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Exploring community perceptions of gender roles as a predisposing factor in schistosomiasis infection in Southwestern Uganda

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Abstract

Introduction: Schistosomiasis, a neglected tropical disease impacts people of all genders and ages. Studies done on gender as a risk factor in schistosomiasis infection and control have not considered what the men and women in schistosomiasis endemic communities think about gender roles as a contributing factor to infection and control. We explored the perceptions of endemic farming (Kyaterekera) and fishing (Ndaiga) communities along Lake Albert in Kagadi District of Uganda regarding gender roles as a predisposing factor to schistosomiasis infection.

Methods: We employed ethnographic design and conducted 10 key informant interviews, held 18 focus group discussion sessions (150 individuals), and made observations of the risky practices in the two community settings. Thematic analysis was used to analyse the data collected.

Results: Gender roles are perceived by both male and female participants from both settings to predispose the different genders to infection differently. Societal expectations and gender stereotypes are perceived by participants from both sites to predispose both genders to the risk of infection. Farming men, think that bilharzia is a lake-side problem. Finally, drug side effects are perceived to be a concern by both genders from both sites, although the women in the fishing setting would prefer to use herbs and prayers while the men think going to the hospital is ideal.

Conclusions: Perceptions of gender roles as a predisposing factor to schistosomiasis infection and control differ according to gender and geographical location. Shared gendered aspects involve societal expectations, stereotypes, and side effects. Developing gender-specific interventions to control the disease, like providing separate toilets, gender-sensitive treatment campaigns, and gender inclusion in decision-making could go a long way in curbing the disease.

1. Introduction

Schistosomiasis is a Neglected Tropical Disease (NTD) of public health importance, mostly affecting poor and rural communities, particularly agricultural and fishing populations. Globally, the disease is estimated to infect more than 240 million individuals, while 700 to 800 million people are at risk of infection (Adenowo et al., 2015; Munisi et al., 2017). It is the fourth-leading parasitic disease globally in terms of burden of disease (BOD), with an estimated burden of 3.31 million Disability Adjusted Life Years (DALYs) following leishmaniasis, intestinal nematodes, and cryptosporidiosis, (Pisarski, 2019). In terms of prevalence, schistosomiasis is second to malaria, with over 95% of the global cases in Africa (Onasanya et al., 2021). In Uganda, intestinal schistosomiasis is the most common and widespread form of schistosomiasis, with over 20 million people in 73 districts at risk of infection (Stanton et al., 2017). An estimated 10 million people across 82 districts are reportedly infected with Schistosomiasis (Exum et al., 2019). The disease is caused by schistosome flatworms that use freshwater snails as intermediate hosts.

The World Health Organization (WHO) recommends preventive chemotherapy through mass drug administration (MDA) of praziquantel (PZQ), snail control and behaviour change through water, sanitation, and hygiene (WASH), and health education and sensitization (Lo et al., 2022). Despite these efforts, Schistosomiasis is still endemic in Uganda, especially along lakes and rivers, even in areas where MDA has been implemented since 2003 (Exum et al., 2019). Several studies have attributed this problem to social and cultural factors like inadequate knowledge, negative attitudes, risky practices related to water, sanitation, and hygiene and myths and misconceptions (Rilkof et al., 2013; Exum et al., 2019; Ayabina et al., 2021).

Some studies have linked schistosomiasis infection and control to gender, gender roles, and gender stereotypes but with varying results and not on the communities' perceptions of the gender factor. For instance, a systematic review and meta-analysis to investigate the gender differences in *Schistosoma* infection burdens in Africa showed a variation in infection prevalence among males and females for *S. mansoni* (Ayabina et al., 2021). This could imply that different gender-specific roles predispose men and women to schistosomiasis infection in different communities. However, the study does not reveal what men and women think about these gender roles which could also influence infection.

Studies also show that women and girls are often restricted in their homes since most men carry the burden of being household breadwinners (Wharton-Smith et al., 2019). Consequent to social status and household roles of women and girls, such as cooking, washing, cleaning (Grimes et al., 2015), and digging, they experience greater exposure and eventual schistosomiasis infection from contaminated water (Donohue et al., 2017). On the one hand, men's domination of roles such as community and household leadership limits their contact with water, while livelihood activities like fishing increase their contact with water, facilitating the spread of Schistosomiasis (Rilkoff et al., 2013). It is, however, not clear whether this gendered division of labour arises from the different perceptions held by the communities on what men and women should and should not do.

Gender roles in some settings have been shown to impact the likelihood of infection and the genetic diversity of schistosomes among humans, a systematic review of schistosomiasis infection in Africa demonstrated a higher infection prevalence among males, even though they proved an underrepresentation of females (Ayabina et al., 2021). Another meta-analysis by Mbanefo et al. (2014) that looked at the host determinants of reinfection with schistosomes in humans revealed that children and adult males were more often re-infected than females between 6 and 12 months after treatment with praziquantel. The extent to which men, women and children think that they are the ones more infected than others is not explored by these studies. Yet it could play a significant role in influencing infection since it shapes their behavioural patterns.

On the contrary, a study by Munisi et al. (2017), on the effectiveness of PZQ single and double dosage among primary school children in northwestern Tanzania, found no difference in reinfection rates among boys and girls aged 6–14 years. Similarly, a mixed methods study in Uganda on host gender and in Brazil on the risk factors of *S. mansoni* among school children, found no difference in reinfection among the different genders (Gazzinelli et al. 2017; Trienekens et al, 2020). The study by Trienekens and colleagues however revealed a small behavioural difference in the gender of children regarding risky water practices, and that, the women were more engaged in domestic households than the men.

The above studies present contradictory information regarding the impact of gender stereotypes and roles in schistosomiasis infection warranting the need for more concrete evaluations. Moreover, most of the studies focused on risk factors by observing community members' behaviour and risky practices but not their perceptions of gender as a predisposing factor (Trienekens et al., 2020). And yet, sometimes some people act or behave differently from what they think. However, there is hardly any literature on the individual and community perceptions of gender-specific differences in infection and reinfection risk. Understanding communities' views and perceptions of who they think is most at risk and how gender roles play to predispose infection, is important to guide appropriate gender-sensitive interventions. To address this gap, we explored the community perceptions of gender roles as a predisposing factor in schistosomiasis infection and control among endemic communities along Lake Albert, Western Uganda.

2. Materials and methods

Study area and setting

The study was conducted in Kagadi district in two communities. Ndaiga sub-county (considered highly endemic with schistosomiasis) is found along the Lake Albert shores and Kyaterekera sub-county (considered moderately endemic with schistosomiasis transmission) is located further away upland. Both communities have been receiving PZQ under the MDA programs. Four of the eight fishing villages in Ndaiga sub-county and three of the eighteen farming villages in Kyaterekera sub-county were purposively selected. Population density, nature of economic activities, and proximity to the lake were the criteria used for the selection of study sites. The lakeside is more densely populated than the farming communities. Also, both sites have different economic activities, with fishing identified near the lake, while farming further away. This study postulated that the two sites would have different perceptions of gender roles and their influence on schistosomiasis infection and control, with Ndaiga sub-county near the lake having positive perceptions compared to the ones further away from the lake.

Study design

We employed a qualitative study design using the ethnographic theoretical framework to explore the community's perception of gender roles as predisposing factors to bilharzia infection and control. The qualitative study design explores and understands complex phenomena through groups or individuals' in-depth perspectives, behaviour, and experiences (Hamilton and Finley, 2019). Also, the design seeks to obtain a richer and more dynamic data pool concerning different topics under consideration, such as the community's perception of gender roles with bilharzia infection, for this study. The ethnographic framework involves the researcher immersing himself/herself in the community being studied, to obtain a holistic understanding of their way of life (Anderson et al., 2020). Our study was guided by the principles and methodologies of ethnography, where we spent significant time in the two communities and engaging the community members to obtain a deep understanding of the research topic.

Sample size estimation and participants' selection

A total of 161 individuals were selected for the study. This consisted of 11 individuals for the key informant interviews and 150 adult community members for 18 focus group discussion sessions. The saturation method was used to determine the actual sample size. For KIIs, study participants included local government workers, key public health officers, district health inspectors, and health assistants. The village health team (VHT) members are individuals in communities trained to conduct mobilization and provide basic health services at the household level voluntarily. Meanwhile for the FGDs, adult men and women, household members aged 18 and above were considered in the sample.

Purposive sampling was used to select the participants for the study. Purposive sampling involves study participant selection based on the researchers' knowledge about the topic (Berndt, 2020). Only those local community members who had lived in Kyaterekera and Ndaiga Sub-countries for at least a year and above were selected. This period was considered long enough for a person to have an idea about the disease and therefore, be able to comment on it. Additionally, key informants were included in the study based on their experience concerning health promotion in our study sites and their interface with MDA programs implemented by the local healthcare departments.

Data collection

Key informant interviews (KIIs) and focus group discussions (FGDs) were employed for collecting data. KII involves one-on-one in-depth interviews with individuals who have expert knowledge about the topic as guided by the researcher (Cossham and Johanson, 2019). KII was used because it provided much more detailed information than what was available through other data collection methods that were used (Cossham and Johanson, 2019). Also, it was justifiably used because it was believed that these people are trained in carrying out mass drug administration and know the subject matter under study, so they have more detailed information. KII guides were used to obtain data from the key informants. They contained lists of questions upon which an interview was conducted. Interview guides were used because they helped to eliminate response errors since it was the researcher who controlled the interview process.

Meanwhile, FGD encompasses group conversations between the researcher and a group of participants, with specialized knowledge related to the research topic (Sim and Waterfield, 2019). FGD participants range from approximately five to ten individuals. The technique was used to get an in-depth understanding of roles performed by men and women in the community and how they perceive their gender differences to predispose them to schistosomiasis infection. FGD guides were used in this study to gather participants' views regarding the topic. The guide contained open-ended questions aimed at stimulating informal discussions with participants to understand their perceptions regarding schistosomiasis infection and control. A total of 18 focus group discussions were conducted, 11 in Ndaiga and 7 in Kyaterekera Sub County with male, female, and mixed-gender participants respectively. A total of 9 FGDs were with women, 8 with men and one was mixed, that is, both men and women. This was done to get the views of different genders and compare their

perceptions accordingly. Also, the men and women were separated to allow them to express themselves openly and freely since some of the topics to be discussed were gender sensitive.

The FGD sessions were guided by the first author as the moderator who introduced topics for discussion and engaged participants in lively discussion amongst themselves. Probing was used by the facilitator to further investigate and understand the topics under discussion. Each focus group session comprised between 8 to 10 participants. Discussions lasted about an hour on average. Data were collected in the home and community settings and within the community, settings. For privacy purposes, the researcher chose quiet places such as church buildings, schools or tree shade in isolated locations. The information from the participants was recorded using a digital voice recorder and later transferred to laptops for safety purposes. The methods complemented each other to provide an in-depth understanding of the community's perception of gender roles and their predisposition to bilharzia infection (Odhiambo et al., 2014).

Data Analysis

Thematic analytic method was used to analyse the data. Firstly, the audio recordings from the KIIs and FGDs were transcribed into text in English. Later the transcripts were uploaded into Dedoose software version 9.0.46 for data management. Afterwards, coding frames were developed from one FGD and one KII transcript. To ensure the credibility of the data, two research assistants concurrently read the transcripts and made corrections and clarifications accordingly. The coding frame was then used to code the data by the first author. Next, the first author identified and generated themes from the coded data and then organised them into categories. Themes and subthemes that were similar were grouped, while those that differed were put separately, a process that was repeated for the whole data set. Finally, the findings were presented based on the different perceptions of respondents as per the research objectives. The findings were supported with quotes from transcripts representing participants' views.

3. Results

Participants' response rate

A total of 160 out of 161 responded to the study. Only one participant from the KII did not turn up for the study due to personal commitments, while no study participant refused to engage in the FGD session. Additionally, all the participants who turned up for the study fully participated up to the end. No one in the FGD sessions dropped out during the study (Table 1).

Table 1: Total Number of FGDs and KIIs conducted in the communities.

Data Collection Method	Number	Gender	Sub County
Focus Group Discussions	9 FGDs	Female	5 In Ndaiga 4 In Kyaterekera
	8 FGDs	Male	5 In Ndaiga 3 In Kyaterekera
	1FGD	Mixed-4 males and 6 females	1 in Ndaiga
TOTAL **18 FGDS**			
Key informant Interviews			Kagadi District
	1 Vector Control Officer	1 Male	
	1 Health Inspector	1 Male	Kagadi District
	3 Health Assistants	2 Males, 1 Female	2 Ndaiga, 1 Kyaterekera
	5LCs	5 Male	3 Ndaiga, 2 Kyaterekera
TOTAL	10 Individual In-depth Interviews		

Participants' sociodemographic characteristics

From the socio-demographic data analysed, more than half of the participants (53.33%: 80/150) were females, and most study participants (80%: 120/150) were married. On the other hand, more than half of the participants (56.67%: 85/150) were in the age brackets between 30-49 years old, implying most participants were young adults. Furthermore, more than three-quarters of the participants (73.33%: 110/150) were either at the primary level or below with slightly more than half of the participants (50.67%: 76/150) being fishmongers as shown in table 2 below.

Table 2: Participants' socio-demographic characteristics

Sex	Frequency	Percent
Male	70	46.67
Female	80	53.33
Total	**150**	**100.00**
Marital status		
Single	25	16.67
Married	120	80.00
Divorced	5	3.33
Total	**150**	**100.00**
Age in Years		
18-29	26	17.33
30-39	40	26.67
40-49	45	30.00
50-59	35	23.33
60-69	4	2.67
Total	**150**	**100.00**
Education level		
Primary	110	73.33
Secondary	25	16.67
Tertiary	15	10.00
Total	**150**	**100.00**
Occupation		
Fishmongers	76	50.67
Farmer	48	32.00
Social worker	10	6.67
Fishermen	10	6.67
Public servant	6	4.00
Total	**150**	**100.00**

Source: data from participants, 2021

The community perception of gender roles as a predisposing factor to schistosomiasis infection.

The participant responses are summarized in Table 3.

Table 3: Participants' perception of gender as a predisposing factor to schistosomiasis from both the fishing and farming communities

SN	Themes	Views from fishing communities	Views from farming communities
A	Gender roles as a risk factor	Men think they are more exposed to Schistosomiasis because they carry out fishing on Lake Albert Women think they are most exposed, due to their roles that expose them to contaminated water	Men think women are more at risk due to socially constructed roles. Women also think they are most at risk, due to their roles that expose them to contaminated water
B	Societal cultural norms	Women think they are at a higher risk of acquiring the infection due to their roles like fetching water.	Women are vulnerable due to social roles like fetching water and cooking food. Men's main activities, such as fishing, and swimming increase their risk of bilharzia infection
C	Stereotypes of signs and symptoms	Both men and women associate swollen belly and vomiting in women with pregnancy	Both men and women associate a swollen belly in men with being rich
D	Myths and misconceptions	Bilharzia is a disease of the lake only and is a sign that an individual misbehaved in the lake.	Signs attached to HIV; Some Symptoms attributed to alcohol. Some signs and symptoms attributed to witchcraft
E	Medicine side effects	Both men and women in fishing communities have positive views on the drugs used in the treatment	Both males and females in farming have negative views on the drugs used in the treatment

a. Perception of gender roles and schistosomiasis infection

The overall perception reported by participants is that men think they are the most exposed to schistosomiasis infection compared to females. This view is mostly held by those in the fishing and not the farming community, because of their fishing activities in Lake Albert. The male participants argued that men spend much time in the water, which increases their risk of infection. One of them had this to say:

"*I can even spend a full month on Lake Albert fishing, there are no toilets or bathrooms, and I defecate in the lake and even drink this water*" **Male FGD, Kitebere Village, Ndaiga sub-county.**

On the other hand, a few female participants from the fishing community also argued that they are at more risk of infection due to their roles. These roles according to the participants, put them in greater contact with the infested water of Lake Albert. Some of the roles mentioned include cooking, fetching water from swamps, and washing clothes and utensils. Some female participants reported:

".....my husband is a fish monger; when he arrives at the shore from fishing, I quickly go to his boat before it even docks; I take the fish he has caught from him, put it in a basin, start removing the scales, and intestines, clean it using water from the lake, then once it is clean, I take it home for sun drying....." **Female FGD, Kamina Village, Ndaiga Sub-County**

"I have been selling fish ever since I started living here at the lake; I always wash the fish from the lake; I clean the fish at the shoreline where the lake water can easily wash away the scales and intestines from the fish back to the lake, once am done cleaning the fish I am starting walking around the village selling it and then fry the remaining that people would not have bought that day" **Female FGD, Ndaiga Village, Ndaiga Sub-County.**

The above finding was also supported by views from the farming community who perceive that a higher risk of infection arises due to their roles. A key informant had this to say:

"..... now like most women are ".....the ones who go to fetch water they are the ones that go to wash, they spend much time in water....." **Male FGD, Kyaterekera A village, Kyaterekera sub-county**

From the above findings, there exist different perceptions among men and women regarding gender roles as a predisposing factor for infection and spread. That is, both men and women perceive themselves to be more exposed than the other gender due to their different roles. Although this view is strongly held by the men from the fishing than the females also from the same communities and both the men and women from the farming communities.

b. Societal cultural norms and susceptibility to infection

Findings from the data reveal that female participants thought that women are at a higher exposure risk to Bilharzia due to societal cultural practices like fetching water and norms like cooking food. For instance, the women are expected to fetch water, wash utensils, bathe children and wash clothes among others. The male participants also supported the female participants' views saying they too, perceive the women as highly exposed to schistosomiasis infection due to cultural expectations of the women's roles like washing clothes along the lake shore. One male participant from Soborwa village in an FGD reported:

".....I think women because women go to water sources a lot, they fetch water, wash clothes wash utensils and then children go with their mothers to the water sources this exposes the children too....." **Male FGD, Kyaterekera B village, Kyaterekera Sub-County**

Data from participants also revealed that culturally, society expects males in the farming community to fend for household needs. The participants perceived this to be the reason why men frequent the lake for business purposes like fishing and transporting food products. Some take their agricultural produce like

matooke, beans, Irish potatoes, and sweet potatoes for sale, while others go to the lake to fish or buy fish. A participant reported:

"I am a farmer who grows matooke; when it is ready, I cut some and take it to the lake for sale……. that is how I get school fees for my children" **Male FGD, Nyantonzi Villages, Kyaterekera sub-county.**

c. Gender stereotypes of bilharzia signs and symptoms

Both the male and female respondents reported commonly known signs and symptoms like weight loss, swollen stomach, body weakness, stomachache, vomiting, yellow urine, swollen stomach, and pale skin. Other symptoms and signs reported include red eyes and diarrhea that manifest among those infected with Bilharzia. However, female participants reported that signs might be confusing as they are often stereotyped by society. For example, women's swollen stomachs and vomiting are sometimes interpreted as pregnancy. For men, there is a belief that if a man's stomach grows big, it could be because he has a lot of money. In an interview with one of the women in Kamina village said:

"……. the women also suffer, but it is difficult to realize they have bilharzia, but children, you can easily tell……." **Individual In-depth Interview, Kamina Village, Ndaiga Sub-County.**

This gender stereotype is further reinforced by scientific explanation that such signs and symptoms take long to manifest thereby making it difficult for the community to notice. Participants noted that Bilharzia could stay in the bodies of both men and women for a long time before signs begin to manifest. People, therefore, tend to neglect it before it worsens as the signs manifest. In an interview, a key informant said:

"……*you know bilharzia can be in your body for a very long time before the signs manifest outside*……." **Key Informant Interview, Kagadi District Health Inspector**

d. Gendered myths and misconceptions

The study findings revealed gender differences in the misperception regarding place of residence and risk of schistosomiasis infection. Male participants from the farming communities thought of bilharzia as a disease only affecting people who live at the lake, men who carry out fishing from the lake. The participants also perceived it to be for women who spend long hours performing house chores in the lake water. They referred to it as "a disease of the lake". A participant expressed himself and said:

"*We do not have people suffering from Bilharzia in this village; if you want to see people suffering from Bilharzia, go to the lake; many people have swollen bellies. That disease is very common at the lake. I cannot lie that I have seen or heard anyone die from Bilharzia in this village*" **Male FGD, Kyaterekera B Village, Kyaterekera Sub County**.

e. Perceptions of gender aspects in the side effects of bilharzia medicine

The study's findings indicate that whereas people use PZQ as the prescribed medication to treat schistosomiasis, its side effects are perceived to be similarly experienced by both men and women and in both lake and fishing communities. The side effects were perceived as more severe than the disease itself. Both men and women believed the side effects were because of the infection, which also showed that the treatment was effective. Also, in both the fishing and farming community, men and women respondents reported diarrhea, dizziness, vomiting, and fatigue as common side effects after taking the medicine. For example, in a focus group discussion, participants expressed themselves and said:

"……. I know there is bilharzia medicine which they give us, and after you have swallowed them, you get diarrhea……." **Female FGD Kyaterekera A village, Kyaterekera sub-county**

The fear of the bilharzia drug side effects is why some people resort to other methods, including herbal medicines and prayers in churches. In both communities, it was perceived that more women sought herbal medicine for bilharzia treatment than men. A female FGD participant from Kitebere Village reported:

"…….I quickly thought about going to look for herbal medicine. I went and sought herbal medicine. And they helped me better than the bilharzia tablets. **Female FGD participant in Kitebere Village.**

4. Discussion

Although some studies have been conducted on gender as a predisposing factor to schistosomiasis infection, the perceptions of men and women in endemic communities regarding gender roles as a potential predisposition have not received adequate attention. We conducted a qualitative study to understand the perception of gender roles and how these roles predispose communities along Lake Albert in Uganda to Schistosomiasis infection. The main findings from the data analysed include community perceptions of gender roles as risk factors for infection, gendered cultural norms, gendered stereotypes about bilharzia signs and symptoms and gendered myths and misconceptions among others. This section presents a discussion of the study findings below.

Community perceptions of gender roles as a risk for infection

First, regarding the community's perception of gender roles as a risk factor, both males and females are perceived to be at risk of infection due to the roles they differently play. However, among the fishing community, participants perceived men to be at a higher risk of infection than women. The participants attributed this to the longer time the men spent at the lake while fishing. This is likely attributed to the societal role of men being providers and family heads. As a result, they are forced to go to the lake for fishing, and sometimes they take a long time, which certainly cannot be avoided as explained by the

community. While on the lake, they must defecate in the lake and drink the lake water as they do not have any other options. Sometimes they even jump into the lake to organize the fishing nets. The findings from this study differ from Munisi et al. (2017) who demonstrated no significant difference in schistosomiasis infection among men and women. Therefore, this study provides significant insights into not only actual infection but also the different male and female perceived roles that predispose the communities to infection.

On the other hand, women are also believed to be at risk of being exposed to Bilharzia due to their household roles, like washing utensils and clothes, bathing children, and cooking, among others. When these household roles like washing clothes and utensils are done in groups, it transforms their mundane tasks into a time for socialization and increasing time spent in the infested water. However, the women still believe men spend more time in the infested lake water than them. The explanation for why women would be less at risk goes back to the time factor, where they believe that these household roles do not require them to spend that much time in the infested water compared to men, who even spend weeks on the lake fishing. The finding from our current study agrees with a study conducted at Lake Victoria on perceptions about interventions to control schistosomiasis (Sanya et al., 2017). Similarly, Trienekens et al. (2020) found that for children, the type of activity, duration, frequency, level of submersion, and site of water activities showed only a few behavioural differences between men and women.

In the farming community, respondents believe women's susceptibility to bilharzia exposure is established by norms, cultural, and social practices that require women to perform roles like fetching water, cooking, and washing compared to men. Women are perceived to be always exposed because of the continuous water contact as they are fetching from contaminated sources. These roles according to participants, make women to be more vulnerable to Schistosomiasis infection. Furthermore, participants perceived that the women who do farming near infested swampy areas may require water from these sources for a constant water supply, thereby increasing their risk of infection. Besides, they may still fetch the same water from the infested sources for drinking when they get thirsty while digging since their households are far from their gardens. Moreover, they rarely return home to drink water and return to the gardens. It should, however, be noted that not all swamps and ponds in the uphill sites are infested with snails; some may be, but others are not.

Overall, however, both men and women in the farming community are perceived to have a lower risk of contact with infected water than their fishing community counterparts. The women from farming communities usually fetch water from dams and streams that may be infested, for household use like washing utensils, cooking, and washing clothes. Those men and women farming community who frequent the lake for business purposes are perceived to be at a higher risk of exposure. It was also noted that men from the farming communities are more engaged in doing business at the lake shore than women, thereby increasing their infection risk. This could be because they step in the water directly from the lake when they reach it. Moreover, a study by Chala and Torben (2018) also reported that some women scooping water at a river in Ethiopia kept their hands dry to prevent contact. However, they demonstrated that contact with water carried home from the river might increase their infection risk. These findings provide insight into the communities' perception of gender roles as the infection risk among different genders using the time factor. Targeted sensitization programs on gender roles and risk factors in endemic areas, like boiling water for drinking, must be prioritized.

Gendered stereotypes of bilharzia signs and symptoms

Findings from this study revealed that the commonly known stereotypes about bilharzia signs and symptoms include weight loss, swollen stomach, and body weakness. Other stereotypes of symptoms include stomachache, vomiting, yellow urine, swollen stomach, pale skin, red eyes, and diarrhea. Also, the stereotype in men is that a swollen belly is a sign of having a lot of money, while women may be considered pregnant. This could explain why some individuals delay seeking medications for such signs and symptoms. Although the study by Mujumbusi et al. (2023) agrees that Bilharzia presents with symptoms such as abdominal pain, abdominal swelling, and anaemia, the study does not tell whether these signs and symptoms are also stereotyped. There is need for a more gendered awareness raising to clarify such stereotypes among the communities.

Perception of gender factor in side effects of bilharzia medicine

This current study found that both males and females from both study settings perceive the medication prescribed to treat bilharzia to be less effective. This could explain the limited drug uptake as reported in a previous study of health-seeking behaviour in the same community (Anyolitho et al., 2023). Additionally, both male and female participants in both communities thought that men, especially fishermen, and farmers, were usually adamant or stubborn to take bilharzia medicine. This could be attributed to fear of the side effects, which require them to stay home until they are fine. Moreover, they believe they could use this time to continue doing their daily activities like fishing and attending to their gardens. Furthermore, the female study participants from the fishing communities reported using herbal medicine, perceived to provide relief compared the conventional medication. Our findings agree with those of Ayesiga et al. (2022) which reported that various individuals from western Uganda perceived more treatment benefits with herbal medicine usage. Therefore, more sensitization concerning bilharzia management must be intensified for better outcomes.

In this study, some male participants argued that even when they followed advice from health workers, the advice did not work as they still experienced the drug side effects. Advice given included things like eating food before swallowing the drug to reduce the side effects. The participants described the side effects as "*worse than the disease itself*." Some participants suggested that there should be a vaccine to replace the current drugs, which can also be given to pregnant women. Furthermore, other studies have shown that Ugandan fishing communities are willing to participate in vaccine trials to fight bilharzia (Sanya et al., 2017). Therefore, mass sensitization concerning drug reception must be prioritized for better health outcomes in both communities, though with emphasis on the fishing communities.

While this study provides interesting insights into the perceptions of gender roles as a predisposing factor in schistosomiasis infection and control in endemic communities, it is difficult to generalise the findings to the overall population due to the small sample size, and biased data collection methods. Furthermore, the fact that few gendered parameters were considered in this study makes it difficult to draw an overall conclusion about the perceptions of gender roles.

5. Conclusions and recommendations

Understanding the communities' perceived social and cultural gender roles is important in Schistosomiasis prevention and control efforts. This study concludes that there exist perceptions towards schistosomiasis infection and control. That is, whereas both men and women from both fishing and farming communities think that their different gender roles put them at higher risk of infection than their counterparts, the men, perceive themselves to be at greater risk due to engaging in fishing activities in the lake. On the contrary, the females in farming communities think that their domestic house chores like fetching water, washing utensils and clothes and others, predispose them to risk of infection more than the males. A comprehensive gendered approach to the design and implementation of awareness campaigns that take into consideration the perceived differences in gender roles is critical to attaining equitable outcomes. Lastly, there is a need to conduct a quantitative study to elucidate the views of the communities regarding the perceptions of gender roles as a predisposing factor for schistosomiasis infection and control.

Declarations

Ethics considerations

We received ethical approval from the Mbarara University of Science and Technology (MUST) Research Ethical Committee (REC), reference number MUST-2021-59. We had permission to collect data from the district health authority. We obtained written informed consent from all study participants before interviews and focus group discussion sessions. We also obtained participants' verbal consent for audio and photo taking for individual in-depth interviews (IDIs) and the Focus Group Discussions (FGDs). Participants' confidentiality was concealed by using serial numbers in place of names to act as identifiers during data collection. We conducted interviews in private and quiet places in the comfort of participants' home settings, respecting their private matters, properties, assets, and materials.

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Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

Transcripts and other field data content for this study are available from the corresponding author on request.

Authors' contributions

FM, VNN, MKA, and TH conceptualized the work. FM and MKA collected data. FM and MKA transcribed, cleaned, and analysed the data. FM and VNN interpreted the analysed data. FM drafted the first manuscript copy, which was reviewed and edited by TH, and MKA. All authors read and approved the final manuscript.

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