6 Focus Group Discussions (FGDs), 2 in each village were conducted. The FGDs were audio-recorded, transcribed verbatim, and analysed thematically to identify emerging themes.

Results: Majority of respondents were aware of the endemicity of *S. haematobium* and the ongoing distribution of praziquantel preventive chemotherapy. Respondents had inadequate knowledge of the disease causation and the role of snails in disease transmission. Also, misconception on the modes of disease transmission was observed. Respondents had undesirable attitudes. They were against regular screening of urogenital schistosomiasis and were into the use of traditional ways of treatment to dodge screening and treatment costs. Respondents exhibited inappropriate water, sanitation, and hygienic practices (WaSH), thus perpetuating disease transmission.

Conclusion: Despite the community being aware and knowledgeable of urogenital schistosomiasis, there is inadequate understanding of how the disease is transmitted, the roles of snails in *S. haematobium* transmission, coupled with undesirable attitudes and inappropriate practices. These potentially compromise the ongoing Government efforts to control the disease in Lindi region. Therefore, there is need to initiate a community-based health education programme targeting behaviour change.

INTRODUCTION

Urogenital schistosomiasis (UGS) is among the serious neglected tropical diseases accountable for significant morbidities in tropical and sub-tropical regions.[1] Transmission of urogenital schistosomiasis involves an intermediate host (*Bulinus* snails) and a definitive host (human).[2] Adult *S. haematobium* worms inhabit the vesicular and pelvic venous plexus of the bladder and produce eggs which are eliminated with urine. When the eggs are released in water under optimal conditions, the eggs hatch and release miracidia which swim and penetrate *Bulinus* snails. Within the *Bulinus* snail, the miracidia develop into *sporocysts* which later develop into infective *cercariae*. When the infective *cercariae* are released from the snail into the water stream, they swim, penetrate the skin of the human host during water contact activities, and shed their forked tails, thus becoming *schistosomulae*. The *schistosomulae* migrate via venous circulation to the lungs, then to the heart, and then develop in the liver, exiting the liver via the portal vein system when mature and reside in the vesicular and pelvic venous plexus of the bladder.[3]

The most commonly affected individuals in endemic areas are the children (pre-schoolers and school-aged children) and people engaged in water-related occupations.[1] Urogenital schistosomiasis in infected individuals leads to dysuria, haematuria, nutrition deficiencies, iron deficiency anaemia, bladder lesions, hydronephrosis and bladder squamous cell carcinoma.[4] Also, in children, it causes growth retardation, cognitive dysfunction, malnutrition, and reduces their ability to learn in school.[5] Globally in 2020, it was estimated that 436 million people live in 78 endemic countries, so they are at risk of getting urogenital schistosomiasis, and over 112 million people were infected.[1] Among the infected people, over 76 millions suffered minor bladder morbidity, 24

million suffered major bladder morbidity, 19 million had kidney problems, 9.6 million had major hydronephrosis due to infection, and 0.162 mortality due to kidney and bladder squamous cell carcinoma.[1] Africa, particularly sub-Saharan Africa, carries the highest burden of the disease (more than 90%) when compared to other regions. This is due to limited access to clean water, inadequate sanitation provision, and poor hygienic practices.[1,6,7]

In Africa, Tanzania is amongst countries with a high burden of urogenital schistosomiasis. Its distribution and prevalence vary across the region.[8] Studies have reported the prevalence of urogenital schistosomiasis to ranging from 1% to 88%, reaching 100% in some regions.[9–12] Like other urogenital schistosomiasis endemic countries, a higher prevalence has been reported among school-aged children below 15 years of age compared to other at risk populations (pre-schoolers and people engaged in water-related activities).[8] In the Lindi region where this study was conducted, there is history of high prevalence of *S. haematobium* since 1987.[13] Recent studies have reported the prevalence of *S. haematobium* to be ranging from 23% to 52.7%, indicating ongoing transmission of the disease.[7,14]

The control of urogenital schistosomiasis is mainly through the distribution of praziquantel preventive chemotherapy. However, if water contact is continued, re-infection can occur after a short period of time (6 months) because praziquantel does not prevent subsequent infection.[15] Other control interventions to complement praziquantel preventive chemotherapy include; snail control to kill the intermediate host (*Bulinus spp*), improvement of Water, Sanitation, and Hygiene (WASH), and health education for behaviour change.[16]

The high burden of urogenital schistosomiasis in Tanzania sparked the initiation of a mass praziquantel preventive chemotherapy in 2005 among school-aged children in 11 regions.[17] The praziquantel preventive chemotherapy is distributed once per year in primary schools targeting children who attend school only, out of school children are left untreated.[17]

Lindi region was among the first 11 regions where praziquantel distribution was implemented. However, despite the use of praziquantel for more than a decade (12 rounds)[17], the prevalence of urogenital schistosomiasis has remained high,[7,14] conceivably indicating persistent transmission, and, there is limited information on the factors contributing to the ongoing transmission of *S. haematobium* in the area.

Hence, there is need to establish urogenital schistosomiasis related knowledge, attitudes and practices among the community members to determine the causes of urogenital schistosomiasis persistent transmission. The study results will contribute towards the sustainable control of urogenital schistosomiasis in the region. Therefore, this study explored the urogenital schistosomiasis knowledge, attitudes, and practices among community members in Mtama district, Lindi region. The findings might be used to modify the existing control programme by including health education and promotion to accelerate the control of urogenital schistosomiasis.

METHODS

Study Design

A community-based cross-sectional study employing a qualitative method of data collection was carried out in the Mtama district in May 2021 to explore the urogenital schistosomiasis knowledge, attitudes, and practices among community members in the Mtama district. This study was part of a large study conducted in the Lindi region to investigate the current burden of *S. haematobium* among children and the factors associated with the persistency of transmission.

Study Setting

This study was conducted in the Mtama district, previously known as the Lindi district council. Mtama district is among the 6 districts of Lindi region located in the South-East of Tanzania's mainland. The district has an area of 5975 km² divided into 31 wards. According to the Tanzania 2012 National Census, the district has an approximate population of 194,143 (females are 102,496 (52.8%)).[18] The tropical climatic conditions of Mtama district, the annual rainfall of 910 mm with an average temperature of 26.3°C favour the breeding and survival of the intermediate host of the *S. haematobium* known as *Bulinus* snails (*Bulinus globosus* and *Bulinus nasutus*).[14]

The ongoing economic activities in Mtama district include; agriculture, livestock keeping, and fishing. Some of these activities such as rice farming and fishing predispose the community to the risk of transmitting and acquiring urogenital schistosomiasis. During farming and fishing activities, farmers and fishermen are exposed to the infested water and hence cercaria penetration through their skin. Also, the lack of toilet facilities around the water sources perpetuates unhygienic activities such as open urination in and around the water sources. Incase, one has urogenital schistosomiasis, such acts would lead to contamination of the water sources with *S. haematobium* eggs. Mtama district has 117 primary schools, one hospital, 6 health centres, and 42 dispensaries with parasitic diseases (urogenital schistosomiasis, malaria, soil-transmitted helminths, and filariasis) affecting the majority.[17,19]

Study Population, Inclusion and Exclusion Criteria

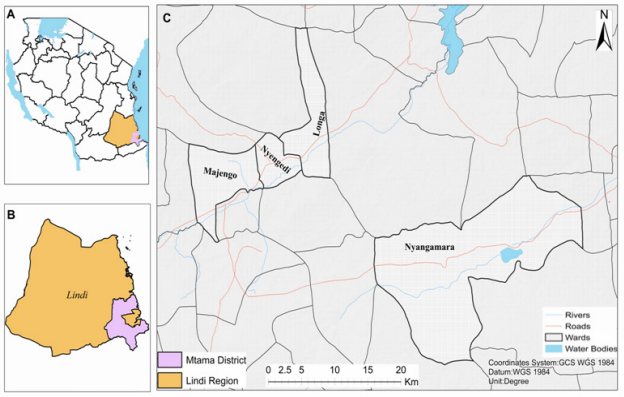
The study population included community members aged 18 years and above living in Mtama district. Study participants were selected among the high risk groups of people whose occupations (farming and irrigation) and domestic tasks involve contact with cercariae-infested waters. Also, these members visit water bodies with their younger children (below 5 years) or school-aged children who assisted them in agricultural or domestic activities. Hence, they were at risk of being exposed to cercariae-infested water. The study included only permanent residents of the Mtama district who agreed to participate in the study and signed the informed consent. Participants who were unable to communicate due to medical conditions were excluded.

Sampling

Purposive sampling was employed to select the study respondents. First, 3 wards (Longa, Nyengedi, and Nyangamara) were purposively sampled from the list of 31 *S. haematobium* endemic wards (Figure 1). Then, one

village per ward was purposively selected, whereby three villages (Mtua longa, Nyengedi A, and Nyangamara from Longa, Nyengedi, and Nyangamara wards, respectively) were selected. In each of the selected villages, a total of 8 to 12 community members were purposively sampled for each of the 2 Focus Group Discussions (FGDs) conducted. The possiblity of selection bias of the respondents was mitigated by defining the study population, setting the inclusion and exclusion criteria, and ensuring the selected participants matched the desired criteria.

FIGURE 1. Map of Mtama District Showing Wards Sampled



(The map was designed based on the data collected using Geographic Coordinate System (GPS) and mapped under GPS WGS 1984)

Data Collection

Focus Group Discussions were held with community members to explore their knowledge, attitudes, and practices on urogenital schistosomiasis and WaSH using a FGD topic guide. The FGD topic guide consisted of a series of open-ended questions and each question had probes for further exploration of the concepts. A total of 6 FGDs were held at the village offices, 2 FGDs for each of the selected villages. To ensure freedom of expression, the first FGD was held with women only and the other with men. All FGDs were audio-taped.

Data Analysis

The qualitative data from FGDs was analysed using a thematic framework approach. The collected audio data was transcribed verbatim and translated from Kiswahili to English to obtain its textual format. For familiarisation, the transcripts were read and reviewed by the investigators several times. Inductive coding of the information from the transcript followed. Coding was done by highlighting phrases or sentences describing the content. After codes creation, the patterns among the codes were identified to form categories. The categories were compared with the data set to ensure that the generated categories were significant and thoroughly represented the actual data. Finally, the categories were integrated until the major themes solidified.

Ethical Consideration

Ethical approval for the study was provided by the Ethical Review Board of the Muhimbili University of Health and Allied Sciences, registration number: MUHAS-REC-12-2020-457. Permission to conduct the study in the Mtama district was obtained from the administrative units of Lindi region, from ward to village level. Verbal informed consent (for respondents who could not read and write) and written informed consent (for those who knew how to read and write) was obtained from the study participants after thorough explanation of the study aims, procedures for the study and their rights to withdraw from participation. Numbers were given to participants as opposed to using participants' names so as to maintain confidentiality. Collected data was transferred to the principal investigator's laptop and secured with a password so that only the authorised personnel could access the data.

RESULTS

Socio-Demographic Characteristics of the Study Respondents

A total of 57 community members participated in the 6 focus group discussions conducted at the Mtama district. Their age ranged from 18 to 57 years, with 29 (50.9%) of the respondents being females. The petty business was the main source of income for 29 (50.9%) of the respondents (Table 1).

Theme one: Awareness of urogenital Schistosomiasis as a Public Health Problem in the Mtama District

Endemicity of Urogenital Schistosomiasis and the Sources of Information on the Disease in Mtama

Most of the respondents reported that urogenital schistosomiasis was among the diseases that affected people of the Mtama community, especially among children. The majority of the respondents reported that despite urogenital schistosomiasis being highly endemic, they did not receive any information concerning the disease. However, some respondents mentioned schools and school-aged children as the source of information on the distribution of schistosomiasis preventive chemotherapy in school-aged children.

One of the respondents noted;

"We do not receive information about urogenital schistosomiasis in the community. However, when it comes to the treatment of school-aged children, children are usually told to inform their parents." (Nyangamara FGD, Female 006, 37 years)

Awareness of the ongoing efforts to address the urogenital schistosomiasis in Mtama

The majority of the respondents were aware of the distribution of the preventive chemotherapy to school-aged children as the intervention for the control of urogenital schistosomiasis. One of the respondents mentioned the manual picking of snails twice a year to be among the intervention used to control the transmission of the disease in Mtama:

"Apart from the drugs distributed to school-aged children, we usually handpick the snails at least twice a year to clean the water sources. This helps to minimize the transmission of urogenital schistosomiasis." (Longa FGD, Female 008, 32 years)

Theme two: Knowledge on urogenital schistosomiasis among community members of Mtama

Understanding of urogenital schistosomiasis (causative agent, transmission, roles of snails, symptoms, treatment, control and prevention)

Most of the respondents defined urogenital schistosomiasis as urinating blood or bleeding at the end of peeing, while few respondents defined it as genitalia itching and stomach pain when urinating. None of the respondents was able to state the correct causative of urogenital schistosomiasis. However, majority of the participants knew the mode of transmission. The most mentioned mode of *S. haematobium* transmission was contacting infested water during agricultural activities, swimming, and domestic chores such as laundry. Also, there were some misconceptions on the mode of transmission, such as drinking unboiled water or sharing the toilet with the infected individuals, as pointed out by one of the respondents:

"The transmission of S. haematobium occurs when sharing latrines with infected individuals not observing proper hygiene." (Nyangamara FGD, Male 004, 28 years)

None of the respondents was aware of the role of snails in the transmission of urogenital schistosomiasis. The symptoms of urogenital schistosomiasis were well known in this community conceivably due to the high endemicity of the disease. Symptoms participants mentioned included; blood in the urine, vaginal discharge, abdominal pain, pelvic pain, genital itching, blood in semen, and dysuria. Regarding the population at higher risk of urogenital schistosomiasis, participants mentioned school-aged children, adults working in the rice paddy fields and women doing domestic chores in the infested water. The respondents did not mention the under-fives as a population at risk of disease acquisition.

Treatment for Urogenital Schistosomiasis

All of the participants in the 6 conducted FGDs reported urogenital schistosomiasis as a treatable disease, with the majority preferring to the modern (hospital) way of treatment while some preferred to traditional treatment. Some of the respondents noted;

"Both traditional and modern treatments are used to treat the disease in this community. However, traditional treatments relieve the symptoms shortly, and the symptoms tend to recur." (Nyengedi FGD, Female 007, 26 years)

"They will tell you that they prefer modern treatment. However, most of us end up using traditional treatment due to the cost implications. The traditional treatment is affordable compared to hospital treatment where you have to pay to see the doctor, diagnosis and treatment." (Longa FGD, Male 005, 31 years)

Interventions to Mitigate Urogenital Schistosomiasis in the Community

Regarding government's intervention programs on urogenital schistosomiasis prevention and control in Mtama area, the respondents mentioned the ongoing distribution of preventive chemotherapy for treating and preventing the disease among school-aged children. The respondents further mentioned several preventive measures employed at individual and community level to prevent urogenital schistosomiasis. These measures included snail collection once or twice per year and wearing of gumboots at the rice paddy fields and in shallow water.

TABLE 1: Socio-Demographic Characteristics of Study Respondents (n=57)

Characteristics	n(%)
Gender	
Male	28(49.1)
Female	29(50.9)
Age group (years)	
18-37	41(71.9)
38-57	16(28.1)
Marital status	
Single	24(42.1)
Married/cohabiting	30(52.6)
Divorced/separated	03(5.3)
Level of Education	
No formal education	12(21.1)
Primary school education	27(47.4)
Secondary education	12(21.1)
College	06(10.5)
Main source of income	
Agriculture	13(22.8)
Animal husbandry	09(15.8)
Employment	06(10.5)
Petty business	29(50.9)
Duration of residence (years)	
1-19	13(22.8)
20-38	35(61.4)
39-57	09(15.8)
Villages of residency	
Mtua longa	20(35.1)
Nyengedi A	17(29.8)
Nyangamara	20(35.1)

Participation in Preventive Chemotherapy

Regarding parents allowing their children to participate in the preventive chemotherapy program, most of the parents mentioned that the drug is beneficial for treatment and prevention of urogenital schistosomiasis among school-aged children. For the parent who did not allow their children to participate in the program, there mainly reason for refusal was due to the side effects experienced after intake of the drugs and inadequate information regarding the disease and it's treatment as reported by one of the respondent:

"Some community members do not allow their children to take the drugs because of the side effects experienced." (Nyengedi FGD, Male 008, 26 years)

Theme three: Attitudes on Urogenital Schistosomiasis among Community Members

Discrimination of the infected individuals

Respondents didn't report any form of discrimination or stigmatisation of the infected individuals. They reported

that infected individuals were treated the same as uninfected individuals as confirmed by one respondent:

"We do not discriminate against each other, instead we emphasis the sick to go to the hospital for treatment." (Nyangamara FGD, Female 010, 18 years)

Local Beliefs and Related Misconceptions

Majority of the respondents believed that urogenital schistosomiasis was not associated with local superstitious beliefs. However, few of the respondents reported association between urogenital schistosomiasis and superstition in the Mtama district as reported by one respondent:

"Yes, some people do believe. Sometimes the symptoms and the experience with recurrent infection, you might think you have been bewitched." (Longa FGD, Female 006, 47 years)

The Severity of the Disease in the Mtama Community

With respect to severity of the disease, all of the respondents believed urogenital schistosomiasis was a serious disease due to morbidities associated with the disease. Respondents mentioned bladder destruction, sterility, bladder cancer, and erectile dysfunction as some of the complications associated with the disease.

Screening for Urogenital Schistosomiasis

With regard to screening of urogenital schistosomiasis, few respondents (13, 23%) believed regular screening was important for knowing their infection status, being treated earlier, and avoiding morbidity. Majority of the respondents were against regular screening unless they were severely sick, the reason being it's expensive to screen.

The following were some of the responses:

People of this community don't screen for S. haematobium because of the costs. It's better to buy drugs at the pharmacies when sick rather than screening." (Longa FGD, Female 008, 32 years)

"No one in my family has ever screened for urogenital schistosomiasis. When they experienced symptoms of the disease, we bought medicines at the pharmacy. Imagine seeing a doctor, you have to pay 2500Tsh, diagnosis is 3000Tsh, and treatment is 1000Tsh per drug." (Nyengedi FGD, Male 008, 26 years)

Theme four: Water, Sanitation, and Hygiene Practices toward Urogenital Schistosomiasis among Community Members of Mtama

Water availability and ongoing activities in or near water sources

Majority of the respondents reported that Mtama district was surrounded by several water sources, which are unclean and unsafe for consumption and use. The water sources used by the community include; taps, rivers (Mnongo, Nyengedi, and Lukuledi), spring (Nahimba), stream (Kitumba), short and deep wells, dam (Mbawe), ponds, and Nyengedi irrigational scheme. Regarding the ongoing activities in and near water sources, majority of the respondents reported being engaged in activities such as agricultural (rice cultivation), fishing, and domestic chores that predispose them to infested water as reported by one of the respondents:

"Yes, agricultural activities, this community is involved in vegetable cultivation, sugarcane, and rice farming. Also, all the women do most of their domestic chores at water sources." (Longa FGD, Male 001, 21 years)

Exposure of Children (Under-Fives) to Water Sources

Majority of the respondents reported that women move with under-five children to water sources. These children play from the infested waters thus being exposed to the disease at an early age.

One of the respondents noted;

"To children, water is like a nanny. Once you place the child in water, the child will play without disturbing me when I am working. This habit starts very early, around 2 years in this community."(Nyengedi FGD, Female 007, 28 years)

The Availability and use of Latrines among the Community Members

All respondents from Longa and Nyengedi wards reported that there were no latrines at the water sources. Respondents from Nyangamara reported the presence of a pit latrine that is full, and that there was no initiative to build another one. It was also reported that the lack of sanitation facilities near water sources perpetuated unhygienic practices such as open urination and defecation in or near water sources, as reported by one of the respondents:

"Why waste time urinating and defecating outside the water while no one can see you when doing it in water. Also, defecating and urinating in water is advantageous because of enough water to wipe" (Nyangamara FGD, Male 006, 25 years)

Clearly, majority of the respondents (46, 81%) did not know if open urination caused transmission of urogenital schistosomiasis. Only a few respondents (11, 19.3%) reported that open urination contaminate the water sources and contribute to the transmission of diseases.

The habit of wearing protective gear (shoes) when in water sources/ crossing water sources

The study revealed that majority of the respondents (44, 77.2%) didn't wear protective shoes (gumboots) while working in water or crossing the water sources. This is because majority of the respondents reported not being able to afford the gumboots. Also, only a few respondents (13, 23%) were aware that walking barefooted could cause the acquisition of the disease, but they did not correctly know-how.

Treatment of Water

A few respondents (16, 28.1%) reported treating the water, and the majority did not treat the water due to economic reasons. The methods used for water treatment were; boiling, filtration and use of chemicals. This was clearly reported by one of the respondents who stated:

"In the past when water guard was provided free of charge, we used to treat water but not anymore because now we need to buy." (Longa FGD, Female 003, 44 years)

Most of the respondents knew the importance of water treatment despite not doing it. They mentioned 2 benefits; killing of microorganisms causing the diseases and the purification of water to make it clean and safe for human consumption. Majority of the respondents reported not boiling water for bathing the children due to the cost of

buying charcoal or fire woods (35, 85.3%). Instead, they reported that water is exposed to the sunlight for warming so as to prevent the children from acquiring cold and pneumonia. When the respondents were asked to state if boiling water before bathing the child was helpful in killing the parasite that cause urogenital schistosomiasis, most of them (49, 86%) were not aware. However, a few responded it could help.

DISCUSSION

A successful and sustainable control of urogenital schistosomiasis in endemic areas depends on adequate knowledge, positive attitudes, and appropriate preventive practices regarding the disease. The study explored the community knowledge, attitudes and practices on urogenital schistosomiasis. The study findings revealed that the community of Mtama district was aware of urogenital schistosomiasis as among the endemic disease affecting people in the area. This was probably because the disease has been endemic with a high prevalence for more than 3 decades in the Mtama district.[13] This is in line with the findings of a systematic review which showed high awareness of urogenital schistosomiasis in sub-Saharan Africa.[20]

Mtama community members reported that they did not receive any information regarding the disease due to lack of community health education campaigns. However, due to an ongoing distribution of preventive chemotherapy with praziquantel campaign, school-aged children are given health education about the disease and are regarded as a source of information about the disease to the community. Schools and school-aged children were reported among the sources of information in the communities by other urogenital schistosomiasis studies in endemic countries.[21–25]

Regarding the awareness of the Government's ongoing urogenital schistosomiasis control efforts, majority of the respondents were aware of the distribution of preventive chemotherapy because this intervention has been going on in Mtama for more than a decade. This observation is similar to reports from other studies conducted in Tanzania showing high awareness of the use of praziquantel preventive chemotherapy as the control intervention due to ongoing school campaigns.[10,23]

Only one respondent was aware that manual picking of snails could help to interrupt disease transmission; this was due to lack of awareness and inadequate knowledge on the role of snails in disease transmission. Knowledge on *S. haematobium* can generate effective change in the endemic communities by reducing risk behavioural practices and increasing the community's participation in the control interventions.[26] Most of the respondents were able to describe urogenital schistosomiasis and symptoms, reasonably reflecting their long experiences with these symptoms. These findings are consistent with observations from studies conducted in Tanzania, Ghana, and Cameroon.[23,26–28] However, none of the respondents knew the causative agent of the disease and the exact role of the snails in the transmission of the disease, despite one mentioning the manual picking of snails as a control intervention. This finding is in line with reports from studies conducted in Cameroon and Yemen.[27,29] Despite majority of respondents (43, 75.4%) knowing the correct mode of disease transmission, some misconceptions were also observed, which might influence the increase or decrease in disease transmission as reported in other sub-Saharan countries.[20,21,30]

The findings revealed that there is use of traditional treatment for urogenital schistosomiasis due to inability to pay for hospital costs. Similar to observations reported in Nigeria, Ghana, and Mali.[21,27,30,31] The use of traditional remedies for urogenital schistosomiasis treatment is a growing public health concern in sub-Saharan Africa, requiring urgent intervention.

The improvement of WaSH was not mentioned among the interventions for the sustainable control of urogenital schistosomiasis, which could be due to inadequate knowledge of the role of poor WaSH on the transmission of urogenital schistosomiasis. The World Health Assembly (WHA) recommends promotion of WaSH as an integrated urogenital schistosomiasis control component and elimination strategy as a means of reducing the contamination of water bodies with *S. haematobium* eggs and human contact with cercariae infested water.[7] Despite WHA recommendation, promotion of WaSH has been lagging in low- and middle-income countries where urogenital schistosomiasis is endemic due to limited resources.[32]

The use of praziquantel preventive chemotherapy was viewed by community members as beneficial to school-age children. However, some reported that praziquantel was not beneficial due to its side effects. There is a possibility that the group that believes that praziquantel is not beneficial restrain their children from participating in the ongoing intervention campaigns. Thus, those children will serve as the reservoir of the infection and compromise the Government's ongoing control efforts.[33] Studies conducted elsewhere in Africa reported that fear of praziquantel side effects has discouraged parents and guardians from allowing their children to take praziquantel when distributed in schools.[32,34,35]

Community attitudes towards urogenital schistosomiasis and its control interventions have major implications for causing persistent transmission of the disease and affecting the uptake of the required interventions. The study findings revealed an absence of discrimination of patients suffering from urogenital schistosomiasis in the community. However, there was a belief that urogenital schistosomiasis is associated with superstition. Such beliefs lead to delayed diagnosis and prompt treatment hence resulting in morbidity.[20,21,36] All respondents believed that urogenital schistosomiasis is a serious disease due to the morbidities associated with it. This finding is in agreement with other studies conducted elsewhere.[27,29,37] Despite being aware of the morbidities associated with urogenital schistosomiasis, majority of the community members do not regularly screen for *S. haematobium* so as to avoid the costs involved. This calls for the need for free screening and treatment of *S. haematobium* at health facilities. Inadequate WaSH conditions have a role in the transmission of urogenital schistosomiasis.[7,38] Mtama community is surrounded by several water bodies with several ongoing human activities such as agriculture, fishing and domestic chores. The mentioned activities are known to increase the odds of acquiring the infection.[6,38]

In Mtama, mothers have a common practice of visiting the water sources with their under-five children, these children play in the water. This results in early exposure to infection from water bodies contaminated by infected school-age children and adults and this contributes to the reservoir of continuity of transmission.[39,40] There were no toilets at water sources or near water sources. The lack of toilets results in contamination of water with faeces, urine excreta and increases the odds of disease transmission.[7] The respondents reported unhygienic practices, such as open urination, which contaminate directly the water sources, and walking barefooted while working in water, or crossing the water sources, which facilitate the acquisition of the disease via the cercariae penetration.[41] The respondents were not aware if bathing a child with boiled water could lower the odds of acquiring the infection. It was reported that boiling water made it free of cercariae and safe for domestic use.[42]

Study Limitations

The nature of some of the research questions on the interview guide required respondents to recall past experiences and information. This could have resulted in under or over-reporting of actual situations.

The study relied on information from the community members rather than direct observation in the community. Also, the study did not interview medical officers of Mtama regarding screening and treatment of urogenital schistosomiasis, this could have complimented the information provided by the respondents.

CONCLUSIONS AND RECOMMENDATIONS

Despite the community being aware and knowledgeable of urogenital schistosomiasis, the study revealed that there is inadequate understanding of the disease causative agent and transmission, including the roles of snails, accompanied by misconceptions about the disease. Also, the study revealed the existence of undesirable attitudes on screening and treatment of the disease, and inappropriate WaSH practices, and this perpetuate transmission of the disease in Mtama community. There is need for initiating a community-based health education programme to address the undesirable attitudes and inappropriate WaSH practices. This should be integrated with other ongoing urogenital schistosomiasis interventions in Mtama district. It is also pertinent for the government to ensure that there is adequate supply of water in homesteads and sanitation facilities at or near water sources so as to minimise the number of people visiting the water sources and people involved in unhygienic practices, respectively. Also, the government should provide free screening and treatment of urogenital schistosomiasis at the health centres. This will encourage regular screening and the use of modern (health facility) treatment.

REFERENCES

1. World Health Organization. Schistosomiasis 2019. Available from: https://www.who.int/news-room/fact-sheets/detail/schistosomiasis (Accessed November 30, 2021).
2. Senghor B, Diaw OT, Doucoure S, et al. Impact of Annual Praziquantel Treatment on Urogenital Schistosomiasis in a Seasonal Transmission Focus in Central Senegal. PLoS Negl Trop Dis. 2016; 10(3):e0004557. doi:10.1371/journal.pntd.0004557
3. Olveda DU, Li Y, Olveda RM, et al. Bilharzia: Pathology, Diagnosis, Management and Control. Trop Med Surg. 2013; 1(4):135. doi:10.4172/2329-9088.1000135
4. Bustinduy AL, Parraga IM, Thomas CL, et al. Impact of polyparasitic infections on anemia and undernutrition among Kenyan children living in a Schistosoma haematobium-endemic area. Am J Trop Med Hyg. 2013; 88(3):433-440. doi:10.4269/ajtmh.12-0552
5. Osakunor DNM, Woolhouse MEJ, Mutapi F. Paediatric schistosomiasis: What we know and what we need to know. PLoS Negl Trop Dis. 2018; 12(2):e0006144. doi:10.1371/journal.pntd.0006144
6. Evan Secor W. Water-based interventions for schistosomiasis control. Pathog Glob Health. 2014; 108(5):246-254. doi :10.1179/2047773214Y.0000000149
7. Grimes JE, Croll D, Harrison WE, Utzinger J, Freeman MC, Templeton MR. The roles of water, sanitation and hygiene in reducing schistosomiasis: a review. Parasit Vectors. 2015; 8:156. doi:10.1186/s13071-015-0766-9
8. Mazigo HD, Nuwaha F, Kinung'hi SM, et al. Epidemiology and control of human schistosomiasis in Tanzania. Parasit Vectors. 2012; 5:274. doi:10.1186/1756-3305-5-274
9. Yangaza Y, Mushi V, Zacharia A. Prevalence of urogenital Schistosomiasis and risk factors for transmission among primary school children in an endemic urban area of Kinondoni Municipality in Dar es Salaam, Tanzania. Microbes Infect Dis. 2022;3(1):230-240. doi:10.21608/MID.2021.68520.1133
10. Ng`weng`weta SB, Tarimo S. Urinary schistosomiasis among preschool-age children in an endemic area of Kinondoni Municipality, Dar es Salaam, Tanzania. Asian Pac J Trop Dis. 2017; 7(3):162–8.
11. Bakuza J. Demographic Factors Driving Schistosomiasis and Soil-Transmitted Helminthiases in Milola Ward, Lindi District, Tanzania: A Useful Guide for Launching Intervention Programmes. East Afr Health Res J. 2018; 2(2):156-167. doi:10.24248/EAHRJ-D-18-00008
12. Mazigo HD, Uisso C, Kazyoba P, Nshala A, Mwingira UJ. Prevalence, infection intensity, and geographical distribution of schistosomiasis among pre-school and school-aged children in villages surrounding Lake Nyasa, Tanzania. Sci Rep. 2021; 11(1):295. doi:10.1038/s41598-020-80317-x
13. World Health Organization. OSM-Distribution of Schistosomiasis in Southern Tanzania in 1987. Available from:http://158.232.12.119/schistosomiasis/epidemiology/en/tanzania.pdf (Accessed November 31, 2021).
14. Mushi V, Zacharia A, Shao M, Mubi M, Tarimo D. Persistence of Schistosoma haematobium transmission among school children and its implication for the control of urogenital schistosomiasis in Lindi, Tanzania. PLoS One. 2022; 17(2):e0263929. doi:10.1371/journal.pone.0263929
15. Doenhoff MJ, Cioli D, Utzinger J. Praziquantel: mechanisms of action, resistance and new derivatives for schistosomiasis

. Curr Opin Infect Dis. 2008; 21(6):659-667. doi:10.1097/QCO.0b013e328318978f

16. Rollinson D, Knopp S, Levitz S, et al. Time to set the agenda for schistosomiasis elimination. Acta Trop. 2013; 128(2):423-440. doi:10.1016/j.actatropica.2012.04.013

17. Neglected Tropical Disease Control Program in Tanzania. Report of 2016 on Schistosomiasis control programme among school-age children. 2016. p.23–25.

18. National Bureau of Statistics. The United Republic of Tanzania's 2012 population and housing census distributed by administrative Areas. Ministry of Finance. 2013.

19. Mtama District Council. Statistics. Available from: http://www.lindidc.go.tz/statistics (Accessed November 31, 2021).

20. Sacolo H, Chimbari M, Kalinda C. Knowledge, attitudes and practices on Schistosomiasis in sub-Saharan Africa: a systematic review. BMC Infect Dis. 2018; 18(1):46. doi:10.1186/s12879-017-2923-6

21. Musuva RM, Awiti A, Omedo M, et al. Community knowledge, attitudes and practices on schistosomiasis in western Kenya–the SCORE Project. Am J Trop Med Hyg. 2014; 90(4):646-652. doi:10.4269/ajtmh.13-0488

22. Uchoa E, Barreto SM, Firmo JO, Guerra HL, Pimenta FG Jr, Lima e Costa MF. The control of schistosomiasis in Brazil: an ethnoepidemiological study of the effectiveness of a community mobilization program for health education. Soc Sci Med. 2000; 51(10):1529-1541. doi:10.1016/s0277-9536(00)00052-6

23. Person B, Ali SM, A'Kadir FM, et al. Community Knowledge, Perceptions, and Practices Associated with Urogenital Schistosomiasis among School-Aged Children in Zanzibar, United Republic of Tanzania. PLoS Negl Trop Dis. 2016; 10(7):e0004814. Published 2016 Jul 11. doi:10.1371/journal.pntd.0004814

24. Ssali A, Pickering L, Nalwadda E, Mujumbusi L, Seeley J, Lamberton PHL. Schistosomiasis messaging in endemic communities: Lessons and implications for interventions from rural Uganda, a rapid ethnographic assessment study. PLoS Negl Trop Dis. 2021; 15(10):e0009893. doi:10.1371/journal.pntd.0009893

25. Mindu T, Kabuyaya M, Chimbari MJ. Edutainment and infographics for schistosomiasis health education in Ndumo area, Kwazulu-Natal, South Africa. Cogent Med. 2020;7(1):1794272. doi:10.1080/2331205X.2020.1794272

26. Angelo T, Kinung'hi SM, Buza J, Mwanga JR, Kariuki HC, Wilson S. Community knowledge, perceptions and water contact practices associated with transmission of urinary schistosomiasis in an endemic region: a qualitative cross-sectional study. BMC Public Health. 2019; 19(1):703. doi:10.1186/s12889-019-7041-5

27. Folefac LN, Nde-Fon P, Verla VS, Tangye MN, Njunda AL, Luma HN. Knowledge, attitudes, and practices regarding urinary schistosomiasis among adults in the Ekombe Bonji Health Area, Cameroon. Pan Afr Med J. 2018; 29:161. Published 2018 Mar 19. doi:10.11604/pamj.2018.29.161.14980

28. Yirenya-Tawiah DR, Annang T, Otchere J, et al. Urinary schistosomiasis among adults in the Volta Basin of Ghana: prevalence, knowledge, and practices. J Trop Med Parasitol. 2011;34(1):1-16.

29. Sady H, Al-Mekhlafi HM, Atroosh WM, et al. Knowledge, attitude, and practices towards schistosomiasis among rural population in Yemen. Parasit Vectors. 2015; 8:436. doi:10.1186/s13071-015-1050-8

30. Sacolo-Gwebu H, Kabuyaya M, Chimbari M. Knowledge, attitudes, and practices on schistosomiasis and soil-transmitted helminths among caregivers in Ingwavuma area in uMkhanyakude district, South Africa. BMC Infect Dis. 2019; 19(1):734. doi:10.1186/s12879-019-4253-3

31. Dejon-Agobé JC, Zinsou JF, Honkpehedji YJ, et al. Knowledge, attitudes, and practices pertaining to urogenital schistosomiasis in Lambaréné and surrounding areas, Gabon. Parasit Vectors. 2021; 14(1):486. doi:10.1186/s13071-021-04905-0

32. Pullan RL, Freeman MC, Gething PW, Brooker SJ. Geographical inequalities in the use of improved drinking water supply and sanitation across Sub-Saharan Africa: mapping and spatial analysis of cross-sectional survey data. PLoS Med. 2014; 11(4):e1001626. doi:10.1371/journal.pmed.1001626

33. Cribb DM, Clarke NE, Doi SAR, Vaz Nery S. Differential impact of mass and targeted praziquantel delivery on schistosomiasis control in school-aged children: A systematic review and meta-analysis. PLoS Negl Trop Dis. 2019; 13(10):e0007808. doi:10.1371/journal.pntd.0007808

34. Fleming FM, Fenwick A, Tukahebwa EM, et al. Process evaluation of schistosomiasis control in Uganda, 2003 to 2006: perceptions, attitudes, and constraints of a national programme. Parasitology. 2009; 136(13):1759-1769. doi:10.1017/S0031182009990709

35. Dabo A, Bary B, Kouriba B, Sankaré O, Doumbo O. Factors associated with coverage of praziquantel for schistosomiasis control in the community-direct intervention (CDI) approach in Mali (West Africa). Infect Dis Poverty. 2013; 2(1):11. Published 2013 Jun 10. doi:10.1186/2049-9957-2-11

36. Onyeneho NG, Yinkore P, Egwuage J, Emukah E. Perceptions, attitudes and practices on schistosomiasis in Delta State, Nigeria. Tanzan J Health Res. 2010; 12(4):287-298. doi:10.4314/thrb.v12i4.60123

37. Dawaki S, Al-Mekhlafi HM, Ithoi I, et al. The Menace of Schistosomiasis in Nigeria: Knowledge, Attitude, and Practices Regarding Schistosomiasis among Rural Communities in Kano State. PLoS One. 2015; 10(11):e0143667. doi:10.1371/journal.pone.0143667

38. Grimes JE, Croll D, Harrison WE, Utzinger J, Freeman MC, Templeton MR. The relationship between water, sanitation, and schistosomiasis: a systematic review and meta-analysis. PLoS Negl Trop Dis. 2014; 8(12):e3296. doi:10.1371/journal.pntd.0003296

39. Dabo A, Badawi HM, Bary B, Doumbo OK. Urinary schistosomiasis among preschool-aged children in Sahelian rural communities in Mali. Parasit Vectors. 2011;4:21. doi:10.1186/1756-3305-4-21

40. Ekpo UF, Laja-Deile A, Oluwole AS, Sam-Wobo SO, Mafiana CF. Urinary schistosomiasis among preschool children in a rural community near Abeokuta, Nigeria. Parasit Vectors. 2010; 3:58. doi:10.1186/1756-3305-3-58

41. Rollinson D. A wake-up call for urinary schistosomiasis: reconciling research effort with public health importance. Parasitology. 2009; 136(12):1593-1610. doi:10.1017/S0031182009990552

42. Braun L, Grimes JET, Templeton MR. The effectiveness of water treatment processes against schistosome cercariae: A systematic review. PLoS Negl Trop Dis. 2018; 12(4):e0006364. doi:10.1371/journal.pntd.0006364

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