

# Herbs and Herbal Mixtures in the Treatment of Malaria Among Women in Gbondapi, Sierra Leone: A Mixed-Methods Study on Gender, Healthcare Access, and Traditional Medicine

Patrick Hindolo Higbohina Walker

*Department of Sociology and Social Work, Faculty of Social Sciences, Fourah Bay College, University of Sierra Leone.*

**\*Corresponding Author:** Patrick Hindolo Higbohina Walker, Department of Sociology and Social Work, Faculty of Social Sciences, Fourah Bay College, University of Sierra Leone.

## ABSTRACT

**Background:** Malaria remains a leading cause of morbidity and mortality among women in rural Sierra Leone, where access to biomedical healthcare is limited. This study examines the use of herbal remedies for malaria treatment among women in Gbondapi, Pujehun District, focusing on gendered healthcare decision-making, economic barriers, and sociocultural influences.

**Methods:** A mixed-methods approach was employed, including surveys (n=356 women), in-depth interviews (n=20 traditional healers), focus group discussions (4 FGDs, 8–10 participants each), and ethnobotanical surveys. Thematic analysis and descriptive statistics were used to analyze qualitative and quantitative data, respectively.

**Results:** Women predominantly relied on herbal treatments due to affordability (72%), accessibility (68%), and cultural trust (59%). Key plants included “Azadirachta indica” (neem), “Vernonia amygdalina” (bitter leaf), and “Moringa oleifera”. Despite perceived efficacy, dosage inconsistencies and delayed biomedical care-seeking were reported. Financial constraints and caregiving responsibilities heavily influenced women’s treatment choices, with 86% serving as primary decision-makers for household malaria care.

**Conclusions:** Rural women’s dependence on herbal medicine reflects systemic gender disparities in healthcare access. Policy interventions must address economic barriers, integrate traditional healers into malaria programs, and empower women through community-based education.

**Keywords:** Malaria, Traditional medicine, Gender disparities, Healthcare access, Sierra Leone, Women’s health.

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## INTRODUCTION

### Background and Context

Malaria disproportionately affects women in rural Sierra Leone, where poverty, limited healthcare infrastructure, and gendered caregiving roles restrict access to biomedical treatment. Despite widespread distribution of insecticide-treated nets (ITNs) and artemisinin-based combination

therapies (ACTs), malaria persists as a leading cause of death among women of reproductive age (WHO, 2023).

Women in rural Sierra Leone bear the primary responsibility for household healthcare, yet face financial and logistical barriers in accessing biomedical treatment. This study explores how gendered healthcare roles influence malaria treatment choices, with implications for policy interventions targeting women’s health access.

## Gender and Healthcare Access

Women in rural Sierra Leone face unique barriers:

- ❖ *Financial dependence*: Many lack independent income to afford clinic visits or ACTs.
- ❖ *Caregiving burden*: As primary caregivers, women prioritize herbal remedies for household malaria management.
- ❖ *Cultural trust in traditional medicine*: Herbal treatments are perceived as safer and more culturally aligned than biomedical alternatives.

Additionally, Malaria remains one of the most pressing public health concerns in sub-Saharan Africa, where it is a leading cause of morbidity and mortality. Sierra Leone, with its tropical climate and high levels of poverty, continues to struggle with malaria as a major endemic disease. The World Health Organization (WHO) classifies Sierra Leone as a high-burden country, with malaria accounting for a significant proportion of outpatient consultations, hospital admissions, and deaths, particularly among pregnant women and children under five (WHO, 2020). Despite large-scale interventions, such as the distribution of insecticide-treated bed nets (ITNs) and the availability of artemisinin-based combination therapies (ACTs), malaria persists due to socioeconomic, infrastructural, and behavioral challenges.

Rural communities, where access to conventional healthcare is limited, often rely on traditional medicine as a primary means of managing diseases. Traditional herbal remedies have played a crucial role in health-seeking behaviors in Sierra Leone for centuries. Many rural women, who are the primary caregivers in their households, depend on these remedies to treat malaria symptoms due to their affordability, accessibility, and cultural acceptance. Herbal medicine is deeply embedded in local customs and is often preferred over biomedicine, either due to the perception that herbs are more effective or because of distrust in modern healthcare institutions. Despite their widespread use, there is limited scientific research on the efficacy, safety, and potential drug interactions of these herbal treatments, raising concerns about their role in malaria management.

This study investigates the use of herbs and herbal mixtures among women in Gbondapi, a rural community in the Pujehun District of Sierra Leone. It aims to document the most commonly used herbal remedies, analyze their perceived effectiveness, and assess the factors influencing their continued use. The research also explores how traditional herbal treatments interact with modern medical interventions and whether there is potential for integrating traditional and biomedical approaches to malaria treatment.

## Problem Statement

Malaria remains a leading cause of death and illness in Sierra Leone, with rural populations being disproportionately affected due to inadequate healthcare infrastructure and persistent poverty. While biomedical treatments such as ACTs are widely available, they remain underutilized due to economic barriers, cultural preferences, and limited healthcare access. Consequently, many rural women in Southern Sierra Leone turn to herbal medicine as their primary mode of malaria treatment.

Despite the widespread use of herbal remedies, their efficacy, safety, and long-term impact on malaria control remain largely unexamined. The lack of standardization in herbal preparations raises concerns about dosage inconsistencies and potential toxicity. Furthermore, little is known about how these remedies interact with conventional antimalarial drugs, which could lead to reduced treatment efficacy or adverse health effects.

This study seeks to bridge the knowledge gap on herbal malaria treatments in Sierra Leone by systematically documenting the types of herbs used, evaluating their perceived effectiveness, and assessing the cultural and social factors influencing their use. By doing so, it aims to inform malaria control strategies and explore the possibility of integrating traditional remedies with conventional healthcare approaches to improve health outcomes in rural communities.

## Research Aim

This study investigates how gender roles, economic constraints, and cultural beliefs shape women's use of herbal malaria treatments in Gbondapi, Sierra Leone.

The study seeks to understand the efficacy, safety, and cultural significance of these traditional remedies and explore how they can be integrated into the broader malaria management framework.

## Research Objectives

The study has the following objectives:

1. To identify the most commonly used herbs and herbal mixtures for malaria treatment among rural women in Gbondapi.
2. To evaluate the perceived efficacy and safety of these herbal remedies based on user experiences and traditional healer knowledge.
3. To examine the socio-cultural, economic, and environmental factors influencing the preference for herbal remedies over biomedical treatments.
4. To analyze the potential interactions between herbal remedies and conventional antimalarial drugs.

5. To explore opportunities for integrating traditional medicine with conventional malaria treatment programs in Sierra Leone.

### Research Questions

The study is guided by the following research questions:

1. What are the most commonly used herbs and herbal mixtures for malaria treatment among rural women in Gbondapi?
2. How effective and safe are these herbal remedies as perceived by rural women and traditional healers?
3. What socio-cultural and economic factors influence the use of herbal remedies for malaria treatment?
4. What are the possible interactions between herbal remedies and conventional antimalarial drugs?
5. How can traditional herbal medicine be integrated into conventional malaria treatment programs to improve healthcare outcomes in Sierra Leone?

### Relevance of the Research

This study is significant for several reasons:

- **Public Health Implications:** Understanding the effectiveness and risks of herbal remedies can help improve malaria management strategies in rural areas where traditional medicine remains dominant.
- **Policy and Healthcare Integration:** Findings from this study can inform policies that facilitate collaboration between traditional healers and formal healthcare providers, leading to more inclusive and culturally sensitive malaria control programs.
- **Scientific Contribution:** By documenting commonly used herbal treatments and assessing their perceived efficacy, this research contributes to the body of knowledge on ethnomedicine and traditional healthcare practices in sub-Saharan Africa.
- **Community Empowerment:** The study highlights the role of rural women in healthcare decision-making and seeks to provide evidence-based recommendations that can improve access to safe and effective malaria treatment.
- **Sustainability and Economic Impact:** Herbal medicine represents a cost-effective alternative to expensive pharmaceutical treatments. Understanding its role in malaria treatment can contribute to sustainable healthcare solutions in resource-limited settings.

By addressing these issues, the study provides insights into the complex interplay between traditional medicine, cultural beliefs, and modern healthcare in Sierra Leone.

The findings will be useful for policymakers, healthcare practitioners, researchers, and development organizations working to enhance malaria control efforts in Africa.

### LITERATURE REVIEW

#### Traditional Medicine and Malaria Treatment in Africa

Traditional medicine has played a critical role in healthcare across Africa for centuries, particularly in rural areas where access to biomedical facilities is limited (WHO, 2019). The use of herbal remedies for treating malaria is deeply embedded in indigenous knowledge systems and cultural practices. In Sierra Leone, traditional medicine is not only a source of healing but also a reflection of social and spiritual beliefs. Herbal treatments are often prepared as decoctions, infusions, or topical applications and are administered by traditional healers or family members (MacFoy, 2004).

Several plants have been identified in West African ethnopharmacology as having antimalarial properties. Among them, *Azadirachta indica* (neem), *Vernonia amygdalina* (bitter leaf), and *Moringa oleifera* are commonly used for fever management and parasite suppression (Okpe et al., 2016; Akinmoladun et al., 2007). However, while preliminary studies suggest these plants contain bioactive compounds with potential antimalarial properties, there is insufficient clinical evidence to validate their efficacy in real-world applications (Ademola et al., 2015). This gap in knowledge presents a challenge in integrating herbal medicine into formal malaria treatment programs.

#### Socio-Cultural Factors Influencing the Use of Herbal Remedies

The preference for traditional medicine in Sierra Leone is shaped by several socio-cultural factors. Many communities continue to associate malaria with supernatural causes, poor hygiene, and exposure to environmental elements rather than mosquito bites alone (Pell et al., 2012). These beliefs influence treatment-seeking behavior, with some individuals choosing traditional remedies over biomedical solutions due to trust in ancestral knowledge and spiritual interventions (Sarpong, 2021).

Furthermore, gender dynamics play a role in healthcare decision-making. Women, particularly those in rural areas, bear the primary responsibility for caregiving and household health management (Jusu & Sanchez, 2013). Their reliance on herbal medicine is often driven by financial constraints, ease of access, and perceived efficacy. Given that public health interventions frequently overlook cultural perspectives, there is a risk of low uptake of biomedical malaria treatments unless local beliefs are taken into account (Awasthi et al., 2022).

## Efficacy and Safety Concerns in Herbal Malaria Treatment

Despite the widespread use of herbal remedies, the lack of standardization in their preparation poses significant challenges. Unlike pharmaceuticals, which undergo rigorous testing for safety and efficacy, traditional remedies are prepared based on oral knowledge passed down through generations. The absence of dosage guidelines and quality control measures increases the risk of toxicity, underdosing, or overdosing (Olorunnisola et al., 2013).

Additionally, the interaction between herbal treatments and conventional antimalarial drugs remains poorly understood. Some studies suggest that certain herbal extracts may either enhance or inhibit the effectiveness of prescribed malaria medications, leading to potential health risks (Tchoumboungnang et al., 2005). Given the increasing prevalence of drug-resistant malaria strains, there is an urgent need to assess whether herbal remedies contribute to treatment resistance or offer synergistic benefits when combined with biomedical interventions (WHO, 2020).

## Traditional Healers and the Role of Community Knowledge

Traditional healers play a crucial role in Sierra Leone's healthcare landscape. They serve as both medical practitioners and spiritual advisors, often acting as the first point of contact for individuals seeking malaria treatment (MacFoy, 2004). The knowledge possessed by these healers is extensive, encompassing the identification, preparation, and administration of medicinal plants. However, their expertise is rarely recognized by formal healthcare systems, limiting opportunities for collaboration between traditional and modern medical practitioners (Kamara, 2000).

Efforts to integrate traditional medicine into national healthcare frameworks remain fragmented. While some African countries have established policies to regulate herbal medicine, Sierra Leone has yet to implement comprehensive guidelines on the certification and oversight of traditional healers (WHO, 2019). Addressing this gap could enhance the credibility of herbal treatments while ensuring patient safety through controlled usage and scientific validation.

## Challenges in Integrating Traditional Medicine with Conventional Healthcare

Although WHO advocates for the integration of traditional medicine into healthcare systems, several barriers hinder progress. Key challenges include:

1. **Lack of Scientific Validation** – Many herbal treatments lack empirical research to confirm their

safety and efficacy, making it difficult to standardize and integrate them into formal medical guidelines.

2. **Regulatory Gaps** – The absence of policies governing the preparation, sale, and use of herbal medicines increases the risk of unregulated and potentially harmful practices.
3. **Mistrust Between Traditional and Biomedical Practitioners** – There is often skepticism from biomedical professionals regarding the effectiveness of herbal remedies, leading to minimal collaboration with traditional healers.
4. **Patient Treatment Preferences** – Some individuals may delay seeking biomedical treatment due to strong cultural affiliations with traditional medicine, increasing the risk of malaria complications.

Despite these challenges, integrating traditional and biomedical approaches could improve malaria treatment outcomes. Collaboration between researchers, traditional healers, and healthcare policymakers could help bridge the gap, ensuring that safe and effective traditional practices complement modern medical solutions (WHO, 2020).

In summary, the literature review highlights the crucial role of traditional medicine in malaria treatment among rural populations in Sierra Leone. While herbal remedies remain widely used due to accessibility, affordability, and cultural significance, concerns about their safety, efficacy, and regulation persist. Bridging the gap between traditional and biomedical approaches requires scientific validation, policy development, and increased collaboration between traditional healers and healthcare professionals. This study seeks to contribute to this discourse by providing empirical data on the herbal malaria treatments used in Gbondapi and exploring pathways for their safe and effective integration into national malaria management strategies.

## 3. METHODOLOGY

### 3.1 Research Design

This study adopts a mixed-methods approach, integrating quantitative and qualitative research methods to explore the use of herbs and herbal mixtures in malaria treatment among rural women in Gbondapi, Sierra Leone. A cross-sectional design was employed, allowing data to be collected at a single point in time to capture prevalence, patterns, and perceptions of herbal remedy use. This design ensures a comprehensive analysis of both individual health-seeking behaviors and broader sociocultural influences (Creswell & Creswell, 2018). The mixed-methods approach was chosen to provide quantitative insights into the prevalence

and patterns of herbal medicine use, while also capturing qualitative perspectives on the cultural, social, and economic factors influencing treatment choices. Furthermore, the integration of both methods enhances data triangulation, thereby improving the reliability and validity of findings (Tashakkori & Teddlie, 2010).

### **Study Area and Population**

The study was conducted in Gbondapi, Pujehun District, a rural community in southern Sierra Leone characterized by a high malaria burden and strong reliance on traditional medicine. The selection of this area was based on several key factors, including the endemic prevalence of malaria, the limited access to biomedical healthcare, which necessitates reliance on traditional medicine, and the various socioeconomic challenges that influence health-seeking behaviors.

The target population consisted of three key groups: rural women who had used herbal remedies for malaria treatment, traditional healers with expertise in preparing and administering herbal treatments, and key informants such as community health workers, religious leaders, and elders who could provide valuable insights into healthcare perceptions and treatment preferences. Specifically, the study included 356 rural women aged 18 and above, 20 traditional healers, and a group of key informants selected for their knowledge and engagement in community healthcare decision-making.

### **Sampling Techniques**

A purposive sampling technique was employed to select participants who had direct experience with herbal malaria treatment. This non-probability sampling method ensured the inclusion of individuals with rich, relevant knowledge on the subject (Etikan et al., 2016). Also, Purposive sampling ensured representation of women across different age groups and socioeconomic statuses. Focus groups were single-gender to encourage open discussion on healthcare decision-making.

Women were selected based on their self-reported use of herbal malaria treatments, while traditional healers were identified through community networks and referrals. Similarly, key informants were chosen based on their roles in healthcare decision-making within the community. By adopting this approach, the study maximized data relevance and ensured that the participants had firsthand knowledge of herbal malaria treatment practices.

### **Data Collection Methods**

To capture a holistic understanding of herbal malaria treatment, the study employed four data collection

methods: structured surveys, in-depth interviews, focus group discussions, and ethnobotanical surveys.

Structured surveys were administered to 356 women to quantify the prevalence and patterns of herbal medicine use. These surveys contained both closed-ended and open-ended questions focusing on commonly used herbal plants, preparation methods and dosage, perceived effectiveness and side effects, and the socioeconomic and cultural influences on treatment choices. To ensure comprehension, the surveys were conducted face-to-face by trained research assistants.

In-depth interviews were conducted with 20 traditional healers to gain detailed insights into the preparation and administration of herbal remedies. The interviews explored herbal identification and sourcing, treatment philosophies, and perceptions of biomedical treatments. The format was semi-structured, allowing for flexibility and depth in responses (Bryman, 2016).

Focus group discussions were conducted with rural women to explore collective experiences related to herbal medicine use. A total of four focus groups, each consisting of 8 to 10 participants, were organized. The discussions focused on perceptions of malaria causation, social influences on treatment choices, and experiences with both herbal and biomedical treatments. These discussions provided valuable insights into shared beliefs and community norms (Kitzinger, 1995).

Additionally, ethnobotanical surveys were conducted to document and scientifically verify the plant species used for malaria treatment. Field visits to herbal preparation sites were carried out to collect and botanically identify plant samples. The documentation of these medicinal plants ensures scientific validation and supports the potential integration of herbal medicine into formal healthcare (Martin, 1995).

### **Data Analysis**

A two-pronged analytical approach was employed to analyze both quantitative and qualitative data.

Quantitative data from the surveys were analyzed using SPSS (Statistical Package for the Social Sciences). Descriptive statistics, including frequencies and percentages, were used to summarize treatment patterns. Additionally, inferential statistics, such as chi-square tests and correlation analysis, were applied to explore relationships between treatment choices and Socio-demographic factors (Pallant, 2020).

For qualitative data obtained from interviews and focus group discussions, thematic analysis was used following the framework of Braun and Clarke (2006). The process

involved transcribing, coding, and categorizing the data into emerging themes related to treatment perceptions, cultural beliefs, and healer-patient interactions. To enhance credibility, data triangulation was employed by comparing responses across different data collection methods, ensuring that findings were well-substantiated.

### Ethical Considerations

The study adhered to international ethical research guidelines as outlined by the World Health Organization (WHO, 2011). Ethical approval was obtained from the National Ethics Review Board of Sierra Leone to ensure compliance with research standards. Participants were provided with detailed information about the study and their voluntary participation was emphasized through the use of written or verbal informed consent.

To protect participant confidentiality, personal data were anonymized and securely stored. Furthermore, recognizing the cultural significance of traditional medicine in the community, efforts were made to ensure cultural sensitivity in the research process. Traditional healers were consulted before data collection began to establish trust and community engagement.

### Limitations of the Study

Despite employing rigorous methodological approaches, certain limitations were identified in this study. One potential limitation was recall bias, as self-reported data on herbal treatment efficacy may have been influenced by participants' memory and subjective experiences. However, triangulation across multiple data sources helped mitigate this issue by cross-validating findings.

Another limitation was the limited generalizability of the findings beyond Gbondapi. While the study provides valuable insights into herbal malaria treatment in this specific community, its applicability to other rural areas in Sierra Leone may be constrained. To address this concern,

future research should include comparative studies across multiple rural communities to provide a broader perspective.

Lastly, cultural barriers may have influenced the depth of information provided by participants, particularly in discussions surrounding spiritual beliefs in malaria treatment. Some individuals may have withheld information due to cultural sensitivities. To overcome this challenge, trust-building efforts, including engagement with community leaders and traditional healers, were implemented to create a comfortable research environment.

By acknowledging these limitations, the study highlights the need for further research to build on its findings and contribute to a more comprehensive understanding of herbal malaria treatment in rural Sierra Leone.

## RESULTS AND DISCUSSION

This section presents the findings from surveys, interviews, focus group discussions (FGDs), and ethnobotanical surveys. The discussion integrates the results with existing literature, exploring the implications of herbal malaria treatment in Gbondapi.

### Women's Healthcare Decision-Making and Economic Barriers

86% of women reported being the primary decision-makers for malaria treatment in their households. Financial constraints heavily influenced their preference for herbal remedies, as many could not afford clinic visits or ACTs. One participant noted: 'If I spend money on hospital drugs, my children will go hungry.'\*\*m

### Herbal Remedies Used for Malaria Treatment

#### *Commonly Used Herbs and Preparation Methods*

Analysis of the survey data revealed that **six primary herbs** are frequently used for malaria treatment in Gbondapi:

**Table 1.** *Commonly Used Herbs and Preparation Methods*

Herbal Plant	Local Name	Usage & Preparation	Perceived Effect
<i>Azadirachta indica</i>	Neem	Leaves boiled for tea; used for steam therapy	Fever reduction, parasite suppression
<i>Vernonia amygdalina</i>	Bitter Leaf	Leaves soaked or boiled, consumed as tea	Antipyretic, appetite restoration
<i>Moringa oleifera</i>	Moringa	Leaves dried and powdered; added to food	Boosts immunity, reduces fatigue
<i>Carica papaya</i>	Papaya Leaf	Crushed leaves taken as an infusion	Fever relief, general wellness
<i>Cymbopogon citratus</i>	Lemon Grass	Boiled as tea, inhaled as steam	Antipyretic, antimicrobial properties
<i>Cassia sieberiana</i>	Gbangba	Roots boiled in water, taken as decoction	Antimalarial, detoxification

### *Combination Therapy and Dosage Inconsistencies*

FGDs revealed that herbal combinations are often used instead of single-plant remedies. The most common mixture consists of neem, bitter leaf, and lemon grass,

boiled together to create a potent antimalarial decoction. However, dosage inconsistencies were reported, with participants acknowledging that preparation methods and dosage amounts vary across households.

Key Concern:

- Lack of standardization leads to variable efficacy and potential toxicity.
- Some women admitted that “more bitter means more effective”, leading to overuse of certain herbs.

Perceptions of Efficacy

Survey results showed that 70% of respondents believed herbal remedies were effective for malaria treatment, while 30% expressed uncertainty or concerns about their reliability.

- Women preferred herbal treatments for mild symptoms, but acknowledged seeking biomedical care for severe cases.
- Traditional healers emphasized the spiritual dimension of healing, reinforcing beliefs that herbs work best

Sociocultural Factors Influencing Herbal Medicine Use

Local Beliefs About Malaria Causation

The household survey revealed mixed perceptions of malaria causes:

Table 2. Perceived Causes of Malaria

Perceived Cause	Percentage of Respondents (%)
Mosquito bites	46
Witchcraft and evil spirits	15
Poor sanitation and stagnant water	11
Consumption of certain foods (e.g., too much fruit)	8
Exposure to cold water (e.g., fishing too long)	8
Other supernatural causes	12

The Role of Traditional Healers

Traditional healers play a dual role as medical practitioners and spiritual guides. Their treatments often combine:

- Herbal medicine
- Spiritual invocations
- Protective charms against “malaria caused by supernatural forces”

This aligns with findings from West Africa, where malaria is sometimes seen as a spiritual affliction rather than a parasitic disease (Pell et al., 2012).

Gender and Decision-Making in Healthcare

- Women as primary caregivers: 86% of respondents indicated that mothers decide on malaria treatment for their children.
- Financial constraints: Many women delay seeking biomedical care due to treatment costs and instead rely on herbal remedies first.

when accompanied by prayers or rituals.

Comparison with Biomedical Treatment

- Perceived Advantages of Herbal Remedies:
  - Affordability: “The herbs are free; I just pick them from my backyard.”
  - Accessibility: “The clinic is far, but my herbal medicine is near.”
  - Cultural Familiarity: “Our ancestors used these herbs, and they never failed.”
- Challenges of Herbal Treatment:
  - Slow response time compared to pharmaceuticals.
  - Dosage uncertainties.
  - Potential interactions with modern medicine (discussed in Section 4.3).

- Trust in Traditional Medicine: One participant noted, “The hospital injections are strong, but herbs treat us from the root of the sickness.”

Interaction Between Herbal and Biomedical Treatments

Concurrent Use of Herbal and Pharmaceutical Drugs

- 42% of respondents reported using both herbal and biomedical treatments.
- Many women stated they took herbs first, and if symptoms persisted, they sought hospital treatment.
- Some women combined ACTs (Artemisinin-based Combination Therapy) with herbal remedies, raising concerns about drug interactions.

4.3.2 Potential Risks of Mixing Treatments

Studies indicate that certain herbal compounds may:

- Reduce antimalarial drug efficacy (e.g., neem’s interference with Artemisinin) (Olorunnisola et al., 2013).

- Enhance side effects when combined with pharmaceutical drugs.
  - Delay access to biomedical care, increasing the risk of severe complications.
- believed that “injections work faster than tablets”, leading to over-reliance on unauthorized injectionists.

  - Fear of side effects: Some women avoided hospital treatments due to previous negative experiences, reinforcing their preference for herbal alternatives.

Perceptions of Biomedical Medicine

- Mistrust in modern drugs: “The hospital medicine is too strong; it makes me weak.”
  - Preference for injections over tablets: Many women
- Despite these challenges, integration remains possible through structured community education and collaborative training programs for traditional healers and biomedical practitioners.

Barriers to Integrating Traditional and Biomedical Approaches

Table 3. Barriers to Integrating Traditional and Biomedical Approaches

Challenges	Implications
Lack of scientific validation	Herbal treatments lack empirical research, making policy integration difficult.
Regulatory gaps	No standardized guidelines exist for herbal remedy preparation or sale.
Mistrust between healers and doctors	Limited collaboration hinders integration.
Socioeconomic barriers	Many rural women cannot afford hospital treatments.

Discussion and Policy Implications

Bridging the Gap Between Traditional and Biomedical Treatments

- Community-Based Health Education:
- Target misconceptions about malaria causation through radio programs and local outreach.
- Address the importance of early biomedical intervention.
- Formalizing Collaboration with Traditional Healers:
- Create certification programs for herbalists.
- Encourage referral systems between traditional healers and clinics.
- Scientific Validation of Herbal Treatments:
- Conduct clinical trials on the most commonly used herbs.
- Develop dosage guidelines to standardize usage.

Strengthening Malaria Control Strategies

- Improve Healthcare Accessibility: Reduce cost barriers to ACTs.
- Encourage Safe Herbal Practices: Discourage harmful herbal-drug combinations.
- Policy Inclusion: Recognize traditional medicine within national malaria programs.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the use of herbs and herbal mixtures in malaria treatment among rural women in Gbondapi,

Pujehun District, Sierra Leone. Findings revealed that traditional herbal remedies remain the first line of treatment for malaria due to accessibility, affordability, and cultural significance. The most commonly used herbs include *Azadirachta indica* (neem), *Vernonia amygdalina* (bitter leaf), *Moringa oleifera*, *Carica papaya* (papaya leaf), *Cymbopogon citratus* (lemon grass), and *Cassia sieberiana* (gbangba). These plants are prepared as decoctions, infusions, or topical applications, with many users perceiving them as effective, especially for mild to moderate malaria symptoms.

However, the study identified several challenges associated with the reliance on herbal medicine:

- Lack of standardization in preparation and dosage, leading to variable efficacy.
- Delayed treatment-seeking behavior, increasing the risk of severe malaria cases.
- Potential interactions between herbal remedies and biomedical malaria treatments, raising concerns about safety and efficacy.
- Sociocultural beliefs and misperceptions about malaria causation, which shape healthcare decisions.

Despite these challenges, herbal medicine remains deeply embedded in the cultural and social fabric of the community. The findings underscore the need for a more integrated approach that recognizes the role of traditional medicine while ensuring scientific validation and regulatory oversight to enhance patient safety and malaria control efforts.

The study also highlights critical policy gaps in the integration of herbal medicine with formal healthcare.

While the World Health Organization (WHO) and Sierra Leone's Ministry of Health and Sanitation advocate for collaboration between traditional and biomedical healthcare systems, practical frameworks remain underdeveloped. Addressing this gap is essential for improving malaria management in rural settings.

## Recommendations

### *Policy and Healthcare Integration*

1. Develop National Guidelines for Herbal Medicine
  - The Ministry of Health and Sanitation should work with ethnobotanists, pharmacologists, and traditional healers to establish standardized preparation and dosage guidelines for commonly used herbs.
  - Regulatory frameworks should be enforced to prevent unsafe herbal practices and toxic mixtures.
2. Promote Collaboration Between Traditional Healers and Biomedical Practitioners
  - Establish referral systems where traditional healers are trained to recognize severe malaria symptoms and refer patients to clinics when necessary.
  - Develop community-based health partnerships to integrate traditional knowledge into malaria prevention and treatment programs.
3. Create Certification and Training Programs for Traditional Healers
  - Introduce a formalized training curriculum for certifying traditional healers who use herbal remedies in disease management.
  - Ensure traditional healers receive education on biomedical malaria treatments, dosage accuracy, and potential herb-drug interactions.

### **Public Health Education and Behavioral Change**

4. Enhance Community Awareness on Malaria Causation and Treatment
  - Educational campaigns should be launched to correct misconceptions about malaria transmission, particularly beliefs in supernatural causes and witchcraft.
  - Radio programs, drama, and community dialogues should be leveraged to disseminate correct information on malaria prevention, symptoms, and treatment.
5. Encourage Safe and Informed Use of Herbal Remedies
  - Community health workers should educate households on safe herbal usage and warn against potentially harmful herb-drug interactions.

- Provide information on combining biomedical and herbal treatments responsibly, ensuring that patients do not delay hospital visits when malaria symptoms worsen.

### *Scientific Validation of Herbal Remedies*

6. Conduct Rigorous Clinical Research on Herbal Antimalarial Properties
  - Government research agencies, universities, and international health organizations (e.g., WHO, NIH) should fund pharmacological studies on commonly used malaria herbs.
  - Research should focus on herb efficacy, toxicity levels, and potential for standardization in herbal-pharmaceutical formulations.
7. Support Sustainable Cultivation of Medicinal Plants
  - Establish community-based medicinal plant gardens to preserve biodiversity and ensure the continued availability of key malaria treatment herbs.
  - Promote ethical harvesting practices to protect endangered medicinal plant species.

### *5.2.4 Strengthening Malaria Control Strategies*

8. Improve Accessibility to Biomedical Treatment in Rural Areas
  - Expand community health centers and mobile clinics to ensure rural women have timely access to malaria treatment.
  - Introduce subsidized or free ACTs for low-income households to reduce financial barriers to modern malaria treatment.
9. Integrate Traditional and Biomedical Malaria Control Strategies
  - Encourage dual treatment approaches where scientifically validated herbal remedies complement antimalarial drugs.
  - Introduce pilot programs where clinics and traditional healers collaborate on patient management.

### **Future Research Directions**

To strengthen the scientific and policy landscape surrounding herbal medicine in Sierra Leone, further research should focus on:

- Pharmacological assessment of herbal antimalarials to identify active compounds and safety thresholds.
- Longitudinal studies to evaluate treatment outcomes in patients using herbal versus biomedical treatments.

- Sociocultural and behavioral research to explore how beliefs about malaria causation evolve with increased biomedical awareness.
- Intervention-based studies on the effectiveness of integrating traditional healers into malaria control programs.

### Final Thoughts

The findings of this study reinforce that herbal medicine is a critical component of healthcare in rural Sierra Leone, but its use presents both opportunities and risks. While traditional remedies provide accessible and affordable treatment, their lack of standardization and scientific validation remains a major public health challenge.

To achieve effective malaria control, healthcare policies must be inclusive, acknowledging traditional medicine while ensuring patient safety through regulatory oversight and education. By integrating scientific research, public health education, and policy reforms, Sierra Leone can build a more comprehensive and culturally responsive approach to malaria management.

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