BMC Public Health

RESEARCH

Open Access

Flowing toward well-being: exploring the nexus of clean water access and sexual reproductive health among women and girls in rural Uganda

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Abstract

Background Access to adequate clean water is crucial for public health, yet approximately one-third of the global population lacks access safe drinking water. Women and girls bear the primary responsibility for water collection due to entrenched gender norms, time spent fetching water, limiting opportunities for education, employment and social participation. Inadequate clean water access negatively impacts women's sexual reproductive health (SRH). While research has explored water access and gender roles, gaps remain in understanding the specific SRH challenges faced by women collecting water.

Objective This research aimed to investigate in what ways clean water access affects the Sexual Reproductive Health (SRH) of women and girls in Jimo parish (in which district, which region of Uganda).

Methods A phenomenological study design was used for research and employing qualitative methods of data collection.

Results The results indicate that traditional gender norms and societal expectations, and soci0-economic status play a pivotal role in shaping the SRH challenges women and girls face while collecting water. Having access to clean water was found important for women and girls to maintain adequate menstrual and pre/post-natal health. Having women included in decision-making bettered the accessibility and cleanliness of the source.

Conclusion Access to clean water, MHM products and information and inclusion of women in decision making, are suggested to play important role for women and girls SRH, water access and quality.

Keywords Clean water access, Sexual reproductive health, Women and girls

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Introduction

Water plays an extremely important role for the health of a population. However, one third of the world's population does not have access to clean drinking water [31]. As of recent estimates, approximately 411 million people in Africa lack basic drinking water services [2]. This means they do not have access to at least 20 L of clean water per day from a protected source within a 30-min round trip. The situation is particularly dire in Sub-Saharan Africa (SSA), where around 794 million people lack clean drinking water [2, 29]. Water scarcity affects one in three people in the African region and is exacerbated by factors such as population growth, urbanization, and increased household and industrial water use. This scarcity often forces individuals to rely on unsafe water sources, leading to health issues like waterborne diseases [33].

Women and girls are more likely to be in charge of fetching water due to existing gender norms where women take care of domestic activities and men provide financially for the family [32]. Girls are taught specific gender-related tasks from a young age such as collecting water, cooking, washing clothes and taking care of children [13]. Women spend approximately 2 to 20 h per week traveling to water collecting points [6]. Spending a lot of time collecting water means that women can allocate less time to other activities such as going to school, working or partaking in social activities [32]. Although these figures have improved in the last two decades, there remain extensive inequalities in 'accessibility, availability and quality' of water [31].

Rural areas are disproportionately affected as water collecting points are often located far from residences, negatively influencing accessibility [26]. Women face greater consequences related to lack of water facilities, including impact on their Sexual Reproductive Health (SRH) [20]. For example, when walking far distances, women can face challenges when menstruating due to lack of sanitation and hygiene facilities [20]. In rural areas, women must walk long distances to fetch water, putting them at risk of abuse and sexual assault [22]. A study by Ayoade and Sikiru [8] conducted 800 interviews with women in Nigeria and found that almost 60% expressed that they had experienced sexual assault whilst collecting water. Another study discovered that individuals often experienced physical and verbal abuse, further affecting their health [6]. This not only puts their SRH at risk, through STDs and unplanned pregnancies, but also severely impacts their mental health and wellbeing [16].

Although women play a detrimental role in water collection, they rarely are integrated in decision making when it comes to water management [16]. This makes it difficult for them to express their concerns and implement change, highlighting the power imbalances that exist in many rural communities. The lack of female participation is typically a result of existing gender norms and power relations [1]. Access to water is important for the empowerment of women and gender equality, which has a positive knock-on effect on economic development. Decreasing the time spent fetching water could allow women to enter the labor market, contributing to economic development of the country as well as improving the economic stability of the household [12].

Although there is an increasing amount of research on topics of water access and women, there remains gaps in the literature. Firstly, there is a limited number of studies focusing on water carriage and the challenges women face when collecting water. A vast number of studies make it clear that women are the ones who collect the water but few focus on how it affects their SRH. Secondly, there is a gap in research when looking at multiple inequalities at once, making intersectionality a strong basis to contribute to the knowledge gap. This study addresses these gaps by examining the intersection between women residing in rural areas with lower economic status.

Research background and intervention

Amref Health Africa Uganda is a non-governmental organization (NGO). Amref Health Africa Uganda implemented a project code-named 'Piwa Maleng II', meaning our clean water in Acholi, a local dialect in target sub counties of Lamogi and Pabbo in Amuru district, Northern Uganda [4]. The project aimed to improve access to clean water in the Amuru district and in the long run, reduce teen pregnancies and further [4]. The program had many initiatives, including setting up solar powered water systems, decreasing teenage pregnancies and school dropouts, as well as hygiene and sanitation promotion through workshops and community outreaches [3].

Methodology

Study design and setting

The research utilized the phenomenological study design to explore participant's lived experiences on the topics of interest. This study was conducted in Amuru district, located in post-war Northern Uganda. The district is comprises of 4 Sub-counties and 1 Town Council, 32 parishes and 63 villages. Jimo Parish was selected for this research because 2 of its 4 villages benefited from the Piwa Maleng interventions.

Sample size and sampling

Purposive sampling was used for data collection to ensure that participants can share valuable information relevant to the study. The participants were divided into three main groups according to age, with some overlaps. Group one was women aged 18–50 years; group two was

adolescent girls aged 13–17 years attending school while group three was adolescent girls aged 13–17 years not attending school. The age ranges were chosen as it is the time women undergo menstruation cycles and therefore able to discuss their SRH challenges.

Participants were initially approached through community gatekeepers (parish chiefs, women's group leaders, and school administrators) to facilitate contact and build trust. The gatekeepers were contacted through members of the organization, Amref, to help select and mobilize participants for the data collection. Meetings with each gatekeeper were held before any interviews began to explain the purpose of the research and the use of the data. During the meeting it was ensured that the gatekeepers completely understood who was eligible for the study. To mitigate potential coercion or selection bias, we took the following steps: (1) Gatekeepers were provided with only general inclusion criteria and asked to share study information broadly rather than nominating specific individuals; (2) When gatekeepers introduced the study, they emphasized that participation was entirely voluntary and that declining would have no negative consequences for the individual or the community; (3) Study information sheets and consent forms were provided directly to each potential participant in private, one-on-one meetings, during which research staff clearly explained the purpose, procedures, risks, and benefits of participation; (4) Participants were reminded that they could withdraw at any time without penalty or loss of benefits; and (5) All consent discussions were conducted in participants' preferred language and setting, ensuring comprehension and comfort.

In the schools, the headmaster selected 5 girls for in depth interviews and 8 girls for focus group discussions aged 13–17. For the participants in the community, Village Health Teams helped select women and girls in each village. A total of 25 In-depth Interviews (IDIs) were conducted with three groups: five with women (18–50 years), ten with school-going adolescent girls, and ten with out-of-school adolescent girls between 13–17 years. Key Informant Interviews (KIIs) were conducted with four individuals per village: a village leader, two senior women teachers (one per school), and a Village Health Team (VHT) member. This gave a total of 8 key informant interviews. Additionally, Focus Group Discussions (FGDs) were conducted with four groups of women per village, two groups of school-going girls (one per school), and one group of out-of-school girls and one group of older women 18–50 years totaling to 8 FGDs. Overall, 41 qualitative interviews/discussions were held, at which point saturation had been reached. To monitor saturation, the first 25 transcripts were coded and reviewed in batches of five. After the 27th interview, no new high-level codes emerged, and subsequent interviews yielded only minor refinements of existing themes. We therefore concluded that thematic saturation was reached by the 30th interview. All remaining interviews served to confirm and deepen these established themes rather than generate new ones.

Data collection procedures

During data collection, a mixture of in-depth interviews, key informant interviews and focus group discussions were conducted. The study developed data collection tools such as in-depth interview guide, key informant interview guides and focus group discussion guide to support data collection. *"see supplementary files for the interview guides used".*

Informed consent forms were obtained from the parents or guardians (head teachers) of the adolescent girls in school and out of school. These interviews, lasting 30 min-1.5 h, allowed participants to share detailed experiences. Each group had tailored interview guides to ensure relevance.

Key Informant Interviews (KIIs) were conducted with four individuals: a village leader, two senior women teachers (one per school), and a Village Health Team (VHT) member. These interviews provided specialized knowledge on water access and sexual reproductive health (SRH). The village leader shared insights on water source management and related interventions, the teachers discussed water and SRH education challenges for schoolgirls, and the VHT provided information on SRH challenges within the community. These interviews helped address research sub-questions on education, water management, and SRH challenges.

Focus Group Discussions (FGDs) were conducted with four groups of women, two groups of school-going girls (one per school), and one group of out-of-school girls. Each FGD had eight participants and lasted 1.5–2 h. Unlike IDIs, FGDs captured community perspectives, allowing participants to share stories beyond their own experiences. This method highlighted group dynamics, gender roles, and community expectations, contributing to a broader understanding of the research themes. Participants were more open during FGDs, fostering natural discussions and debates.

Data management

All interviews were audio-recorded with participants' permission, then transcribed verbatim by the research team. Transcripts were checked against the recordings for accuracy and de-identified to protect confidentiality. All files (audio recordings, raw transcripts, and analytic outputs) were securely stored on password-protected computers. Atlas ti software was used to organize transcripts and code the data systematically.

Data analysis

We followed a reflexive thematic analysis approach, combining both deductive and inductive methods to ensure that pre-existing theory and emergent insights from the data were given equal weight. The analytic process unfolded in six iterative steps:

1. Familiarization
   Two researchers read all transcripts in full, annotating initial impressions and noting recurring topics in analytic memos. Memos focused on how participants described water and SRH challenges.
2. Initial coding (Deductive + Inductive)
   Deductive codes were drawn from our three sub-questions, and the structure of the interview guide (e.g., "decision-making roles," "access barriers"). Inductive codes were added whenever participants raised novel issues not covered by the existing codebook (e.g., "local healing practices," "peer support strategies"). Both coders independently applied this hybrid code set; a preliminary codebook was maintained with definitions and exemplar quotes.
3. Codebook refinement & inter-coder dialogue
   Weekly meetings were held to compare coding decisions. Discrepancies were discussed and reconciled, with the codebook updated to reflect agreed refinements (e.g., splitting "access barriers" into "geographic barriers" vs. "cultural barriers").
4. Theme development
   Codes were grouped into overarching candidate themes by clustering related codes (e.g., "gendered decision-making," "community mobilization," "health-seeking behaviors"). We then examined co-occurrence patterns to ensure themes were well grounded in the data.
5. Review and definition of themes
   Candidate themes were reviewed against the full data set to verify internal coherence and distinctiveness. Themes that lacked sufficient supporting data or were too heterogeneous were split or discarded. Final themes were named and defined in a shared analytic memo, with illustrative quotes selected to capture their essence.
6. Constructing meaning & ensuring rigor
   We engaged in reflexive journaling throughout surface and bracket researcher assumptions. Credibility was enhanced by peer debriefing with two senior qualitative experts, who reviewed our codebook and thematic structure. Dependability and confirmability were addressed. Transferability was supported by rich, contextualized descriptions of the study setting, participant characteristics, and exemplar quotations. This clear, stepwise account demonstrates how raw interview data were managed, systematically coded, and transformed into well-defined themes, which ensures the transparency and rigor required for robust qualitative inquiry.

Results

Background information

The demographic of the participants varied in each subgroup. Within the schools, the majority of participants were between the ages of 14–15. This was due to the fact that the only schools present in Jimo parish are primary schools. This meant that the upper year students were usually around 13–15 years old. However, there were a few older students WHO started school later. The girls not attending school were mostly older, as many of them had attended primary school but did not continue to secondary school. Lastly, the in-depth interviews with women were mostly under the age of 35. As mentioned previously, Uganda has a very young population meaning that the frequency of women over 35 years is simply lower.

Water sources in Jimo parish

The four main water sources in Jimo Parish are tap, borehole, unprotected and protected wells. The taps are often newer water sources and are therefore not only located closer to the communities but are in better conditions. The unprotected dug wells are the most common in Jimo but the least visited. This is because it is the water source with the dirtiest water, often murky with a green layer on top. The most frequented water source was the protected spring well. Boreholes were slightly less used than taps but remain an important water source. Women and girls often complained that the boreholes were hard to pump and therefore used a lot of energy. Although at first participants said that the water is clean, later in the interview, they mentioned poor water quality as one of their challenges.

The number of times participants collected water a day varied within each subgroup. Women and girls in school collect water an average of 3–4 times a day. Girls not in school collected water more often than the other two groups, with an average of 5–10 times a day. This is due to the fact that they did not attend school, and their main task was to complete Household chores and take care of the family. The time spent collecting water varied drastically per participant. Some participants only took 5 min while others took almost 2 h. The participants who took more than one hour not only lived further away from the source but also experienced long waiting lines, delaying their journey home. Most women and girls said that the road to the water point was clear and easy to pass. As they often walk through people's compounds to reach the

Table 1 Water sources in Jimo Parish

	Parish	Village	Water Source			
			Tap	Borehole	Protected spring Well	Unprotected dug Well
1	Jimo	Ayeng ki Lok	0	1	1	2
2		Arugudi	0	1*	1	3
3		Abutupa-waya	2	1	1	1
4		Jimo	2	1*	0	3
Total			4	4	3	9

*Boreholes in Arugudi and Jimo have not been working for the last 2 years

water source. When the road gets bushy, the community often clears it to improve access and safety. For most, the journey is easy due to the smooth roads, but those who walk farther find the distance challenging; Table 1.

Socio-cultural context

Traditional gender roles are deeply ingrained in Acholi culture, as nearly all participants stated that household chores are considered a woman's duty. These tasks include keeping the compound clean and tidy, washing the dishes and clothes, collecting water, cooking, working in the field and taking care of the children. As a result, a significant part of their tasks require water. Women therefore collect water not only to bathe and drink but also to perform other tasks such as washing dishes. Although women are responsible for most household work, the men are the ones who hold the decision-making power within the home. This responsibility often falls to the oldest man in the family. When it comes to deciding who in the family should collect water, most participants expressed that no one had made this decision. It is usually the task of the mother, and when she has children, it becomes the task of the eldest daughter. Therefore, it is often not decided upon but simply passed down through generations. During the interview, participants would often make remarks as the following:

> *"No one decides. I just collect water whenever we are running out because it's my responsibility." (Doreen, 24-year-old woman)*

Religion also played a role in why women and girls felt that household chores were their tasks. As it had been this way for generations, some participants shared that God had created women to perform such tasks and that is why they felt it was their duty. As the population in Amuru district is very religious, traditional gender roles can be linked back to the Bible. During an FGD with girls not attending school, one of the participants shared:

> *"We feel like it is not too much to do, we were created by God to be women, so these are our responsibilities." (Miremba, aged 15–17)*

Participants expressed that they believed that it is their duty and that they feel it is right for them to collect water. This was almost always accompanied with participants not facing any pressure to collect water. Adolescent girls often shared:

> *"I do not feel pressure or expectations as I always make sure that there is enough water at the house." (Christine, 16 years old, not attending school)*
> *"I do not feel pressure or expectations. If there is no water I feel like I need to go fetch more" (Rehema, 14-year-old girl attending school)*

With a lack of pressure, many participants also did not face punishment related to collecting water. However, some had faced beatings or quarrels from their parents or guardians for delaying at the water point or not having collected enough water. Adolescent girls in and out of school would most often receive punishment from their parents or guardians. Women are most punished by their husbands as their alcoholic husbands would get angry if they returned from the bar and did not have enough water to bathe.

> *"Men come back when they are drunk and beat you up when they do not get water, for example a lady … was beaten up by her husband because he wanted to bathe but there was no water in the house" (Nakimera, young woman in FGD)*

This demonstrates the existing power imbalances within the household. Women have a lot of responsibility for the home but if they fail to complete certain tasks it can lead to abusive behavior from their husbands. Women had very mixed views on men collecting water. Half believed that it was because the man was a good person and wanted to help his wife. The other half pitied these men, thought that it was inappropriate and that they should find a wife. Nevertheless, both views demonstrate that it is unusual for men to collect water as they must either be exceptionally loving or must not have a wife. When looking at the answers given by the adolescent girls attending school, almost all expressed that a man is just as capable of collecting water as a woman.

"I think that there is nothing wrong with a man collecting water. The work is for everyone and should not be divided." (Christine, 16 years old)

When asked whether the men in their family collected water, most answered no. However, the majority of adolescent girls not attending school believed that it was inappropriate for a man to collect water. This demonstrates that education plays a role in how girls view gender roles and household tasks. For example, during an IDI with a girl not attending school, she shared:

"I do not believe that it is right for a man to collect water as it is not their duty." (Jane, 14 years old)

Participants initially stated that water collection was on a first-come, first-served basis. However, further discussion revealed that elders often had priority, and younger girls had to help them first. Women also let school children collect water in the morning to ensure they arrive at school on time. Despite a few exceptions, there is overall respect, with people waiting their turn.

SRH challenges when collecting water

This section focuses specifically on challenges experienced during menstruation, pregnancy and related to sexual abuse.

Challenges collecting water during menstruation

Most participants, both women and girls, continued to collect water during their periods. Many did not see menstruation as a burden but also needed to ensure the household continued to have enough water. Although they reported feeling fatigued and having abdominal/back pain, these symptoms rarely stopped them from collecting water. However, few collected less water or used smaller jerry cans. For example:

"Yes, I get cramps and headaches but I still fetch water because if I do not go, there is no one else to help." (Winnie, 17 years old attending school)

In some cases where girls experienced extreme pain, their sisters or mothers would step in to help them. In a focus group discussion with women, a participant shared that she would help her daughter when she felt pain on her periods:

"It was my mother to help me fetch water [when on my period] … so I give the same help to my daughter when she is experiencing period cramps, I fetch for her water … so that she can become clean and get energy." (Nakimera, woman below the age of 30).

The main determinant of whether a participant collected water on their periods was whether they had sufficient menstrual products and if they experienced pain. The most popular menstrual product used by women and girls were disposable pads. Many also used reusable pads or doubled their underwear. Some could not afford to buy disposable pads so would resort to using clothes or biker shorts.

Bathing regularly is a way in which women and girls manage their periods. This not only ensures their menstrual hygiene but also decreases their chance of staining their clothes. Participants shared that they bathed 3 times a day on their periods, often meaning that they need more water than on regular days. Water is essential for menstrual hygiene, posing challenges for women and girls who face mobility issues during their periods due to lack of products, cramps, or overflow. The accessibility and products used plays a significant role in the way women and girls experience collecting water on their periods. Half of the participants expressed that they had enough menstrual products and rarely ran out. Girls attending school often said they had enough as they received products from school. Women are more likely to run out of menstrual products largely because they did not have enough money to buy them. When looking at the adolescent girls not attending school, around half complain of not having sufficient products due to a lack of funds. The other half either worked in people's gardens to earn money to afford it or would get supported by their parents. Water collection was particularly hard for women and girls who had limited supply of menstrual products and experienced overflow. This is because of fear of staining their clothes when collecting water and being seen. Girls with heavier flows would face more challenges as they were more likely to stain their clothes if they did not have enough menstrual products. Participants with lighter flows would see their period as less of a burden as even without the necessary products, they would face little challenges.

"I always experience blood overflow … I double the pads and make sure to put on a thick sweater, but it still stains my clothes, so I always go back home. (Rehema, 14-year-old attending school)
"I run out, and when this happens, I normally just use knickers and bathe constantly to avoid blood stains." (Christine, 16-year-old not attending school)

The two quotes above demonstrate the different experiences between girls with heavier versus lighter flow. Although Rehema has access to sanitary products, she still faces challenges collecting water. Contrarily, Christine runs out of sanitary products but is able to manage it due to her lighter flow. This shows that having

the necessary products does not always decrease the challenges.

Challenges collecting water during and post pregnancy

Almost all women had at least one child, with the majority having 4 or fewer. Most had their first child between the ages of 15–18, often with their current husbands whilst some had to drop out of school as a result of their pregnancies. The main challenges that women face when collecting water during pregnancy include weakness and abdominal/back pain. However, most women continue to collect water during their pregnancies as they have no one to assist them and the work still needs to be done.

> *"No, I had no challenges … I was weak but I still fetched water. For example, when I was pregnant … I fell flat on my stomach when I went to fetch water which led to complications. I started to be weak … but because there was no one to help me I still had to fetch water." (Jackeline, 30-year-old woman)*

Although participants, like Jackeline, would initially say that they faced no challenges when collecting water, this often later came with complaints of fatigue, pain and feeling weak. This is a way in which women justify their problems, they face difficulties, but they do not openly consider them challenges. Although women said they faced no challenges and continued their routine as normal, the pain and fatigue make it more difficult to collect water. Not collecting water would be seen more as a challenge as many participants expressed that there was no one there to help them. After a normal delivery, most women rest for a week or less before resuming their normal activities, such as collecting water. However, C-sections led to longer resting periods of 1–6 months with some resting up to a year due to complications. Some women took no rest at all and said they could even fetch water the day of delivery. For example:

> *"I never rested after giving birth, I can fetch even the same day I gave birth, I feel healthy and there is no one who was there to help me collect water" (Fiona, 30-year-old woman)*

Women who take little or no rest often had no one to help them. For those who did take rest, they would receive help mostly from their children, neighbors or co-wives. Many women complained about a lack of support from their husbands, both in the form of household help and economic support. The high physical strain during and after pregnancies often led to women taking longer to fully recover. Some participants shared stories about where they had lost their babies due to their high physical activity or other unknown reasons. The case study below is an example from a focus group discussion of a situation where high physical activity leads to a participant losing their child.

Case study

Afiya is a 30-year-old woman residing in Ayeng ki Lok village, is a peasant farmer with 4 children. During her first pregnancy she continued to carry heavy jerry cans of water until she started to experience pain and noticed blood and pus coming out of her. She visited the doctor and was told that her uterus wall was breaking. The doctor strictly advised her to limit her physical strain and to rest. She decided to leave her husband's home and rest at her mother's place. There her mother supported her with water collection, cooked her food, and brought her water to bathe. However, one day Afiya's mother-in-law came to pick her up and said that she should be in her husband's home. Once she had returned to her husband's home, her mother-in-law forced her to continue collecting water and undertake heavy garden work. Afiya's bleeding returned along with headaches and feelings of nausea. She begged her mother-in-law to stop making her perform these activities, but she gave her no mercy. Afiya tried to seek help from her husband and father-in-law, but no one believed or supported her. One day, she felt immense pain and fled to hide in the bathroom. That is when she noticed that she was experiencing premature labor. She delivered the baby in the bathroom, but the newborn only survived a couple of minutes before passing away. She wholeheartedly believes that the death of her baby was the fault of her parents in law, if they had supported her, this would not have happened.

Afiya's story demonstrates how societal expectations and gender norms can have a negative impact on a woman's SRH. Even with her condition during her pregnancy, she was expected to perform her duties. She did not have the power to refuse her mother-in-law's wishes and therefore had no other choice but to continue the household task her doctor had advised her against.

Although none of the adolescent girls who were interviewed had been pregnant, a lot of the women had gotten pregnant at a young age and others had seen or heard about teen pregnancies. The general trend was that teen pregnancies came with considerably more challenges. Firstly, the girls felt a lot weaker during the pregnancy which often meant that they could not collect water or perform their other usual Household activities. Some participants said they had seen young pregnant girls WHO could only lie in bed during the entirety of their pregnancies. This puts a higher workload on their sisters or mothers. A participant shared a story from a 12-year-old classmate who had become pregnant:

"She did not continue school and gave birth prematurely. She had complications at birth with her womb, and she was told she no longer can have children. The child is alive, but it is still very weak." (Rehema, 14 years old attending school)

Young girls are more likely to face complications during pregnancy. Girls aged 13–16 all struggled during deliveries due to their underdeveloped bodies, making natural births difficult and painful. Most required C-sections because their hips were not wide enough, causing tearing in the womb and long recovery periods. This can sometimes result in infertility, affecting their societal status where childbearing is highly valued. Not being able to have children can significantly impact a woman's standing and perception in society.

Risk of sexual assault when collecting water

The findings indicated that sexual assault on the way to the water point was rare. Participants explained that this was because the water sources are now located closer to homes and the roads are rarely bushy. During the rainy season communities are mobilized to clear the bush. Clear roads lead to feelings of safety as assaults often occur as a result of men or boys hiding in bushy areas. Women and girls had adopted ways to decrease their risk of being assaulted. For example, participants expressed that they have learnt not to collect water once it had become dark and to move in groups rather than alone.

"There was a time when there were many bad people close to the water hole; there was a bushy area where they would hide. I was scared during this time and then my mum advised me to always walk with someone which is why I do not walk alone anymore." (Rehema, 14 years old attending school)

Walking in a group made it less likely for boys and men to approach them. Most women and girls not attending school said they would walk alone to the water source whilst girls in school were more likely to walk in groups. This is because they get taught ways to decrease the chances of being sexually assaulted (see Sect. 5.3.2). Boys bathing at the water point caused discomfort to several participants. This is because these boys often teased and seduced young girls and women. During such situations, participants returned home without collecting water.

"When the tap runs out, I have to go to the borehole. When I get there, I see that there are a lot of boys, and it scares me. I end up going home and not fetching water because I am scared, they will take advantage of me." (Peace, 13 years old, attending school)

As a result, feeling unsafe can lead to women and girls not being able to collect the water they need. This means that they either have less water available or need to return to the source again, taking up more time in their day. Numerous adolescent girls mentioned that there were people bothering them at and on the way to the water source. This was either from boys or other women. Although rape cases were few, participants often mentioned cases of attempted assault. However, the assault was often prevented by people passing by and intersecting the instance. Jenny, an adolescent girl not attending school shared during an FGD:

"A girl who is my neighbor was almost raped on her way to fetch water … but she managed to escape and rushed home" (Jenny, age range 13–17)

There are instances of young men who try to lure girls in on the way to the water source, and if they refuse, the men often resort to beating them up as a punishment. There were a few cases of rape reported by participants however many older women expressed that it had been more of a problem in the past. Participants expressed that gender-based violence was still occurring, but simply less on the way to water points. Most incidents happened around trading centers, video halls, and dance halls.

The role of education in the awareness and implementation of SRH practices

Almost all the girls in school said that they did not come late to class because of collecting water. They said they would make sure to wake up early to have time to fetch water before school. There were a few who did come late at times as the water source was located very far from the school. Both Agwayugi Primary School and Jimo Primary School had water sources available on the property. The following section will examine the ways in which sexual reproductive health is taught at school and how this impacts the awareness and implementation of SRH practices.

Education on menstruations

The schools discuss menstruation quite extensively with their students. This meant that all participants attending school talked very openly about their menstruation. The lessons usually start from the age of 13 where girls are taught How to handle their periods and How to stay hygienic. Not only does the school provide girls with disposable pads and underwear, they also teach them how to make reusable pads. This means that almost all girls in school have enough products to manage their periods. This makes walking to the waterpoint and attending school considerably easier as they are less likely to run out. Girls are taught to thoroughly wash reusable pads in clean water, lay them out in the sun to dry and ideally iron them to kill bacteria. Moreover, girls are strongly advised

to bathe at least 3 times a day during their periods in order to maintain their personal hygiene. The importance of clean water is emphasized for personal hygiene and is a key factor in the way girls manage their periods. As both schools have water sources, a tap or a borehole, girls have easy access to water while attending school. This means that they can bathe at school and change their menstrual products with ease.

> *"[I] change my pads 3 times a day. At school there is also a changing room, and I can get soap and a bucket to bathe in and change at school." (Nakato, 14 years old)*

However, during the key informant interview conducted with the senior women teacher, WHO is responsible for the girls and teaching them sex education at Jimo Primary, she discussed that the tap at schools can break down. When the water breaks down, students need to collect water at another borehole which is located further away. If students want to collect water to drink or bathe during break, they often come back to class late. The distance makes it harder for girls to maintain bathing 3 times a day affecting their menstrual hygiene practices. Students can go to the senior woman teacher during the school day if they start their period or stain their skirts. She hands out both disposable and reusable pads as well as clean skirts to change into. Washrooms were available at both schools providing a safe and secluded place for girls to bathe (see image 5 and 6). Women participants commented that the education received about menstruation at school has drastically improved the hygiene practices of young girls.

> *"The girls feel free and confident when they are menstruating. This is because they have changing rooms at school where they can bathe and change from." (Dembe, FGD with women)*

Contrary to the past, most girls bathe multiple times a day and are able to manage their menstruation very well. Some mothers say that they do not even know when their daughters are on their periods as they rarely stain their skirts. They also mentioned that the difference in hygiene practices between girls attending school and girls not attending school is quite drastic.

Education on pregnancy and sex

Girls are taught about sex in school and how to avoid teen pregnancies and early marriage. They are told to stay in school and abstain from sex. As there is a risk or abuse on the way to the water point, girls are taught how to politely refuse any boys or men who try to lure them in for sex. They are told to say that they are too young and that it is not appropriate for them to have relationships yet. If there are cases of sexual abuse, they are told to immediately report it and to not be afraid to talk to their parents or teachers. Furthermore, girls are taught to dress respectfully to not attract unnecessary attention when walking to the water source. The lessons on pregnancy and sex were not as extensive as the ones about menstruation. Girls are told that sexual assaults occur at night and when you are walking alone. It was evident that participants had implemented the lessons learnt in school as they often walked in groups and rarely went to collect water at night. Students were told not to have sex but not necessarily why or how to prevent pregnancies. This led to a taboo around early pregnancies and dating at a young age. However, when asked whether girls felt like they could openly ask questions about these topics, a vast majority said yes. They believed that it is good to talk about such topics.

> *"Yes, I can openly ask questions to my mother or the senior woman teacher as we are always advised to not fear anything." (Norah, 15 years old, attending school)*

Some said they could ask about certain subjects but not about others, such as contraception and sex. However, girls not attending school were much shyer discussing such topics and were more likely to say that they could not openly ask questions. As a result, one can see that through the spread of knowledge there is a better sense of awareness. Girls who do not attend school may have less knowledge on topics of sexual reproductive health and therefore feel less comfortable seeking guidance or support regarding their SRH. This can lead to poorer hygiene practices but also perpetuates the taboo around sex and early marriage.

Education on general body hygiene

In schools, students are also taught how to stay clean and healthy, highlighting the importance of clean water. Water should be used not only to clean your body but also the latrines and the compound. This means that if girls see that the water they are collecting is dirty or murky, they are more likely to go to another water source to find cleaner water. They are advised to wear closed shoes in the latrines to avoid close contact with dirty water which may contain diseases. They are taught not to share undergarments as it can also spread diseases. Clothes should be worn only a maximum of two times before being washed. Girls are also taught to bathe their younger siblings as they are too small to know what is right and how to keep themselves clean.

> *"You should bathe and then put on clean underwear. We are taught to always change our clothes after bathing and to not reuse dirty underwear." (Winnie, 17 years old, attending school)*

On the one hand, these practices are good as they decrease the risk of infections from poorly washed undergarments and through constant bathing personal hygiene is improved. On the other hand, washing clothes and bathing more regularly means that women and girls need to collect more water to maintain their personal hygiene and SRH, leading to a higher work burden. During a key informant interview with a Village Health Team (VHT), she expressed that although education in schools has significantly improved the personal hygiene of girls, the personal hygiene of women and girls not in school is significantly worse. She explained that they do not bathe regularly and their personal hygiene on their periods is inadequate. This leads to more stained clothing and overall poorer SRH.

> *"At home, it happened to a neighbor who got a blood stain. I went and told her to go bathe and change her clothes, but she refused, saying it's her own body to deal with." (Justine, 15 years old, not attending school)*

Due to the lack of knowledge on menstrual hygiene, some women do not understand the importance of staying clean and bathing regularly, especially on their periods.

> *"[There should be more education on] Menstrual hygiene because there are some women who don't bathe from morning to sunset" (VHT working in Jimo Parish)*

As seen from the quote above, in a key informant interview with a VHT she confirmed that education had a significant impact on the hygiene practices of women and girls. She emphasized that there needs to be more workshops available for women as they lack knowledge in general body cleanliness.

Involvement of women in the management of the water source

Current management

The management and leadership differed immensely between each source. Many participants said that the local community leader was in charge of the water source. However, there were also water committees, volunteers and the school supervised the water source. Few of the water sources had no form of leadership as volunteers would step in to take care of the source. The leaders handle issues of repairs, settling arguments between water users and other practical matters. For almost all water sources, meetings are organized by the leaders to discuss any issues and allow the community to raise any concerns. Although there are currently more men responsible for the management of water sources, there has been an increase in the participation of women. This is partly due to the fact that when the community is able to elect the leader, women are more likely to be appointed.

> *"The committee here has more women, because women are less corrupt and are not drunkards like men. So, we elected people who are capable" (Lucy, 50-year-old woman)*

Amref has played a significant role in involving more women in the management of water sources. Their project which installed new taps in the communities would be coupled with water committees who get trained to manage and maintain water sources. Due to the training, the water committees have learnt not only how to repair the water source but also what it takes to be a good leader. Water Committees are elected by the community during meetings, resulting in more women being elected. The community acknowledges that women are more engaged with water collection and therefore are more knowledgeable on how to successfully supervise the source. Participants who had women in their leadership expressed:

> *"It is women who are the ones who interact and use the water the most. In case there are challenges with water they are the ones who are most affected so their views should be heard most." (Jackeline, 30-year-old women)*

Participants' views on the involvement of women in management of the water source remained mixed. As mentioned before, the majority believed that having more women involved in the management of the water source would have a positive impact. However, some participants said that women would not help the management of the water source because they are too emotional and if given too much authority, they would just cause more conflict. They believe that this would impact the water source in a negative way.

> *"It would spoil how the water source is managed because women are short tempered and like gossiping. If they are more in the committee, it would bring negative competition amongst themselves hence not serving the interest of community members." (Gladys, 18-year-old woman)*

This perpetuates the existing gender norm that women are inferior to men and that men should hold the decision-making powers. A link can also be made to education as it was often the uneducated women who believed that having women as leaders would cause more harm than good. As a result, education not only challenges the traditional gender roles of women but also empowers them. Girls learn to stay in school and prioritize their education and career rather than marrying early and dropping out of school.

> *"The committee here has more women, because women are less corrupt and are not drunkards like men. So, we elected people who are capable" (Lucy, 50-year-old woman)*

The impact of management on the experiences of women and girls with water

Community-based management structures, committees of local volunteers tasked with upkeep, fee collection, and conflict resolution, are widely promoted as a key pillar of sustainable WASH service delivery [30]. In Jimo Parish, most water sources remain free for daily use, with occasional repair levies of 2,000–5,000 UGX imposed after breakdowns. While low or absent user fees reduce barriers for cash-poor households, irregular contributions often stall maintenance, mirroring findings that fee-collection challenges undermine repair efficiency in low-income communities.

Where active water committees exist, their routine cleaning campaigns and communal bush-clearance work not only improve water-point functionality but also enhance perceptions of safety and hygiene-outcomes echoed in studies showing that women manage and clean shared sanitation facilities more diligently when empowered through local governance structures [21]. Compulsory meeting attendance, enforced by fines or land-use sanctions, ensured broad participation, but also risked excluding the most marginalized who could not afford penalties for absence.

> *"This has affected the way the water source is managed in a good way. In case you do not help with cleaning the water source, you get a fine and sometimes they even confiscate your land. This helps people respect the rules and follow them." (Juliet, 25-year-old woman).*

Compulsory meeting attendance, enforced by fines or land-use sanctions, ensured broad participation, but also risked excluding the most marginalized who could not afford penalties for absence.

Women's voices were more consistently heard in forums where female committee membership was high, aligning with evidence that increased women's representation correlates with better responsiveness to women's WASH needs, such as menstrual hygiene and personal safety interventions.

> *"We feel like our views are being heard because the majority who attend these meetings are women. " (Namono, woman during FGD)*

Conversely, sources lacking formal leadership suffered neglect: overgrown surroundings, broken pumps, and longer walking distances, factors known to exacerbate water-related workload and heighten SRH risks, including infections and fatigue.

> *"The water source is in miserable condition and it's upon individuals if they feel like conducting general cleanliness around the water source." (Aminah, 20-year-old woman)*

Integrating these insights, our findings underscore that effective community management in rural WASH must balance low user fees with reliable repair funds, ensure inclusive governance that amplifies women's priorities, and employ accountability measures sensitive to the poorest. Such an approach is critical not only for sustaining technical functionality but also for safeguarding women's and girls' health, dignity, and time use in water collection.

Discussion

Gender roles

De Guzman et al., [11], Kasma et al., [19], Sweetman & Medland [28], suggested, women hold primary responsibility for water collection and therefore face greater inequalities than men. This could also be seen in this research as all women and girls collected water and saw it as their duty. However, the results showed that most women were not told to perform these tasks but that they felt it was their duty. It demonstrates how cultural norms are deeply ingrained in the lives of women and girls, impacting their daily routines. Although some women and girls believed it was acceptable for men to collect water, the men in their families did not do so. Although there may be a gradual shift in mentality due to education and women's empowerment, the change in actions is much slower. As a result, women continue to face the double burden of being responsible not only for all the housework and children but often are also responsible for the farming work, earning the household income.

Although Basri et al. [9]. suggested that women face a great deal of pressure due to the high workload, most women and girls expressed that they did not. With gender norms as one of the main concepts used in the

theoretical framework, this research shows how being a woman or girl shapes the experiences they have accessing water. Not only do they innately become responsible for household tasks, they must also ensure that their husbands have food, water to bathe and clean clothes. This highlights how men have the upper hand in the household creating a power imbalance. Women can be seen as the leader of the household in some ways as they are responsible for children and household activities, yet they do not hold the final decision-making power. Hakansson [14] and Obbo [25] argued that women do hold authority in the household in different ways. Although they may not have more authority than men, they remain important figures in the household which was seen in their increased participation in water management.

Sexual reproductive health challenges

Although Jalali, [18] had suggested that there is a taboo surrounding menstruation, this research revealed quite the opposite. Women and girls talked very openly about their menstruation and explained that they continued to collect water during their periods. A few factors were seen to influence this. Firstly, there have been numerous programs and initiatives focused on keeping girls in school during their periods and improving menstrual hygiene. Younger girls therefore had significantly better hygiene than elderly women or girls not attending school. As the Feminist Political Ecology of Health framework suggested, knowledge and education on health practices played a significant role in the health of a population. The way a population handles their health is very closely linked with the way it is viewed in society and the knowledge built around it [15]. In the case of menstruation, the increase in knowledge led to women and girls talking about the topic with ease and comfort. It significantly improved hygiene practices and led to girls experiencing almost no challenges collecting water on their periods. Those who did face challenges often did not have the knowledge of menstrual hygiene or had heavier flows and no means to buy products. Adolescent girls not attending school were most likely to face challenges collecting water. This is because they often lacked knowledge on menstruation and hygiene management, further highlighting the importance of knowledge and education for SRH. A lack of knowledge results in worse hygiene practices as these girls often experienced leakages and bathed less often. In addition, the schools provided the girls with menstrual products, making it easier for them to manage their periods compared to the girls who did not attend school. Similarly, Hulland et al.'s. [17] findings suggested that fear of leakages and embarrassment while collecting water on their period could lead to women and girls bathing less frequently leading to poorer menstrual hygiene. Most of the girls in school bathed three times a day, meaning they needed to collect more water than on the average day.

Although back and abdominal pain were quite common among women and girls, it often did not prevent their water collection. As there was rarely someone to take over their tasks, they often did not have any other choice. This is due to the fact that culturally, it is a woman's task to collect water. Therefore, even when the woman or girls are not feeling well, they continue to collect water. No support is expected from male figures in the family, meaning that they continue their usual tasks despite experiencing challenges. This can also be seen when women are pregnant as they continue to collect water during pregnancy despite feeling more fatigued and experiencing pain. As Jalali [18] stated, having access to clean water was extremely important post-delivery to prevent infections and ensure a speedy recovery. Therefore, women would rest for a short period of time before continuing to collect water as there is a lack of support available and water remains essential. Although scholars such as August [7] found that having limited access to clean water led to IUDs, none of the participants complained of having experienced this. However, this apparent absence of complaints should be interpreted with caution. In many contexts, discussion of gynecological symptoms and sexually transmitted infections is stigmatized, and women may be reluctant to disclose sensitive health concerns, particularly in group settings or when speaking with researchers perceived as outsiders. Moreover, symptoms such as pelvic pain or abnormal discharge can be normalized or attributed to other causes, further suppressing formal reporting. Future studies should consider confidential, private interviewing techniques or symptom-checklist prompts to reduce social desirability bias and better capture the full spectrum of water-related SRH consequences."

When looking at the prevalence of sexual abuse on the way to the water point, it was less common than what the literature suggested. Contrary to the study conducted by Ayoade and Sikiru [8] where most women had experienced sexual assault, this study showed that most women had not. A key factor influencing this was the environment and condition of the road leading to the water point. The bush being cleared, new water sources being located close to households and the fact that many routes passed through people's compounds ensured a more secure path. Furthermore, communities had adopted practices to limit the risk of experiencing assault. Women and girls often prevented collecting water at night, when most cases of assault happened, and would walk in larger groups to prevent being a target. Women expressed that these coping mechanisms played a significant role in decreasing sexual assault attempts when collecting water. As a result, there are now fewer teen pregnancies and

reported rapes than in the past. Contrary to Pommells et al. [27], Nunbogu & Elliott [24], there were few instances of abuse making the impact on women's health less significant than was suggested. The safer environment and the fact that participants experienced less fear collecting water led to less impact on their SRH than anticipated.

Although cases of sexual abuse were minimal, arguments and fights at the water source were more prevalent. Although this does not directly affect the SRH of women and girls, it can impact water access. Participants reported returning home without water after fearing a situation, potentially decreasing the water collected per day. As a result, women and girls have less water to perform their day-to-day tasks, affecting their water use and hygiene practices.

Women involvement in management of water sources

Although there are more men responsible for the management of water sources, there has been an increase in the participation of women.

When there was the possibility to elect leaders for the water source, women were more likely to be elected than men. This is because participants believed that since women are most concerned with water collection activities, they know what is best for the water source. Meetings allowed community members to raise concerns and suggest improvements to the leader. Although most women said that this allowed them to bring forth their problems, a few women said that they still did not feel like their voice was being heard. This goes in line with what Caruso et al., [10] found in Kenya, where even when given the chance, women felt like they could not speak up. The management of water sources has brought positive changes such as cleaner surroundings.

The participant responses showed that having more women involved in the management of the water source would have a positive impact. This is well supported with Asaba and Fagan [5] argument that having more women in charge of the water source would have a positive impact on the management and sustainability of water. However, there were still a number of participants who believed the opposite. Women were accused of being too emotional, bringing more conflict and arguments to the water source. This highlights how women were at times seen as inferior to men, perpetuating the existing power imbalances and the inferiority of women. This supports Adams et al.'s [1]. claim that having less women in management are a result of existing gender norms and power imbalances.

However, participants also complained that community members did not show up to clean ups organized by the leader. This can lead to conflict between the community as individuals do not respect the rules. Participants expressed that it is often men that do not show up to organized clean ups. As Naiga et al. [23]. found, men view water differently which influences the decisions around it and the responsibility they feel towards it.

Intersectional perspectives on water insecurity and SRH

Applying an intersectional lens to our findings reveals how school attendance, age, socioeconomic status, and geographic location interact to shape women's and girls' experiences of water insecurity and related SRH challenges. For instance, girls who remained in school benefited from structured menstrual hygiene education and regular access to pads and bathing facilities on campus, which allowed them to maintain hygiene routines and efficiently integrate water collection into their school day. In contrast, out-of-school adolescents, who were often older, lacked formal SRH instruction, and had limited financial means to purchase sanitary products, faced a double burden: they needed to collect water more frequently for household chores while managing menstruation with improvised materials, heightening both physical fatigue and anxiety about leakage.

Among adult women, economic dependency and household hierarchies further compounded vulnerability. Women without economic autonomy or supportive kin networks were unable to delegate water-fetching duties during pregnancy or postpartum recovery. In one vivid example, a young mother in a low-income household endured forced heavy lifting of water containers despite medical advice to rest, ultimately experiencing severe health consequences. This case highlights how gendered expectations and lack of agency can directly undermine maternal health.

Geographic remoteness and mobility constraints also intersected with age. Participants residing in distant hamlets described daily round-trips of up to two hours along uneven or partially cleared paths. Younger girls, when taught to travel in groups for safety, could mitigate risks of harassment, but older or less mobile women, who walked alone at slower paces, remained exposed to conflicts at crowded water points and fatigue from extended journeys. These layered dimensions of identity and context demonstrate that one-size-fits-all interventions are insufficient; instead, targeted strategies, such as extending school-based SRH programs to community centers for out-of-school youth, subsidizing menstrual supplies for the poorest households, and improving pathway maintenance in remote areas, are necessary to address the compound realities of water insecurity and SRH across different subgroups.

Limitations to the study

- Using purposive sampling could have come with limitations. Though participants were carefully

selected, it exposes the study to selection bias. Consequently, the results may not represent the whole population, making it hard to generalize the findings in other circumstances or geographical locations

- Due to different cultural backgrounds between the researcher and the participants, use of translators may have altered the data collected as the translated answers may not have been directly identical to the participants' responses.

Conclusion

This study explored how access to clean water may influence the SRH of women and girls in Jimo Parish, northern Uganda. Findings suggest that gender norms, education, and water politics play an important role in shaping their SRH experiences. Women often bear the primary responsibility for water collection, reinforcing traditional roles that limit their decision-making and increase physical strain, especially during pregnancy and menstruation. These societal expectations may further contribute to SRH related challenges. School attendance was associated with improved hygiene knowledge and practices, when combined with access to clean water, appeared to support better menstrual management and reduce SRH-related challenges. Although men largely remain in control of water management structures, there are indications of increasing participation by women, which may be contributing to improved access and organization. Nonetheless, underlying power imbalances and skepticism toward women's leadership in water governance remain evident.

Future research and policy recommendations

This research opens up the possibility of numerous future research topics. Firstly, a follow up study could include more of a male point of view. Having a focus solely on women allowed the research to be focused but also provided a one-sided view. Having an added male voice could help better understand the existing gender roles and norms and the way women are perceived to men. It could add a deeper layer of analysis and understanding of the cultural context. Secondly, an interesting follow up study could focus more on the impact of new and improved clean water sources on the sexual reproductive health of women. Although this research briefly touched upon it, it could be a topic in itself. Having a deeper focus on new water sources would allow a better understanding of the impact of clean water on SRH and the importance of improving water access.

In terms of policy recommendations, it necessitates community led initiatives which aim to empower women and integrate them more into the decision-making process. To ensure that the women are able to manage the water source effectively, training programs should be developed to teach women on effective leadership and how to sustainably manage water sources. Additionally, women and girls not attending should have workshops to teach them more on the importance of hygiene and how to maintain their SRH. This research demonstrated the importance of knowledge for the awareness and implementation of SRH practices and how girls attending school had significantly better hygiene practices. This knowledge should be made accessible to all women and girls through government led initiatives which teaches about SRH and how clean water can be used to ease the challenges they face.

Abbreviations

FGD	Focus group discussion
IDI	In-depth interview
KII	Key informant interview
SRH	Sexual reproductive health
STD	Sexually transmitted disease
VHT	Village health team

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-24649-1.

Supplementary Material 1.

Acknowledgements

We would like to extend appreciation to Amref Health Africa in Uganda for efforts in implementing the PIWA Maleng II Project. The goal of the project is to reduce rates of teenage pregnancy and improve access to WASH for 39,000 people living in Pabbo and Lamogi sub-counties in Amuru district.
Special gratitude to Amref Health Africa Project Management Team, Utrecht University and Amuru District Local Government for supporting the research process including review of data tools, review of research protocol, mobilization of the target participants.
Thanks to all the school teachers, Village Health Teams, Local leaders, girls and women for the valuable responses they provided to the research team at the time of data collection.
Lastly, special thanks are extended to the Research Assistants (RAs), and the entire research team for their hard work and endurance during the fieldwork and compilation of the research manuscript.

Authors' contributions

P. K and S.D: Conceptualization, Methodology, Software S.D and M.L: Investigation. Savanna Desmarquest, M.M and N.O: resources S.D, M.M and N.O: Writing—Original Draft. P.K, N.T and M. N: Writing—Review & Editing. M.L and S.D: Data Curation and Visualization M.L and S.D: Supervision and Project administration.

Funding

Amref Health Africa Uganda received writing support through a project funded by Pathway Foundation through Amref UK. The funders had no role in the study design, data collection and analysis, publication decision, or manuscript preparation. The contents are solely the authors' responsibility and do not necessarily represent the official views of the supporting institutions.

Data availability

This data is part of the ongoing WASH program in Amref Health Africa. Therefore, datasets used and analyzed during this study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval and consent to participate

The Research Ethics Committee of Uganda Christian University (UCUREC) and Uganda National Council for Science and Technology (UNCST) approved this study protocol and tools (SS2829ES). Additionally, the DHO of Amuru district granted administrative permission to conduct the study. All participants provided written and signed informed consent. For participants below the age of 16 years, informed consent was obtained from parents or guardians (head teacher). All data has been anonymized to maintain confidentiality. All methods were carried out following the relevant guidelines and regulations of the Declaration of Helsinki.

Consent for publication

The authors of the manuscript have reviewed and approved the final version and consent to publication. Written informed consent for publication of the anonymized quotes and case descriptions was obtained from study participants featured in the study.

Competing interests

The authors declare no competing interests.

Received: 19 May 2025 / Accepted: 26 August 2025
Published online: 24 January 2026

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