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Gender-related factors affecting community malaria-related perceptions and practices in Migori County, Kenya

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Abstract

Background Malaria poses a significant global public health challenge yet there remains limited information on the influence of gender dynamics on malaria programmes despite the well-known gender-specific differentials in the prevalence, transmission and exposure to malaria. The 2024 World Malaria Report indicates that the burden of malaria and the challenges in addressing it remain severe in sub-Saharan Africa (SSA), with eleven countries including Kenya bearing almost two-thirds of the global disease burden. Kenya remains heavily affected, with around 70% of the population at risk. The aim of this paper is to explore how gender-related factors influence malaria healthcare-seeking perceptions and practices in Migori County, a malaria endemic area in Western Kenya.

Methods The study employed a qualitative research design to gain in-depth insights into local perceptions and practices regarding malaria. Thirty-one in-depth interviews, four gender-stratified focus group discussions, six key informant interviews, and five process mapping exercises. Participants were purposively selected to ensure diversity and data thematically with both inductive and deductive approaches applied to generate themes.

Results The results of the study are in three main themes; gender-related similarities and differences in malaria healthcare-seeking perceptions; gender differentials in malaria prevention and treatment practices and the gendered dimensions of malaria healthcare-seeking information. Participants were generally aware of malaria, although there were noticeable gaps in their understanding regarding transmission and prevention. Gender related factors including gender dimensions (gender roles and relations); social stratifiers (level of education, gender identity, occupation) and cultural dynamics (beliefs- religion and traditional superstitions) influenced the perceptions of risk and vulnerability. Decision-making was reported as shared in relation to type of treatment and access to care.

Conclusion The study of community's perceptions reveals that malaria healthcare-seeking, knowledge, attitudes and practices and the perceptions of risk and vulnerability are influenced by gender roles and relations and intersections among socio-demographic factors, beliefs including religion and traditional superstitions, and occupation. Gender disparities in knowledge and healthcare-seeking behaviours illuminated in this study underscore the need for gender-sensitive public health interventions, inclusive health policies and integration of pluralistic health care systems to improve public health outcomes.

Keywords Malaria, Gender, Intersectionality, Health seeking behaviour, Perceptions, Risks, Vulnerability

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Background

Sub-Saharan Africa (SSA) continues to shoulder the heaviest burden of malaria with 95% of malaria cases in 2021. In 2021 96% of all deaths with 80% among children under 5 years was recorded in SSAs [1, 2]. Malaria, a vector-borne disease is susceptible to inherent phases of change triggered by climate, changes in human land use and the effectiveness and coverage of initiatives and measures that focus on the parasite and vector [2–4]. The disease spreads across zones with diverse risk and intervention profiles determined by altitude, rainfall patterns, and temperature, and malaria prevalence [1, 3–5].

There has been marked progress in reducing the global malaria burden over the last two decades and four countries have eliminated it. However, progress has plateaued with data from 2022 indicating that milestones set out in the World Health Organization (WHO) Global Technical Strategy for Malaria (GTS) for the year 2020 were missed by a wide margin [2, 4, 5]. Malaria thrives in and exacerbates poverty by directly endangering health [6, 7]. Malaria costs lives and deepens inequalities, disproportionately affecting the most vulnerable groups such as pregnant women, infants, children under 5 years, refugees, migrants, internally displaced people, and indigenous people [6–8]. Women, men, young people and children at different times assume roles as patients, caregivers and healthcare providers, and experience differentiated vulnerabilities to, and impacts from malaria [7–9]. Recurring infections often strike families multiple times in a year, during which women are impacted as patients or caregivers to sick family members and children. In resource-limited settings this direct and indirect burden on families affects livelihoods, creating a vicious cycle of inequity [6–9].

Kenya's population is vulnerable to malaria with 70% at risk, with thirteen million individuals living in endemic regions and an additional nineteen million in highland epidemic-prone and seasonal transmission zones [3, 10, 11]. Interventions to control malaria in Kenya have been integrated with key strategies focused on prevention and case management at community level [10, 11]. These strategies combined with messages about social behavioural changes, increase community uptake and utilization [3, 10–13]. Despite these efforts, the families and communities at greatest risk are among the hardest-to-reach populations, living in remote, rural areas with poor access to health services as is the case of Migori County, western Kenya [10, 13]. Malaria prevalence and incidence is more than two times higher in Migori County than the national average [10]. The need to interrogate the drivers of malaria including the perceptions and misconceptions, and to analyse its direct and indirect burden on

communities, especially women and adolescent girls, has been highlighted [10–12].

Previous studies have shown that community beliefs and behaviours significantly impact the effectiveness of malaria control measures including those aimed at reducing transmission [11–15]. Understanding the knowledge systems and perceptions of communities regarding malaria can inform control strategies and health education messaging and encourage the community's participation in surveillance and control activities [12, 15, 16]. Conversely, misconceptions about malaria transmission, prevention, and treatment can lead to inappropriate healthcare-seeking behaviours and hinder the adoption of preventive measures [16–18]. Coupled with this, lack of or inadequate mainstreaming of gender in the malaria preventive or control strategies may render them inappropriate to different segments of the community [16, 18, 19]. Understanding the gendered and transmission misconceptions that shape malaria healthcare-seeking, knowledge on prevention and transmission, perception of risk and vulnerability, as well as case management at community level is thus essential for designing effective interventions [14, 15, 17, 19, 20].

This paper, therefore, presents evidence from a cross-sectional qualitative study that applied participatory approaches in Migori County, Western Kenya, to provide in-depth understanding of gender related factors in community healthcare-seeking perceptions and practices that would be relevant in shaping malaria elimination policy and programmes (Fig. 1).

Methods

Study design

This study utilized an exploratory qualitative research design to interrogate the malaria healthcare-seeking perceptions and practices in Migori County, Kenya. The study employed a cross-sectional approach where data was collected over a period between June and December 2021. Participatory data collection methods were triangulated as detailed in the subsequent subsection.

Study site

This study was part of a larger project (“An assessment of gender and intersectionality in disease exposure, care-seeking behaviour and treatment pathways in malaria prevention and control in Kenya: a case of Migori County”) and was conducted in 2 sub-counties; Awendo and Suna East, Migori County. Migori County is a multi-ethnic county with the dominant tribes being the Luo, Kuria, Suba, Luhya, Kisii, and the Somali. As per the 2019 census, the county had a population of 1,116,436. The county is one of Kenya's malaria endemic zones with



Fig. 1 Map of Migori county. <https://opencounty.org/county-about.php?com=8&cid=44>

prevalence rates being twice higher than the normal average [10, 21].

The field interviewers, all university graduates, with experience in qualitative research, underwent 1 week training covering the study objectives, qualitative data collection methods, interview guides, and research ethics. A two-day field pretest was conducted to ensure accuracy and reliability of the data collected. The results of the pretest were used to make necessary changes in the study guide before the full study commenced.

Data collection

This cross-sectional qualitative study utilized various methods to explore experiences and how gendered patterns of behaviour influence exposure to mosquitoes, treatment and access to care decisions, highlighting the perceptions and misconceptions of malaria. The study triangulated thirty-one in-depth interviews (IDIs), four focus group discussions (FGDs), six key informant interviews (KIIs), and five process maps. The IDIs targeted community members who were purposively selected to include differentials in gender identity, age, level of education, level of income, occupation, disability status, place of residence (urban/rural), and religion. The six key informant interviews were conducted to provide formative data at the onset of the study and later to triangulate the healthcare-seeking and treatment pathways of malaria as captured from the insider (emic) perspectives of target communities. Four FGDs were conducted separately in equal numbers for each gender identity (men or women), representing rural and urban areas of Migori County, Kenya. The FGDs were held with between 6 and 12 discussants and captured the normative views of the general community in relation to the gender related factors that affect healthcare-seeking perceptions and practices. The KII participants included the key stakeholders in the healthcare sector involved in malaria control at community, county, and national levels.

Ethical considerations

The protocol was approved by the WHO Ethics Review Committee (ERC) and the Kenyatta National Hospital/University of Nairobi Ethics Review Committee (KNH-UoN ERC) in Kenya. Quality assurance procedures were conducted from the beginning of the project to ensure ethical quality data practices. Daily debrief meetings were held to monitor progress, obtain feedback regarding the project, and agree on ways to manage and resolve challenges that arose without negatively affecting laid down project goals and processes. Informed written consent was obtained from all potential participants prior to any data collection with information about the study shared

and questions and concerns addressed by the research team.

Data processing and analysis

All the audio-recorded interviews were downloaded daily to a secure password protected drive. The languages commonly used were Luo and Swahili. Audio recordings were transcribed verbatim and translated into English. Inductive and deductive approaches were applied to code the transcripts and generate themes that guided further steps in the analysis process. Thematic data analysis was utilized, and themes were inductively and deductively generated based on the grounded theory approach [22]. Utilizing the NVivo 14 (QSR International, Lumivero, Denver, USA), the qualitative data was organized into codes and themes to enable deductive unravelling of the community gender related factors affecting healthcare-seeking perceptions and practices. The key themes emergent from the study findings were gender-related similarities and differences in malaria healthcare-seeking perceptions; gender differentials in malaria prevention and treatment practices and the gendered dimensions of malaria healthcare-seeking information. The findings were triangulated across different data sources, including the secondary data from the literature review. These themes have been woven into the findings and discussed in relation to empirical literature in the findings and discussion section.

Results

Socio-demographic characteristics of the study participants

Marital status, ethnicity and religious affiliation

Majority of the respondents, 85% were married, 8% widowed 6% single and only 1% were separated. There were no men who had been divorced or widowed. Most of the respondents were of the Christian faith with 358 (79.7%) cited being protestant and 18.7% (84) citing the Catholic faith, 0.9% (4) cited Muslim and 0.7% (3) mentioned no religion. Luo is the most dominant ethnic group in both households at 81.3% (365), followed by those who were Luhya at 9.6% (43) then the Kisii at 4.9% (43) other ethnicities mentioned were Kalenjin (0.7%), Kamba and Kikuyu (0.4%) Kuria (1.1%) and others (1.6%) as in Table 1.

Level of educational attainment

According to the findings, the majority (33.3%) had attained primary education, while an equal proportion (33.3%) had completed secondary education. A smaller segment (10.4%) had pursued college or diploma-level studies, and only one participant (2.1%) had reached university education. Notably, 6.3% of the participants had

Table 1 Summary of demographic characteristics of study participants

Demographic Variable	Category	Frequency (N = 48)	Percentage (%)
Gender Identity	Men	24	50
	Women	24	50
Age group	20–29	5	10.4
	30–39	12	25.0
	40–49	9	18.8
	50–59	8	16.7
	60–69	7	14.6
	70+	7	14.6
Marital status	Married	33	68.8
	Single	2	4.2
	Widowed	9	18.8
	Separated	2	4.2
	Widower	2	4.2
Occupation	Farming	16	33.3
	Business	5	10.4
	Housewife	3	6.3
	Casual Labourer	3	6.3
	Tailoring	3	6.3
	Other (e.g., Mason, Priest, Teacher, Driver, Mechanic, etc.)	18	37.5
Religion	Christian (SDA)	9	18.8
	Christian (Catholic)	6	12.5
	Christian (Anglican)	4	8.3
	Christian (Roho)	3	6.3
	Christian (Other)	9	18.8
	Islam	1	2.1
Ethnicity	Unspecified	16	33.3
	Luo	40	83.3
	Luhya	3	6.3
	Other	5	10.4
Education level	No School	3	6.3
	Primary	16	33.3
	Secondary	16	33.3
	College/Diploma	5	10.4
	University	1	2.1
	Unspecified	7	14.6
Disability status	No Disability	47	97.9
	Yes (Mobility)	1	2.1

no formal schooling, highlighting potential challenges in health literacy and access to information. Additionally, 14.6% of the participants' education levels were unspecified.

Malaria healthcare-seeking knowledge and perceptions

Knowledge of malaria among the participants is categorized into four main themes: transmission, symptoms, treatment, and prevention. The understanding of these aspects varied notably between men and women who

participated in the study. While most residents had accurate information about the cause of malaria, some held incorrect views. Intersectional factors such as education level and socio-economic status played a crucial role in shaping participants' knowledge and practices related to malaria. Individuals educated to at least the fourth year of high school (referred to as Ordinary level), regardless of gender identity (men or women), demonstrated better understanding of the cause of malaria than those who were illiterate or semi-literate:

While many residents are well-informed, some still believe in myths about malaria transmission due to limited access to accurate information. As a health worker, it's crucial to emphasize that malaria is primarily transmitted through the bite of infected mosquitoes. While misconceptions exist within the community, it's important to educate residents about the true transmission pathways to combat this preventable disease effectively. (Participant 1, KII, Woman)

Participants with lower education levels expressed uncertainty about the role of mosquitoes in spreading malaria, despite understanding that mosquitoes are involved:

Malaria is transmitted by mosquitoes but sometimes we hear that if one is rained on, they can get malaria or if one exposes themselves to the cold. So, we are not sure whether it's mosquitoes because despite using the mosquito net, we just get sick. We are also told that it's the female mosquito that spreads malaria. It starts to bite after 10pm. By 10pm, most people are usually asleep, but they wake up sick. So, we are not so sure whether it's mosquitoes or the rain. (Participant 3, men FGD)

As noted above, some community members believed that being rained on or exposed to cold could also cause malaria, indicating confusion about the disease's transmission mechanisms:

It exposes them to them because they wake up early in the morning when it is still cold and their work involves touching the water in the cold, so the coldness can make them have malaria. (Participant 10, IDI, Woman)

Additional misconceptions about nature and transmission of malaria were expressed in a FGD, when it was mentioned that chlorine, a chemical commonly used for water purification [23] can be used to prevent malaria. This indicates a belief that malaria is transmitted through the consumption of infected water rather than by mosquitoes:

To prevent malaria, there are drugs which the health workers give us here in the village like chlorine, so we put the chlorine in water after we have fetched the water for drinking, so I think if you use it well you will prevent contracting malaria. (Participant 4, men FGD)

Some men work as casual laborers and if they drink just any water. This can make them get malaria (Participant 1, IDI, Woman)

The other erroneous beliefs were that malaria is caused by eating mangoes:

I know it's only caused by mosquitoes, but some people also say it is caused by mangoes. (Participant 8, IDI, Woman)

Beliefs of community members including religion a determining factor of health, informed the Malaria healthcare-seeking behaviours. A prevailing belief among participants suggested that religion held the potential to treat malaria within the community:

We have a religion called 'Roho' church, which when you are sick you go and get prayed for, [to heal] and they say it's not sickness they say its witchcraft. Roho church, if you get sick you are not taken to the hospital, you get prayed for because they believe that when they pray you will get healed. They don't even allow you to take any drugs. (Participant 12, IDI, Woman).

Specific churches or doctrinal teachings emphasized prayer as a means of addressing malaria, advocating for followers to abstain from seeking medical treatment at hospitals and refraining from using conventional medication.

There was traditional superstitious belief especially among women caregivers of older generations that ITNs 'suffocate people'. This resulted in a reluctance to use ITNs limiting individual protection among the aged populations but also posing a broader challenge to caregivers in the community:

I sometimes hang a net over my mother-in-law's bed as she sleeps, but the moment I leave her room, she says she doesn't want these things that suffocate people. She untucks the net and folds it back up. It's very hard to deal with them. (Participant 6, women FGD)

Regarding treatment, there is a consensus on the importance of seeking medical attention. However, some participants still hold onto traditional beliefs and practices. For instance, certain religious groups discourage medical treatment in favour of prayer, viewing sickness because of witchcraft rather than medical condition.

As in the study findings, the understanding by the community that mosquitoes transmit malaria was common among both men and women, with several participants specifically mentioning the female *Anopheles* mosquito as the vector:

Malaria is contracted from mosquito bites, but not all mosquito bites cause malaria, rather it's a

specific type called the female Anopheles mosquito (Participant 3, women FGD)

Looking at malaria, it is caused by mosquito bites, but most people use the bed nets, and no mosquito has bitten them (Participant 6, men FGD)

Dirty environments and water were also reported to contribute to malaria transmission since they are mosquito breeding grounds:

If one stays in a dirty environment where there is dirty water and children play in it, they can get malaria. (Participant 8, IDI, Man)

Men and women demonstrated a basic awareness of malaria symptoms, correctly identifying common symptoms such as fever, chills, headache, and muscle aches. This awareness seemed particularly high among adults aged 30–50 years, who reported prior experiences with the disease either personally or within their families.

Notable is that both men and women were adept at identifying common signs and symptoms of malaria, such as fever, chills, and headache:

When I am bitten even by one mosquito, the next day I will have signs of malaria like fever and feeling unwell. (Participant 2, FGD, Man)

Women were reportedly particularly knowledgeable and vigilant, recognizing and reporting symptoms early due to their caregiving roles and their greater access to healthcare services. An IDI with a woman participant emphasized this significant role of women in malaria healthcare-seeking behaviour as:

Women tend to pay a lot of attention to little details and are caregivers. They can easily notice all the signs of illnesses including malaria. They can easily tell a symptom or a sign because they are keener, they also tend to visit hospitals more than the men. (Participant 10, IDI, Woman)

Gender identity, age and occupation differentials in malaria prevention and treatment practices

There was awareness of various preventive measures especially when involved in agricultural activities, indicative of the shared understanding and communal effort in employing practical methods to reduce malaria transmission.

Further, the study findings pointed to individuals involved in outdoor occupations, such as casual laborers and cattle herders who were mainly men, being more susceptible to malaria due to their increased exposure to mosquito habitats and activity periods:

You can get malaria when you go to the herding and

get rained on in the fields, so you can get malaria through that. (Participant 7, men FGD)

Some participants in contrast noted that women unlike men, while they also often engaged in casual labor, they exhibited a proactive behaviour upon returning home by changing out of their work clothes, thereby mitigating the risk of malaria transmission. However, there was a contrasting pattern among men, who tended to retain their work attire even after returning home and wore them again the following day with the perception that the clothes may still host malaria causing mosquitoes.

If a woman goes to work as a casual labourer, when she returns home, she takes her clothes off and wears clean ones [so she cannot contract malaria] but men, they stay in those clothes and still wear them the following day (Participant 9, IDI, Woman)

Further, from the findings, individuals, particularly farmers, who traversed their community's surrounding areas barefooted, often in the early morning hours on their way to their farms may inadvertently expose themselves to the purported risk of malaria:

Malaria requires one to have heavy clothing. Especially if one wakes up early, they need to wear heavy jackets and socks. Don't go without protecting your chest. I also had my socks on, but I just washed them. We live in a very cold place (Participant 5, IDI, Woman)

Practices by men and women were seen as increasing malaria exposure or prevention. Women attended a lot of community activities that would leave them outdoors for long hours and these were believed to increase their risk of exposure to malaria. Attending burials for instance:

Mostly women attend burials, where they spend the whole night outside in the dark and there are mosquitoes around, so that's when they can be infected with malaria (Women FGD 02).

Also, income generation activities that meant long hours late into the night were seen to expose women to more risk of contracting malaria:

We can get malaria, as women who do business, we could close our businesses at eight o'clock in the evening, and with doing business in an open-air market and the mosquitoes start biting from 5 o'clock in the evening (Women FGD 03)

The participants reported that elderly men might be exposed to malaria due to their social habits and behaviours such as alcohol consumption which involves

spending most of the time outdoors or exposure to rain while returning home, hence increasing their vulnerability. The activities that men participated in, and these were seen as exposing them to malaria, like drinking beer that meant late hours:

Men can get malaria from places where they spend more time like in bars. Most of their time they spend in bars and where there is pool game, so they could spend time in such places till late in the night when mosquitoes can bite them from there (Women FGD, 02).

The study indicated that getting wet in the rain could lead exposure to malaria:

The reason why many elderly men contract malaria more is that sometimes they drink the local beer, and they can be rained on when they are on their way, so that can expose them to malaria (Participant 3, IDI, Woman)

Men often were outdoors, and the spaces were not always free of mosquitoes hence more risk of malaria:

Most of the time, in places where we hang out, like open places where it has not been sprayed with mosquito insecticides then automatically you will get malaria (Participant 16, Man IDI).

As men, after returning home from work, we have places where we rest like in bars where we have drinks as we have our leisure time. We can drink until 11 o'clock at night, so we can be exposed to mosquitoes and get malaria in those places (Men FGD 01)

Notable is that men's drinking was related to inconsistent use of mosquito nets:

Men get malaria when maybe after drinking alcohol and get drunk that they forget to even sleep under a net (Women FGD, 03)

These gender-specific barriers highlight the need for targeted education and distribution strategies that consider the unique needs and concerns of different gender groups while taking into consideration the other intersecting factors.

The preventive measures mentioned included the use of protective clothing, specifically boots, as a means of malaria prevention among farmers:

Personally, I prevent mosquito bites by wearing boots when going to the farm, to protect myself from the cold, so I don't get malaria. Other people also go to the farm with boots, to prevent them from contracting malaria (Participant 11, IDI, Woman).

The perception that getting cold causes malaria is common in the study setting as well as other regions in Kenya. Keeping the environment and homes clean was also another prevention measure that the community practiced to keep off mosquitoes:

Cleanliness is key, if your surrounding is clean, we can't get malaria because our places are clear of bushes so the mosquitoes will go to other places (Men FGD 04).

We try and slash the surroundings and avoid the stagnant water that acts as the breeding place for mosquitoes (Women FGD 03).

From the community perspectives, children tend to play in dirty stagnant water which increased their vulnerability to malaria as captured in the excerpts:

For the children, I think they play in the water at school and the cold is what makes them contract malaria. (Participant 5, KII, Woman)

They play in water [water puddles] which also contribute to malaria because mosquitoes lay eggs in the water which causes malaria. (Participant 4, IDI, Man)

Gendered dimensions of malaria healthcare-seeking information

While awareness existed regarding the importance of insecticide-treated nets (ITNs) for the prevention of malaria, study findings also unravel misconceptions around their use and maintenance. Participants reported variations in how they managed and prepared nets for use, sometimes contrary to recommended guidelines. Notable is the perception of mosquito-net induced itching which leads to washing the nets. Practices by women as the home managers and caregivers were seen to deviate from ITN usage protocols; some reported, for instance, washing them with detergents, and drying in the sun, a practice that reduces the insecticide's effectiveness. The community often ignored the recommendation to dry nets in the shade which is intended to preserve the insecticide efficacy for malaria prevention.

When we were given the nets, we were told to dry them in the shade, but some said that it itches the eyes, so some people wash it with soap and detergent powder, then aired them in the sun, so that is how it would not itch. But I have never done that. (Women FGD 03).

The findings also pointed to the prevalent skepticism about ITNs and their effectiveness for mosquito protection and instead opted to use them for fencing vegetable

farms. T may reflect a lack of trust or understanding of ITNs' protective benefits but underscores the value placed on agriculture within the community:

Some people believe that nets do not protect us from mosquitoes. So, they use it to fence their little vegetable farms. (Participant 8, IDI, Man)

Diverse perceptions and practices related to the prevention of malaria were identified through the in-depth interviews with nearly all participants mentioning the use of mosquito nets when sleeping in places where malaria is present, as a preventive measure:

Looking at malaria, it is caused by mosquito bites, but most people use bed nets, and no mosquito has bitten them. (Participant 10, IDI, Woman)

Notable reluctance was evident in the findings on the use of mosquito nets and bedbug infestation and illness. A perceived association between use of mosquito nets and bedbug infestation and illness was described, which apparently stemmed from bedbugs allegedly becoming more visible whenever nets were in use, which may be related to general hygiene rather than the use of mosquito nets.

We have nets which we were issued with, but you will find someone bringing excuses that the nets are causing sicknesses and increasing bedbugs. (Women FGD 03)

The proactive role of healthcare providers in providing health information through awareness and sensitization forums for malaria prevention measures to the community members whenever they visited the health facilities:

When I go to the hospital, we are taught how I should prevent malaria by keeping my environment clean and sleeping under a mosquito net. (Participant 6, women FGD)

Women were notably more able to access knowledge on malaria during hospital visits, linked to their health-seeking behaviour and their primary caregiving roles that meant more frequent visits to healthcare facilities. As such more women than men had more access to malaria sensitization and knowledge initiatives, manifesting a gendered dimension to health information access as elaborated in the excerpt:

As men, we rarely go to the hospital unless it's necessary. This means we miss out on a lot of important information about things like malaria. It's usually the women who take the kids to the doctor and learn about prevention and treatment. We just don't have

the same opportunities to get that information first-hand. (Participant 2, men FGD)

Interesting was the crucial role that broadcast media, especially radio stations, play in the initial dissemination of malaria-related information. This information was easily accessible and consumed by men compared to women. While women access information through health providers and health facilities, men who had less frequent hospital visits compared to women used the radio more and accessed relevant information on malaria in disseminating health information. This is because the broadcasts serve as an accessible medium for delivering health messages especially to the rural populations and the wider audience, informing them about symptoms such as fever and advising them to seek medical attention.

Community health promoters (CHPs), formerly known as community health volunteers (CHVs) were also key sources of malaria knowledge to the men and women in Migori County through their community outreaches:

I am among the people living in the village...we mainly get information from CHVs in the village. They are the ones who give us information about malaria, and they are also the ones who give us referrals to the nearest health facility when we are sick, here in Marewa health center. (Participant 1, men FGD)

Community health promoters (CHPs) serve as vital links between the community and the healthcare system, providing education about malaria, and its prevention, and offer referrals to health facilities for Malaria diagnosis. The sources of information include broadcast media, particularly radio, which was accessible by many participants, serves as an essential medium for disseminating malaria-related information. The study highlighted that men, who frequent hospitals less often than women, often rely on radio for initial health information. This highlights the importance of utilizing diverse communication channels to reach different demographic groups effectively. Our findings also suggest gender differences in the use of preventive measures such as ITNs. These differences are further intersected with other demographic characteristics including age, education levels and occupational risks. Women, particularly older women, resist using ITNs due to discomfort or misconceptions that they cause suffocation or illness. Other participants, especially those with low education levels, associated these nets with bedbugs while some dried them in the sun,

further hampering the mosquito usage instructions and efficacy. Some community members opt for heavy clothing, which however do not provide comprehensive protection from mosquitoes that may bite exposed areas such as arms and face.

Discussion

This study aimed to explore the gendered factors and their influence on malaria healthcare-seeking perceptions and practices which have a public health implication on malaria control efforts within Migori County, western Kenya and regions of similar socio-cultural and economic contexts. Despite this widespread understanding, there were notable misconceptions among the participants in the study especially pertaining to the causes of malaria and subsequent utilization of preventive practices [6–9, 17, 19]. Some participants incorrectly believed that malaria could be contracted from climatic factors such as cold weather or rain. Some mentioned eating mangoes as a potential cause while others used mosquito nets for alternative purposes including fences. These beliefs can be rooted in cultural practices, anecdotal experiences, or misinterpretations of symptoms and causality. The findings indicate an intersection between community members' health behaviours and livelihood activities [7, 8, 15–17, 19].

Religious practices coexist with conventional medical treatment and even though they do not prevent people entirely from seeking hospital care for malaria, with some people still rely on practices like the use of holy water and prayer for treatment yet others perceive malaria as a simple disease that can be managed with home-based remedies [15, 19, 20].

Gender roles and relations are illuminated in this study to influence malaria healthcare-seeking knowledge, attitudes and practices and the perceptions of risk and vulnerability [7, 8, 15, 19]. The findings reveal significant gender differences in malaria perceptions, with people, both women and men displaying varying levels of knowledge and engagement with preventive measures. The burden of malaria persists despite the ongoing prevention and control interventions over the last two decades with the different malaria endemic and epidemic zones being strategically targeted with a view to eradicate this infectious disease [7, 8, 16, 24].

By identifying gaps in malaria prevention, healthcare-seeking and treatment knowledge and addressing misconceptions, public health initiatives can be better tailored to the needs of the community, ultimately improving the effectiveness of malaria control efforts in the region [7–9].

From the study, hospitals, broadcast media and community health promoters play a crucial role in educating

the residents about malaria prevention and treatment. Health care providers often take the opportunity to educate patients on malaria prevention during hospital visits, with a particular emphasis on the use of ITNs and maintaining clean environments. Different studies have demonstrated that community health workers (CHWs), serve as vital links between the community and health systems, provide continuous education and referrals, especially in rural areas where access to formal healthcare is limited [9, 15, 25, 26]. More women than men have a frequent interaction with healthcare providers which enables them to gain critical knowledge on malaria and implement it within their households [7, 8, 16]. Conversely, men, who visit healthcare facilities less frequently, may not receive the same level of information and education on malaria prevention.

Most participants in this study demonstrated adequate knowledge and awareness on malaria transmission, with men and women correctly identifying mosquitoes, specifically the female *Anopheles* mosquito, as the primary vector for malaria and fever, anxiety and headache as part of malaria symptoms [7, 11]. Corresponding results were reported by a KAP study in Ghana where a striking 99.6% of mothers (280 out of 281) had heard about malaria, indicating a high level of general awareness about the disease [11, 17].

This knowledge was prevalent across various demographic segments, suggesting effective dissemination of basic malaria education. According to Ngalasa et al. [24], universal awareness underscores the effectiveness of previous public health campaigns and educational initiatives in disseminating basic information about malaria to this demographic. Similarly, rural women in Nigeria demonstrated greater awareness of malaria symptoms within their households and ensured that affected individuals received appropriate treatment [27, 28]. Yeka et al. [29] conducted a similar study in Uganda, assessing knowledge, attitudes, and practices towards malaria. They found that women in Ugandan households had more knowledge of malaria symptoms than their men counterparts, likely because women are more involved in household decision-making, especially regarding health. Therefore, gender relations are crucial to consider when designing educational programs on malaria, given the differences noted between the two genders [7, 8, 16, 29, 30].

Previous studies indicate gaps in knowledge that needed to be addressed through targeted interventions [27, 28, 30]. Adum et al. [17] found that a small percentage attributed malaria to too much sun, witchcraft, or other incorrect causes, with 2.5% of mothers not knowing the cause at all. However, other studies have reported different findings. For example, Singh et al. [31] identified

a significant knowledge deficit about malaria transmission among a tribal area of central India. Their study revealed that a substantial portion of the sample population mistakenly believed that malaria could be contracted through contact with contaminated food and water [29]. The findings of this study underscore the importance of targeted and focused educational efforts to correct misconceptions within any given population. They further reflect a need for clearer communication about the specific role of mosquitoes in malaria transmission [16, 28, 29]. By understanding the community's perceptions and misconceptions, stakeholders can design more effective strategies to combat malaria and improve overall public health outcomes in Migori County as well as other malaria endemic areas in Kenya.

Strengths and limitations

Strengths

This exploratory qualitative study offers nuanced in-depth understandings of the gender related factors affecting malaria healthcare-seeking perceptions and practices. These are important in enhancing our understanding of malaria knowledge and perceptions among the populations with different gender dynamics and contribute to the broader discourse on public health interventions specifically tailored to the unique socio-cultural and economic contexts of the region.

Limitations

Firstly, the study relied on self-reported data which may introduce participant bias. Participants might have provided responses they believed, rather than their actual perceptions or behaviours. Secondly, the study's cross-sectional design limits the possibility to draw causal inferences about the relationships between malaria knowledge and healthcare-seeking behaviours. Such qualitative findings provide in-depth perspectives important to inform large scale longitudinal studies to shape policies and intervention. This study provides an in-depth interrogation of how gender roles and relations, age, level of education, beliefs including religion and traditional superstitions as well as occupation influenced the malaria healthcare-seeking knowledge, attitudes and practices and the perceptions of risk and vulnerability, of the community of Migori County, Kenya, important to inform policy and intervention measure in malaria endemic zones.

Conclusion

The study underscores the critical role of targeted educational campaigns and inclusive health policies in addressing malaria effectively. Majority of the participants in this

study have knowledge of malaria signs, symptoms, treatment and prevention of malaria. Gender disparities in malaria knowledge and health-seeking behaviours among the study participants highlight the need for gender-sensitive approaches in public health interventions.

Abbreviations

CHP	Community health promoter
CHW	Community Health Workers
ERC	Ethics Review Committee
FGD	Focus group discussion
IDI	In-depth interview
ITNs	Insecticide-treated nets
KNH	Kenyatta National Hospital
KII	Key informant interview
KAPs	Knowledge attitudes and practices
SSA	Sub-Saharan Africa
WHO	World Health Organization
UoN	University of Nairobi

Supplementary Information

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Supplementary material 1

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Author contributions

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Availability of data and materials

No datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare no competing interests.

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