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Community self-care, prevention practices, and treatment-seeking behaviors related to malaria: a qualitative study grounded in Orem's self-care deficit theory in Malanje, Angola

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Background: Malaria remains a major public health problem in Angola, where sustained transmission persists despite expanded access to preventive and therapeutic interventions. Understanding community self-care practices is essential to improving malaria control in endemic settings.

Objective: To explore community perceptions, prevention practices, and treatment-seeking behaviors related to malaria among residents of the Canâmbua neighborhood, Malanje Province, Angola, using Dorothea Orem's Self-Care Deficit Theory as an analytical framework.

Methods: A descriptive qualitative study was conducted with 28 adult household members selected through convenience sampling. Data were collected through in-depth semi-structured interviews and direct household observation between May and June 2024. Interviews were audio-recorded, transcribed verbatim, and analyzed using thematic content analysis.

Results: Participants demonstrated substantial biomedical knowledge regarding malaria transmission and symptoms. Preventive practices included mosquito net use, environmental sanitation, and elimination of stagnant water. However, consistent implementation of these measures was hindered by discomfort associated with net use, economic constraints, and limited access to antimalarial medicines in public health facilities. Severe malaria manifestations

were occasionally interpreted through sociocultural explanatory models, contributing to delayed care-seeking.

Conclusions: Despite relatively high levels of malaria-related knowledge, significant self-care deficits persist due to structural and health system barriers. Theory-informed, culturally sensitive interventions that strengthen self-care agency and ensure uninterrupted access to diagnosis and treatment are critical for effective malaria control in peri-urban Angolan settings.

KEYWORDS

Angola, community perceptions, malaria, prevention practices, qualitative study, self-care, treatment-seeking behavior

Introduction

The WHO African Region bears a disproportionate share of the global malaria burden, accounting for nearly 90% of cases and deaths, where sustained transmission is exacerbated by fragile health systems and inequitable coverage of preventive and curative interventions. Within this regional context, Angola remains a high-burden, high-mortality setting. In 2024, Angola contributed approximately 2.7% of global malaria deaths and 9.8 million cases, representing 3.5% of all cases worldwide (1).

Malaria remains a leading cause of morbidity and a major contributor to mortality in Angola, disproportionately affecting children under five years of age and pregnant women. This persistent burden highlights the continued severity of malaria in the country, despite sustained control efforts and the adoption of internationally recommended prevention and treatment strategies (1–5).

The epidemiology of malaria in Angola is characterized by pronounced geographical heterogeneity. Transmission intensity varies across provinces and districts as a function of ecological conditions, rainfall patterns, vector density, population mobility, and inequalities in access to health services. Northern and central provinces, including Malanje, experience sustained and often perennial transmission due to favorable environmental conditions for *Anopheles* mosquito breeding and gaps in vector control coverage. Seasonal peaks during the rainy season contribute to recurrent malaria episodes at the household and community levels (6).

Although national malaria control strategies have expanded access to rapid diagnostic tests, artemisinin-based combination therapies, and long-lasting insecticidal nets (LLINs), reductions in malaria mortality have not been accompanied by consistent declines in incidence. This discrepancy suggests that access to biomedical tools alone is insufficient and that individual and household practices related to prevention, symptom recognition, and treatment-seeking play a decisive role in malaria outcomes (6–9).

In this context, Dorothea Orem's Self-Care Deficit Theory provides a relevant conceptual framework for understanding malaria control at the community level. According to Orem,

health is maintained through self-care activities performed by individuals or households to meet self-care requisites, whereas illness occurs when self-care demands exceed an individual's or community's capacity, resulting in a self-care deficit. Applied to malaria, preventive behaviors such as environmental sanitation, consistent mosquito net use, elimination of stagnant water, and timely care-seeking constitute essential self-care actions. When knowledge, resources, or socioeconomic conditions limit the ability to perform these actions, self-care deficits emerge, increasing vulnerability to disease (10).

Evidence from African settings indicates that misconceptions regarding malaria transmission, delayed recognition of symptoms, and reliance on informal or traditional treatments contribute to delayed diagnosis and inadequate prevention, even where biomedical services are available. From an Oremian perspective, these gaps reflect not only deficits in knowledge but also constraints in the capacity to translate knowledge into effective self-care behaviors (7, 8).

Qualitative research methods are particularly well suited to exploring self-care practices and deficits within specific sociocultural contexts. By examining local explanatory models of malaria, qualitative approaches provide in-depth insights into how individuals perceive their responsibilities, capabilities, and limitations in preventing and managing the disease. Despite Angola's high malaria burden, theory-informed qualitative studies examining community self-care capacities remain limited, particularly at the neighborhood level (11).

The Canâmbua neighborhood, located in Zone 2 of Malanje Province, represents a setting where malaria transmission remains a recurrent public health concern, yet empirical evidence regarding how residents understand and enact malaria-related self-care is scarce. Addressing this gap is essential for informing nursing- and community-based interventions aligned with primary health care principles. Therefore, this study aimed to explore community perceptions, prevention practices, and treatment-seeking behaviors related to malaria in the Canâmbua neighborhood, Malanje Province, Angola, using a qualitative approach grounded in Dorothea Orem's Self-Care Deficit Theory.

Methods

Study design

This qualitative study was guided by an interpretivist paradigm aiming to understand community perceptions and self-care practices related to malaria. This approach was selected to capture participants' lived experiences and local explanatory models, consistent with Dorothea Orem's Self-Care Deficit Theory, which emphasizes individual and household capacity to prevent, recognize, and manage illness.

Study setting

The study was conducted in the Canâmbua neighborhood, located in the municipality of Malanje, Malanje Province, in the central-northern region of Angola. The municipality covers an area of approximately 2,422 km², is situated at an average altitude of 1,122 meters above sea level, and is located between 9°32'24.54" S and 16°20'27.46" E (Figure 1) (12). It has an estimated population of 221,275 inhabitants.

According to the Köppen climate classification, the region has a humid tropical climate, characterized by a rainy season lasting approximately 6–7 months (October to April) and a dry season of 5–6 months (May to September). Annual precipitation ranges between 900 and 1,200 mm, with average temperatures between 20°C and 25°C and relative humidity ranging from 65% to 75%. Predominant soil types include Ferralsols and Acrisols in the northern areas, while Luvisols dominate the central and southern zones, with transitional Cambisols also present (13).

Malanje municipality borders Kiwaba Nzogi to the north, Mucari to the east, Cangandala and Mussende (Cuanza Sul Province) to the south, and Cacuso and Calandula to the west. The province is predominantly inhabited by the Kimbundu ethnolinguistic group, although other groups such as Bakongo, Chokwe, and Umbundu are also present.

Zone 2 of the Canâmbua neighborhood, a designated area for community outreach and nursing internships of the University Rainha Njinga a Mbande, was intentionally selected due to its high population density, precarious sanitation, presence of stagnant water, limited access to health services, and recurrent malaria cases reported by local health units. These characteristics are comparable to other peri-urban and rural areas of Malanje Province, supporting the transferability of the findings.

Study population and sampling

Participants were selected using a non-probabilistic convenience sampling strategy. The study sample comprised 28 adult household members residing in the study area. Households were identified with the support of nursing students undertaking community-based internships in primary health care. Data collection continued until thematic saturation was achieved,

defined as the point at which no new analytical categories emerged from the data (11).

Data collection

Data were collected between May and June 2024 through semi-structured interviews and systematic direct observation. Interviews were conducted by four nursing faculty members and one final-year nursing student using a flexible interview guide that allowed participants to elaborate freely on their experiences and perceptions. Interviews were carried out in Portuguese or, when necessary, in Kimbundu by fluent speakers to ensure linguistic and cultural accuracy. All interviews were audio-recorded and transcribed verbatim.

Direct observation was conducted concurrently with the interviews and focused on household environmental conditions and malaria-related practices, particularly the presence, placement, condition, and use of mosquito nets. Observational data were systematically recorded as structured field notes immediately after each household visit. These notes were subsequently integrated into the analytical process through triangulation with interview transcripts, enabling comparison between reported behaviors and observed practices and enhancing the credibility and interpretive rigor of the findings.

Interviews were conducted in participants' homes, lasted approximately 45–60 minutes, and were carried out in Portuguese or, when necessary, in Kimbundu by fluent speakers to ensure linguistic and cultural accuracy. All interviews were audio-recorded, transcribed verbatim, and analyzed using thematic content analysis.

Inclusion and exclusion criteria

Inclusion criteria were: (i) residence in the study area for more than one year; (ii) age 18 years or older; and (iii) voluntary willingness to participate in the study. Individuals who did not meet these criteria were excluded.

Ethical considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Participants received detailed information about the study objectives, procedures, potential risks and benefits, confidentiality safeguards, and their right to decline participation or withdraw at any time. Due to varying literacy levels, verbal informed consent was obtained and documented prior to data collection. All testimonies were randomly anonymized using alphanumeric codes (A1, A2, A3, A4, A5) and no personally identifiable information was collected or reported. Audio recordings and field notes were securely stored and accessed only by authorized members of the research team for the purposes of analysis. Ethical approval was obtained from the Research Ethics Committee involving Human Beings of the University Rainha Njinga a Mbande.

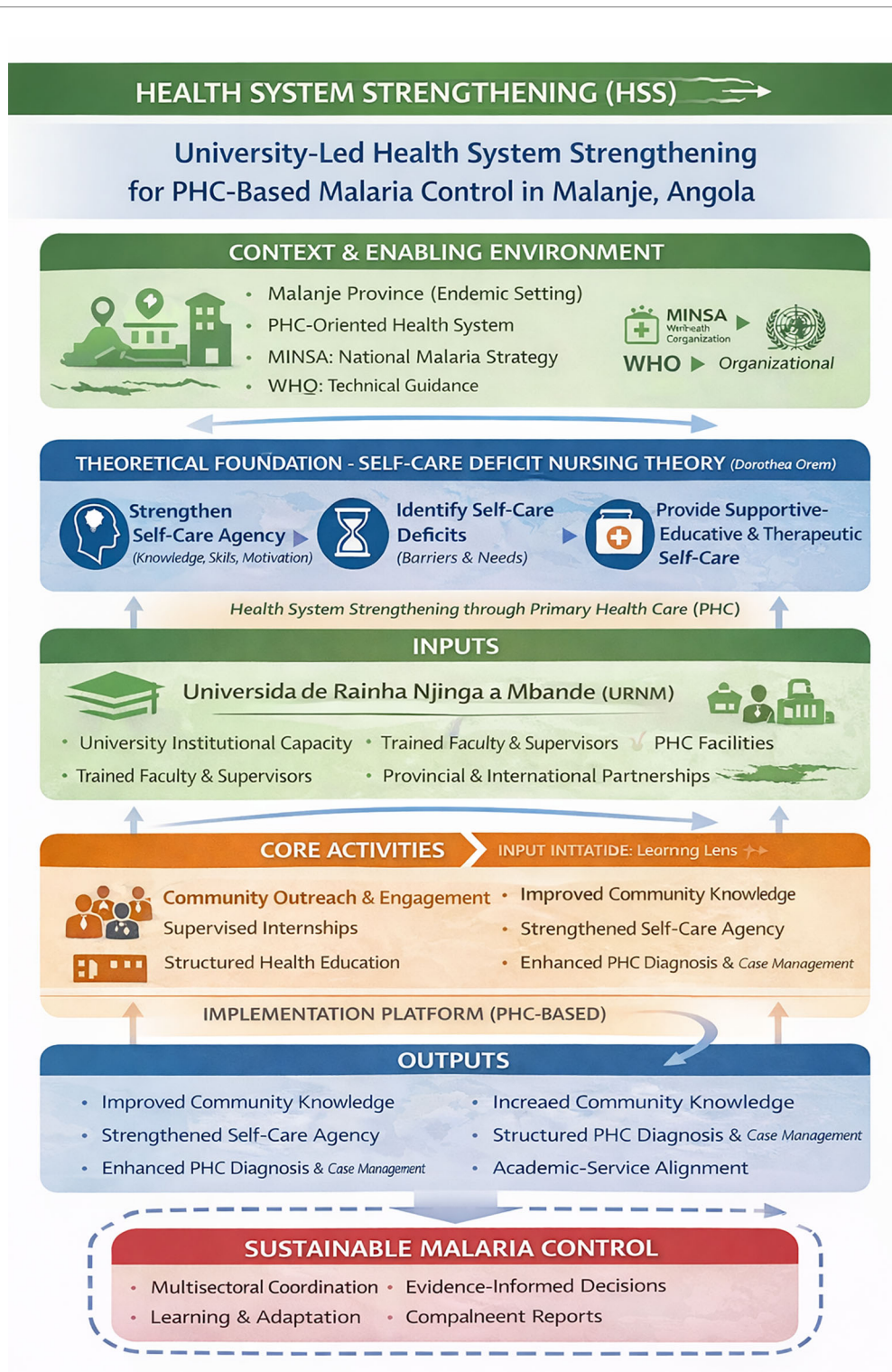


FIGURE 1 Study area map showing the location of Malanje Province in Angola and the Canãmbua neighborhood within the municipality of Malanje.

Data processing and analysis

Interview data were transcribed verbatim and analyzed using thematic content analysis, following established analytical procedures (14). The analytical process comprised three

sequential stages: pre-analysis, material exploration, and treatment and interpretation of results. During the pre-analysis stage, transcripts were subjected to repeated and independent readings to ensure thorough familiarization with the data corpus.

Subsequently, meaningful units were identified and coded inductively. Codes were then compared and grouped into broader thematic categories through a process of constant comparison and analytical refinement. Four main thematic categories emerged from the analysis: knowledge about malaria, manifestations of the disease, malaria prevention and control measures, and knowledge about malaria treatment. The interpreted findings were contextualized in relation to residents' perceptions, observed environmental conditions, malaria control practices, and the local epidemiological context.

Results

Knowledge about malaria

When asked to define malaria, most participants described it as an infectious disease transmitted by mosquito bites and emphasized its severity and potential lethality in the absence of prevention or timely treatment. Malaria was consistently characterized as a significant health concern within the community and was frequently associated with fatal outcomes based on personal or shared experiences, indicating a predominantly biomedical understanding of the disease.

"Malaria is a very dangerous disease. If left untreated, it kills."
(A1, resident, zone 2, Canâmbua neighborhood).

Manifestations of the disease.

Participants demonstrated broad recognition of malaria manifestations, most commonly reporting fever, chills, headache, loss of appetite, joint pain, abdominal pain, vomiting, and a bitter taste in the mouth. These symptoms were generally described in non-specific terms and were associated with what participants considered typical or uncomplicated malaria episodes.

"When a person has malaria, they feel very cold, have a headache, and may vomit."

(A2, resident, zone 2, Canâmbua neighborhood).

When discussing more severe presentations, several participants referred to the local Kimbundu expression *"wassaluka malagi"* to describe cases involving altered mental status or delirium, which were commonly perceived as indicative of complicated malaria.

"We say wassaluka malagi when a person with malaria starts talking nonsense that is hard to understand."

(A1, A2, A3, residents, zone 2, Canâmbua neighborhood).

In a minority of accounts, these manifestations were interpreted through sociocultural frameworks rather than biomedical explanations, with delirium attributed to witchcraft or spiritual persecution.

"Here, when a person starts talking nonsense, there is a sorcerer in the family who is persecuting them."

(A4, resident, zone 2, Canâmbua neighborhood).

Knowledge about malaria prevention measures.

Most participants reported awareness of malaria prevention strategies, including the use of mosquito nets in sleeping areas and on windows, application of repellents and insecticides, environmental sanitation, and elimination of stagnant water around households. These actions were described as routine

measures intended to reduce mosquito exposure and prevent disease transmission.

"We use mosquito nets, we clean around the house, and we try not to leave objects that accumulate water."

(A5, resident, zone 2, Canâmbua neighborhood).

Despite this awareness, some participants reported not using mosquito nets due to discomfort, particularly excessive heat and a sensation of suffocation during sleep. In contrast, other participants indicated that regular mosquito net use was adopted following home visits and health education activities conducted by the research team.

"We don't use mosquito nets because they get too hot and we feel suffocated."

(A3, resident, zone 2, Canâmbua neighborhood).

"After your visits and teachings, we now use mosquito nets in all the rooms."

(A4, resident, zone 2, Canâmbua neighborhood).

Malaria was described as a long-standing health problem affecting multiple generations within the community. The adoption of preventive practices was frequently attributed to health education initiatives, particularly community outreach activities involving students from the University Rainha Njinga a'Mbande.

"This disease worries us a lot because it's not new. We have seen many university students going from house to house, working with some families, and those families have shared the knowledge with others. We think it's a great help from Queen Njinga a'Mbande University."

(A2, A5, residents, zone 2, Canâmbua neighborhood).

Participants also reported inappropriate use of insecticide-treated mosquito nets, including repurposing them for activities unrelated to malaria prevention, such as agriculture, fishing, or recreational purposes.

"Sometimes I feel ashamed. I see the government making efforts to help the population by providing mosquito nets, but people end up using them in inappropriate ways—taking them to the fields, using them for fishing, or placing them on football goalposts."

(A4, resident, zone 2, Canâmbua neighborhood).

Additionally, some participants reported that mosquito nets received during distribution campaigns were sold rather than used for malaria prevention.

"During past campaigns, many people received mosquito nets and, instead of using them, ended up selling them to other people."

(A3, resident, zone 2, Canâmbua neighborhood).

Malaria treatment-seeking practices

Participants consistently reported seeking care at Malanje General Hospital or local health centers following the onset of malaria-related symptoms. However, they indicated that antimalarial medicines were frequently unavailable in public health facilities, necessitating purchase from private pharmacies. The high cost of commonly prescribed antimalarial drugs, such as

Coartem or quinine, was frequently cited and was associated with the use of traditional medicine as an alternative treatment option.

“The situation here is very difficult. When someone has symptoms, we go to hospitals or health centers, but when the test is positive, we are forced to buy the medication from private pharmacies because the hospitals don’t provide it.”

(A5, resident, zone 2, Canâmbua neighborhood).

Overall, participants perceived malaria treatment as ineffective primarily due to the limited availability and high cost of antimalarial medicines in public health facilities, which were frequently associated with reliance on informal markets and traditional treatment practices.

Discussion

This qualitative study examined community knowledge, perceptions, and practices related to malaria prevention and treatment in the Canâmbua neighborhood, Malanje Province, Angola. The findings reveal a complex interaction between biomedical knowledge, lived experience, sociocultural interpretations, and structural constraints. Although participants demonstrated substantial awareness of malaria transmission and prevention, persistent gaps between knowledge and effective practice were evident, reflecting self-care deficits within a context of endemic transmission and health system limitations.

Knowledge and meaning of malaria: biomedical awareness shaped by lived experience

Participants consistently described malaria as an infectious disease transmitted by mosquito bites, indicating broad penetration of biomedical health messages disseminated through national malaria control activities. This finding aligns with Angolan evidence synthesized by Tavares et al. (2022), who demonstrated that although malaria knowledge is widespread, transmission remains intense due to ecological suitability, historical exposure, and uneven implementation of control measures, with parasite demography studies revealing sustained local transmission despite programmatic scale-up.

Similar patterns have been documented across sub-Saharan Africa. Studies from Ghana and Kenya report that communities often possess accurate biomedical knowledge of malaria causation; however, this knowledge is strongly shaped by repeated personal and familial experiences of illness and death (Ahorlu et al.; Mwenesi). This coexistence of biomedical and experiential knowledge is characteristic of high-endemic settings and reinforces the notion that information alone is insufficient to drive sustained behavior change (7, 8).

From the perspective of Dorothea Orem’s Self-Care Deficit Theory, these findings suggest that while self-care requisites—such as knowledge of malaria causes and prevention—are present, self-care agency is constrained by contextual and structural factors that limit individuals’ capacity to consistently perform preventive actions.

Symptom recognition and interpretations of severity

Participants demonstrated broad recognition of common malaria symptoms, including fever, chills, headache, joint pain, and gastrointestinal complaints, consistent with findings from Angolan facility-based and community studies. The description of severe malaria using the Kimbundu expression “*wassaluka malagi*”, associated with delirium or altered mental status, illustrates how biomedical symptoms are interpreted through culturally embedded explanatory models.

Comparable interpretations have been reported in other African contexts. In Tanzania, Mozambique, and Nigeria, severe malaria manifestations have frequently been associated with spiritual or supernatural causation, particularly when neurological symptoms are present, often resulting in delayed biomedical care-seeking. Angolan molecular and epidemiological studies reinforce the clinical relevance of these perceptions. Ljolje et al. (2018) reported ongoing circulation of *Plasmodium falciparum* with resistance-associated markers, including low prevalence of *k13* mutations but signals linked to lumefantrine tolerance, underscoring the importance of early diagnosis and correct treatment to prevent progression to severe disease (15, 16).

These findings highlight the need for culturally sensitive health education strategies that explicitly link severe symptoms to malaria progression, bridging biomedical explanations and local belief systems.

Prevention practices, mosquito net use, and structural constraints

Most participants demonstrated awareness of recommended malaria prevention strategies, including mosquito net use, environmental sanitation, and elimination of stagnant water, reflecting alignment with Angola’s National Malaria Control Programme and WHO-recommended integrated vector control strategies. However, consistent with evidence from Angola and other African countries, knowledge did not consistently translate into sustained preventive practice.

Participants cited discomfort, heat, and feelings of suffocation as barriers to mosquito net use—issues widely reported in tropical African settings. In Angola, Tavares et al. (2022) emphasized that ecological conditions and housing structures often limit effective net use, even in areas with high coverage. Reports of repurposing and resale of insecticide-treated nets mirror findings from other Angolan provinces and across sub-Saharan Africa. Menegon et al. (17), in Uíge Province, highlighted how economic pressures intersect with malaria control, demonstrating that household-level responses to malaria are shaped by broader livelihood constraints. Similarly, Façonny et al. (2012) (18) documented the coexistence of multiple *Plasmodium* species in northern Angola, reflecting intense and complex transmission dynamics that further complicate control efforts.

Across sub-Saharan Africa, evidence indicates that distributed mosquito nets are often repurposed for alternative livelihood and household uses rather than solely for malaria prevention. In fishing communities along Lake Victoria, long-lasting insecticidal nets were used to support fishing and fish drying due to their availability and material characteristics (19). In Burkina Faso, a majority of households reported a variety of alternative uses for old ITNs—such as crop fencing, ropes, and animal protection—following universal distribution campaigns (20). Comparable patterns have been documented in parts of Tanzania, where repurposed nets are used for garden fencing and other non-health purposes (21). These behaviors may reflect structural vulnerabilities that constrain consistent self-care practices and contribute to persistent self-care deficits.

Treatment-seeking behavior and health system limitations

Participants consistently reported seeking care at public health facilities but described frequent unavailability of antimalarial medicines, requiring out-of-pocket purchases from private pharmacies. This finding aligns closely with Angolan peer-reviewed evidence. Ebel et al. (2021) documented historical and ongoing circulation of drug-resistance markers in Angola, highlighting the importance of uninterrupted access to effective first-line therapies and robust surveillance systems.

Similarly, Ljolje et al. (2018) demonstrated that, although artemisinin resistance markers remained uncommon at the time of their study, emerging tolerance-related markers warranted vigilant monitoring—an effort that is undermined when access to effective antimalarial treatment is inconsistent. These Angolan findings are consistent with broader African evidence from the Democratic Republic of Congo (22), Nigeria (23), and Mozambique (24), where recurrent stock-outs and user fees are strongly associated with delayed treatment, incomplete dosing, and reliance on informal or traditional remedies, reflecting systemic constraints rather than individual non-adherence.

Within Dorothea Orem's Self-Care Deficit Theory, such barriers constitute failures of the health system to support therapeutic self-care, resulting in self-care deficits that are primarily attributable to structural and institutional shortcomings rather than individual behavior.

Policy, programmatic, and theoretical implications

Interpreted through Dorothea Orem's Self-Care Deficit Theory, the findings indicate that while communities possess basic self-care knowledge related to malaria, their capacity to act is constrained by limited resources, environmental conditions, and weaknesses within the health system. Effective malaria control in peri-urban Angolan settings therefore requires strategies that extend beyond information dissemination to address the social and structural determinants of prevention and treatment.

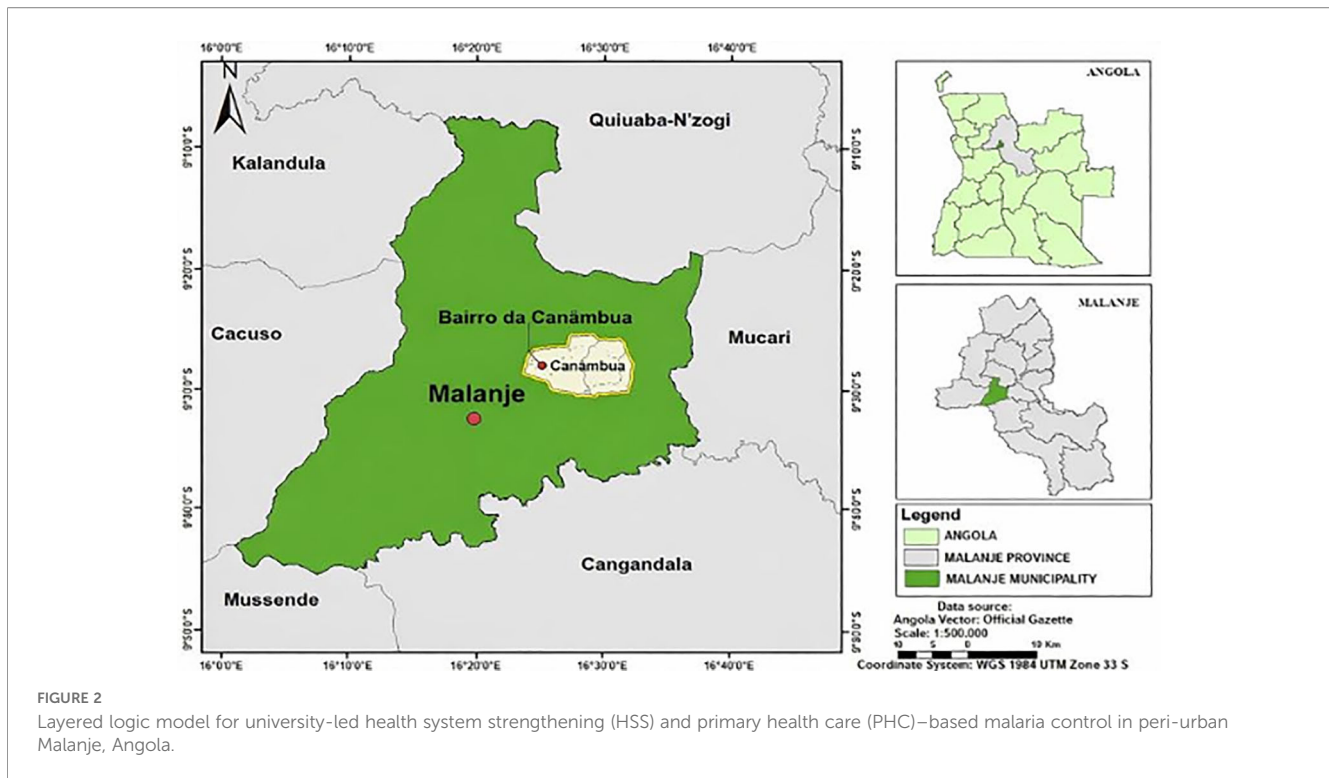
Key policy implications emerging from this study include ensuring the continuous availability of free diagnostic services and antimalarial medicines, supported by ongoing drug-resistance surveillance; strengthening community-based nursing and primary health care interventions explicitly focused on enhancing household self-care capacity; integrating malaria control with broader social protection, housing, and sanitation policies; and embedding culturally sensitive communication strategies that address local explanatory models of severe malaria and promote timely care-seeking.

Universities, through undergraduate and postgraduate health training programs, play a strategic role in advancing these objectives by linking education, service delivery, and research. Community-based internships and outreach activities implemented by health training institutions can reinforce malaria awareness, support behavior change, and strengthen linkages between households and primary health care services. In Malanje Province, the implementation of such interventions is further enabled by the existing Memorandum of Understanding between the Provincial Health Office/MINSA and the World Health Organization, which provides an institutional framework for aligning academic outreach, primary health care activities, and malaria control priorities at the provincial level.

These relationships are integrated into a layered logic model for university-led health system strengthening (HSS) and primary health care (PHC)-based malaria control in peri-urban Malanje, Angola (Figure 2). The model outlines how an enabling policy and governance environment, supported by provincial health authorities and international partners, underpins PHC-oriented malaria control strategies. Grounded by Dorothea Orem's Self-Care Deficit Nursing Theory, the framework operationalizes health behavior change through the identification of self-care deficits and the implementation of supportive-educative and therapeutic self-care interventions. The University Rainha Njinga a Mbande serves as an implementation platform within PHC by mobilizing institutional capacity, supporting the training of health professionals, facilitating community outreach activities, and contributing to operational and implementation-focused evidence generation. These processes are associated with strengthened self-care agency, improved PHC service delivery for malaria prevention, early diagnosis, and case management, and enhanced alignment between academic training and health service provision. Through iterative learning mechanisms and multisectoral coordination, the model is expected to contribute to improved system responsiveness and resilience, thereby supporting sustained reductions in malaria morbidity and mortality in endemic peri-urban contexts.

Strengths and contribution

This study provides in-depth, neighborhood-level qualitative evidence on malaria-related self-care practices in a high-transmission peri-urban setting in Angola. Its theoretical grounding in Dorothea Orem's Self-Care Deficit Theory enhances



analytical depth and supports transferability to similar contexts in sub-Saharan Africa. The integration of community-based nursing education further highlights the applied relevance of the findings.

Limitations

This study is limited by the use of convenience sampling and the context-specific nature of qualitative research, which may restrict generalizability. Social desirability bias may also have influenced participants' responses. Nevertheless, the analytical depth and theoretical grounding enhance the transferability of findings to similar settings.

Conclusions

This study indicates that, despite relatively high awareness of malaria transmission and prevention in the Canãmbua neighborhood, important gaps persist between knowledge and the consistent adoption of effective preventive and treatment practices. These gaps are largely driven by economic constraints, limited access to health services, and structural weaknesses within the health system, which restrict households' ability to translate knowledge into sustained self-care behaviors.

Interpreted through Dorothea Orem's Self-Care Deficit Theory, the findings suggest that malaria control in peri-urban Angolan settings requires more than health information alone. Strengthening self-care agency must be accompanied by targeted actions to reduce

self-care deficits, including reliable access to rapid diagnostic testing, free and effective antimalarial medicines, and the correct and continuous use of mosquito nets.

Final considerations

Universities are integral to HSS, contributing to workforce development, knowledge translation, and community engagement that underpin effective PHC. In this context, the University Rainha Njinga Mbande supports malaria control by integrating community outreach, supervised clinical internships, and structured health education into health professional training, thereby reinforcing PHC-level prevention, early diagnosis, and case management.

From an implementation science perspective, these actions align with Dorothea Orem's Self-Care Deficit Nursing Theory, which provides a practical framework for promoting sustained health behavior change through the identification of self-care deficits and the delivery of supportive-educative interventions. When embedded within PHC services, this approach facilitates the adoption and sustainability of malaria prevention and treatment practices.

Overall, effective and sustainable malaria control in endemic settings such as Malanje Province depends on strengthened coordination among PHC services, academic institutions, and national and international partners. Integrating HSS strategies with theory-informed, behavior-centered approaches is essential to enhance system responsiveness and achieve durable reductions in malaria morbidity and mortality.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Comit e de  tica em pesquisa com seres humanos da Universidade Rainha Njinga a Mbande, CEP/URNM/02/24. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was not obtained from the individual (s) for the publication of any potentially identifiable images or data included in this article because O consentimento foi obtido de forma verbal dos entrevistados e anotados no mesmo processo pelos pesquisadores.

Author contributions

MatG: Investigation, Conceptualization, Methodology, Writing – original draft, Formal analysis, Writing – review & editing. MauG: Writing – review & editing, Conceptualization, Data curation, Formal analysis. JRZ: Writing – review & editing, Investigation, Resources. MLD: Investigation, Writing – review & editing, Conceptualization. BNC: Methodology, Formal analysis, Writing – original draft. FCM: Writing – original draft, Formal analysis, Writing – review & editing. ENMS: Writing – original draft, Formal analysis, Writing – review & editing, Methodology. EE-V: Validation, Funding acquisition, Resources, Investigation, Writing – review & editing, Methodology, Supervision, Formal Analysis, Project administration.

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References

- World Health Organization. *World malaria report 2025*. Geneva: World Health Organization (2025). Available online at: <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2025>.
- U.S. Agency for International Development. *President's Malaria Initiative: Angola malaria profile*. Washington (DC): U.S. Agency for International Development (2024). Available online at: <https://www.pmi.gov/where-we-work/Angola/> (Accessed January 14, 2026).
- Minist rio da Sa de de Angola (MINSa). *Angola regista redu o de mortes por mal ria*. Luanda: MINSa (2023). Available online at: <https://minsa.gov.ao/web/noticias/minsa-Angola-regista-redu%C3%A7%C3%A3o-de-mortes-por-mal%C3%A1ria> (Accessed November 10, 2025).
- World Health Organization Regional Office for Africa. *Angola celebrates World Malaria Day with renewed commitment*. Brazzaville: WHO AFRO (2025). Available online at: <https://www.afro.who.int/pt/countries/Angola/news/Angola-celebra-o-dia-mundial-da-malaria-com-foco-no-compromisso-renovado> (Accessed August 10, 2025).
- Minist rio da Sa de de Angola and Instituto Nacional de Estat stica. *Anu rio Estat stico Sanit rio 2021*. Luanda: MINSa/INE (2021). Available online at: https://ine.gov.ao/Arquivos/arquivosCarregados/Carregados/Publicacao_638375138220811576.pdf (Accessed May 09, 2025).
- Tavares W, Morais J, Martins JF, Scalsky RJ, Stabler TC, Medeiros MM, et al. Malaria in Angola: recent progress, challenges and future opportunities using parasite demography studies. *Malar J.* (2022) 21:396. doi: 10.1186/s12936-022-04424-y
- Ahorlu CK, Dunyo SK, Afari EA, Koram KA. Malaria-related beliefs and behaviour in southern Ghana: implications for treatment, prevention

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Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was used in the creation of this manuscript. During the preparation of this work, the authors used ChatGPT (OpenAI, San Francisco, CA, United States) to create a Layered logic model for university-led health system strengthening (HSS) and primary health care (PHC)–based malaria control in peri-urban Malanje, Angola, improve the language and readability of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the integrity and accuracy of the manuscript. No generative AI tools were used to generate, analyze, or interpret data, or to draw scientific conclusions.

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- and control. *Trop Med Int Health*. (2006) 11:1190–8. doi: 10.1111/j.1365-3156.2006.01681.x
8. Mwenesi HA. Social science research in malaria prevention, management and control in the last two decades: an overview. *Acta Trop*. (2005) 95:292–7. doi: 10.1016/j.actatropica.2005.06.004
9. Mitano F, Ventura AM, Palha PF. Access to health services and malaria treatment in sub-Saharan Africa: implications for equity and disease control. *Health Policy Plan*. (2016) 31:1253–61. doi: 10.1093/heapol/czw060
10. Orem DE. *Nursing: concepts of practice*. 6th ed. St. Louis: Mosby (2001).
11. Green J, Thorogood N. *Qualitative methods for health research*. 4th ed. London: Sage Publications (2018).
12. Pereira G. *Ethnographic map of Malanje*. Luanda: Faculty of Natural Sciences, University Agostinho Neto (2023).
13. Huntley BJ. Soil, water and nutrients. In: Huntley BJ, editor. *Ecology of Angola*. Cham: Springer (2023). 103–128. doi: 10.1007/978-3-031-18923-4_6
14. Bardin L. *Content analysis* Vol. 70. . Lisbon: Edições (2011).
15. Ebel ER, Reis F, Petrov D, Beleza S. Historical trends and new surveillance of *Plasmodium falciparum* drug resistance markers in Angola. *Malar J*. (2021) 20:175. doi: 10.1186/s12936-021-03713-2
16. Ljolje D, Dimbu PR, Kelley J, Talundzic E, Lucchi N, Plucinski M, et al. Prevalence of molecular markers of artemisinin and lumefantrine resistance among patients with uncomplicated *Plasmodium falciparum* malaria in three provinces in Angola, 2015. *Malar J*. (2018) 17:84. doi: 10.1186/s12936-018-2233-5
17. Menegon M, Pearce RJ, Inojosa WO, Pisani V, Abel PM, Matondo A, et al. Monitoring for multidrug-resistant *Plasmodium falciparum* isolates and analysis of pyrimethamine resistance evolution in Uíge Province, Angola. *Trop. Med. Int. Health*. (2009) 14:1251–1257. doi: 10.1111/j.1365-3156.2009.02369.x
18. Façoncy C, Gamboa D, Sebastião Y, Hallett R, Sutherland C, Sousa-Figueiredo JC, et al. Various *pfprt* and *pfmdr1* genotypes of *Plasmodium falciparum* cocirculate with *P. malariae*, *P. ovale* spp., and *P. vivax* in northern Angola. *Antimicrob Agents Chemother*. (2012) 56:5271–5277. doi: 10.1128/AAC.00559-12
19. Minakawa N, Dida GO, Sonye GO, Futami K, Kaneko S. Unforeseen misuses of bed nets in fishing villages along Lake Victoria. *Malar J*. (2008) 7:165. doi: 10.1186/1475-2875-7-165
20. Hien AS, Hien H, Bacyè FY, Badolo H, Tiono A, Diallo CO, et al. What happens to old insecticide-treated nets after household use in Burkina Faso? *Malar J*. (2024) 23:350. doi: 10.1186/s12936-024-05181-w
21. Msangi SJ, Mponzi WP, Muyaga LL, Nkya JD, Mwalugelo YA, et al. Challenges of proper disposal of old long-lasting insecticidal nets and their alternative uses in rural south-eastern Tanzania. *PLoS One*. (2024) 19:e0279143. doi: 10.1371/journal.pone.0279143
22. Carrel M, Kim S, Mwandagalirwa MK, Mvuama N, Bala JA, Nkalani M, et al. Individual, household and neighborhood risk factors for malaria in the Democratic Republic of the Congo support new approaches to programmatic intervention. *Health & Place*. (2021) 70:102581. doi: 10.1016/j.healthplace.2021.102581
23. Onwujekwe O, Hanson K, Uzochukwu B. Inequities in the use of malaria preventive measures and treatment-seeking behaviour in Nigeria. *Malar J*. (2010) 9:145. doi: 10.1186/1475-2875-9-145
24. Galatas B, Saúte F, Martí-Soler H, Guinovart C, Nhamussua L, Simone W, et al. A multiphase program for malaria elimination in southern Mozambique (the Magude project): A before-after study. *PLOS Med*. (2020) 17:e1003227. doi: 10.1371/journal.pmed.1003227