Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 12 (2025): December 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i12.1988
Original Article

Exploring the therapeutic uses of African wormwood (*Artemisia afra*): A cross-sectional ethnobotanical study in KwaZulu-Natal, South Africa.

Sibonelo Thanda Mbanjwa
Mangosuthu University of Technology P.O. Box 12363 Jacobs 4026 Durban, South Africa

Abstract

Background

A cross-sectional ethnobotanical study was conducted with 120 participants from rural and peri-urban communities in KwaZulu-Natal. Participants were selected through purposive and snowball sampling. Quantitative data were collected through structured questionnaires assessing frequency, preparation methods, and perceived effectiveness. Qualitative data were obtained through in-depth interviews with traditional healers, herbalists, and elderly community members.

Results

African Wormwood was widely used for treating flu (76%), chest congestion (65%), fever (48%), digestive ailments (33%), and as a steaming herb (51%) during COVID-19. Most respondents prepared it as a tea (57%) or via inhalation (steaming) (38%). 81% of participants reported moderate to significant health improvement after use. Traditional healers emphasized their role in spiritual cleansing, immune support, and malaria prevention. However, some concerns emerged around overuse and the lack of dosage guidelines, particularly for pregnant women and children.

Conclusion

The findings affirm African Wormwood's role in community health practices, reflecting cultural trust and wide therapeutic application. Its use during the COVID-19 pandemic highlights contemporary relevance. Nevertheless, further scientific evaluation is urgently needed to establish its bioactivity, safety, and appropriate dosage.

Recommendations

Pharmacological studies should validate efficacy and safety across demographic groups. National health policies could strengthen collaboration with Indigenous knowledge holders to integrate traditional remedies such as *A. afra* into formal systems. Education campaigns are needed to promote safe preparation and use, while conservation strategies must be implemented for sustainable harvesting.

Keywords: *Artemisia afra, African Wormwood, Ethnobotany, Traditional medicine, Indigenous knowledge, Herbal remedies, Community health, COVID-19, Therapeutic use, Sustainable harvesting*
Submitted: *July 22, 2025* ***Accepted:*** *September 06, 2025* ***published:*** *December 01, 2025*
Corresponding Author: *Sibonelo Thanda Mbanjwa*
Email: ***mbanjwa.sibonelo@mut.ac.za***
Mangosuthu University of Technology P.O. Box 12363 Jacobs 4026 Durban, South Africa

Background

Artemisia afra, commonly known as African Wormwood, is one of the most widely used medicinal plants in traditional healing systems across sub-Saharan Africa. It is renowned for its efficacy in treating respiratory ailments such as colds, flu, and bronchitis, as well as fever, digestive disorders, and malaria. The plant is rich in volatile compounds such as cineole, camphor, and thujone, which are believed to confer its antimicrobial, antipyretic, and anti-inflammatory properties. Traditionally, *A. afra* is prepared as a herbal tea or used for steaming and inhalation, especially during seasonal outbreaks of respiratory infections. Despite its cultural and medicinal importance, scientific validation of *Artemisia afra*'s efficacy and safety remains limited. In South Africa, particularly in KwaZulu-Natal, the plant continues to be used widely, especially in rural and peri-urban areas where access to formal healthcare is limited. With the recent increase in herbal remedy use during the COVID-19 pandemic, there is a renewed urgency to document Indigenous Knowledge, usage patterns, community perceptions, and the plant's therapeutic outcomes. The objective of this study is to investigate the traditional uses, community perceptions, preparation methods, and therapeutic applications of *Artemisia afra* in KwaZulu-Natal, South Africa, to contribute to its scientific validation, sustainable use, and integration into broader healthcare practices.

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Objectives

I. To document the traditional uses of *Artemisia afra* among community members in KwaZulu-Natal.
II. To assess how frequently and in what forms African Wormwood is used.
III. To explore community perceptions of its effectiveness and cultural significance.

Methodology

Study Design

This study employed a cross-sectional mixed-methods design. The approach integrated both qualitative and quantitative components to explore the traditional uses, perceived effectiveness, and preparation methods of *Artemisia afra* in community health settings.

Study Setting

The research was conducted in rural and peri-urban areas of KwaZulu-Natal, South Africa, between January and April 2018. These locations were selected based on the prevalence of traditional medicine use and access to knowledgeable community members and traditional healers.

Participants

A total of 150 participants were included in the study. Eligibility criteria required participants to be aged 18 years and older, have used or had knowledge of *Artemisia afra*, and be residents of the selected communities. Participants were selected using purposive and snowball sampling methods to ensure inclusion of individuals with direct experience in using or preparing the plant, as well as key informants such as traditional healers and elders.

Bias

To minimize bias, data collectors were trained to conduct interviews in participants' preferred languages (primarily isiZulu and English) and in culturally sensitive ways. Interview guides were pre-tested to ensure clarity and neutrality. Triangulation between quantitative and qualitative data was employed to validate responses, and efforts were made to include diverse age groups and genders to ensure broader representativeness.

Study Size

The study sample comprised 150 participants. This sample size was determined based on the exploratory nature of the research and the need to achieve adequate breadth for descriptive statistical analysis, while also ensuring sufficient depth to achieve saturation in the qualitative component. A sample of 150 was therefore considered appropriate to balance both quantitative and qualitative data needs. Of the 150 participants, 120 provided quantitative data through structured questionnaires. For the qualitative strand, 30 participants contributed data through semi-structured interviews. Among these, 20 individuals were engaged in in-depth interviews, selected purposively to capture diverse perspectives in relation to age, gender, socio-economic background, and experiences with *Artemisia afra*. This distribution allowed for both statistical representation and a rich thematic exploration of participants' views and practices.

Statistical Analysis

Quantitative data from structured questionnaires were analysed using descriptive statistics (frequencies, percentages) using SPSS version 25. Qualitative data from semi-structured interviews were transcribed and analysed using thematic content analysis, which involved coding transcripts to identify patterns, recurring themes, and culturally significant narratives. Missing quantitative data were addressed using case-wise deletion, ensuring that only complete responses were used in the final analysis.

Ethical Consideration

The study received ethical clearance from the Mangosuthu University of Technology Research Ethics Committee on 11 February 2023. All participants provided written informed consent, and the research was conducted in accordance with ethical principles involving respect for persons, confidentiality, and cultural sensitivity.

Results and Findings

Socio-demographic Characteristics of Participants

A total of 150 participants took part in the study. The majority (n = 120; 80%) contributed quantitative data through structured questionnaires, while 30 participants (20%) engaged in the qualitative strand, including 20 participants in in-depth interviews. The participants ranged in age from 18 to 55 years (mean age = 32.6 years). Women constituted a slightly higher proportion of the sample compared to men. Most participants were single (64%), with a smaller proportion married (26%), and the remainder either divorced or widowed (10%). In terms of education, nearly half (48%) had attained secondary-level education, while 37% had tertiary qualifications, and 15% had only primary-level education. Employment status varied: 42% were employed, 35% unemployed, and 23% were students.

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Table 1: Socio-demographic Characteristics of Participants (N = 150)

Characteristic	Category	n	%
Gender	Male	68	45.3
	Female	82	54.7
Age group (years)	18–24	39	26.0
	25–34	56	37.3
	35–44	34	22.7
	45+	21	4.0
Marital status	Single	96	64.0
	Married	39	26.0
	Divorced	15	10.0
Education level	Primary	22	14.7
	Secondary	72	48.0
	Tertiary	56	37.3
Employment status	Employed	63	42.0
	Unemployed	53	35.3
	Students	34	22.7

Figure 1: Participant Flow Diagram

This diagram illustrates the flow of participants throughout the study, beginning with those approached, screened, and excluded, followed by the confirmed eligible participants (n = 150). It further shows their allocation into quantitative (n = 120) and qualitative (n = 30) components, with a subset of 20 participants selected for in-depth interviews, and concludes with the total number analysed.

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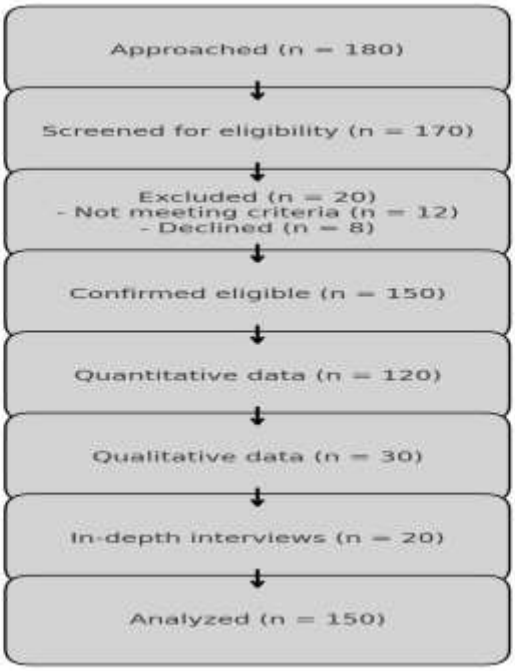

Figure 2 shows that African Wormwood (*Artemisia afra*) is most commonly used for treating flu (76%) and chest congestion (65%), highlighting its primary role in managing respiratory conditions. This is consistent with its traditional use as a decongestant and its reputation as a natural remedy for colds. Fever (48%) and digestive issues (33%) also ranked as common ailments treated, indicating the plant's broader therapeutic value beyond respiratory health. Notably, 51% of participants reported using it as a steaming herb during the COVID-19 pandemic, which demonstrates the plant's adaptability in modern health crises and the trust placed in traditional remedies when biomedical access is limited.

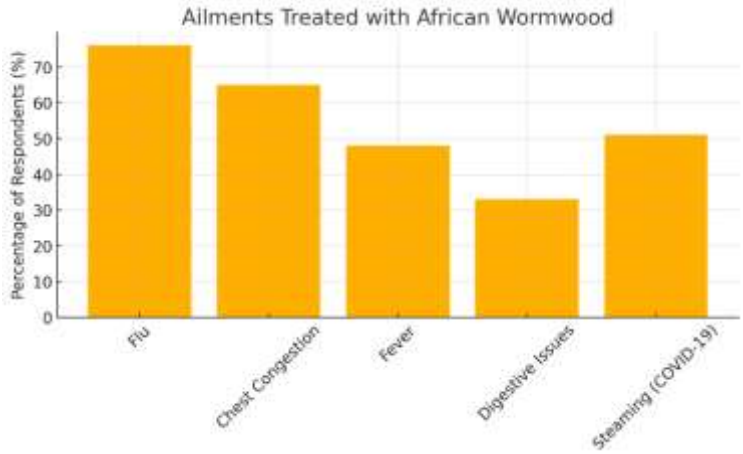

Figure 2: The graph represents the ailments treated with African wormwood

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Figure 3 reveals that 57% of respondents prefer preparing African Wormwood as herbal tea, while 38% use it via steaming or inhalation, particularly for respiratory ailments. The tea preparation is likely favoured for its simplicity and accessibility, often used to manage fever, digestive discomfort, and immune support. Steaming, on the other hand, gained popularity during the COVID-19 outbreak and remains a preferred method for clearing sinuses and alleviating chest symptoms. This pattern suggests that preparation methods are strongly influenced by the type of ailment and the cultural transmission of knowledge within families and communities.

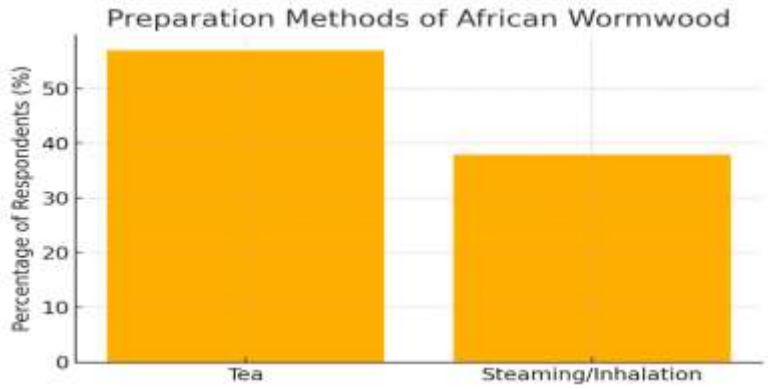

Figure 3: The graph represents the methods of African wormwood

Figure 4 indicates a strong community belief in the effectiveness of African Wormwood, with 81% of participants reporting moderate to significant improvement in their health conditions after use. This high percentage reflects the deep cultural trust in traditional medicine and the plant's long-standing presence in Indigenous healing systems. However, 19% of users reported no improvement or were unsure, which may be attributed to incorrect preparation, use for non-indicated conditions, or placebo effects. The high rate of perceived effectiveness underlines the potential value of further clinical research and supports calls for safe integration of African Wormwood into formal healthcare settings.

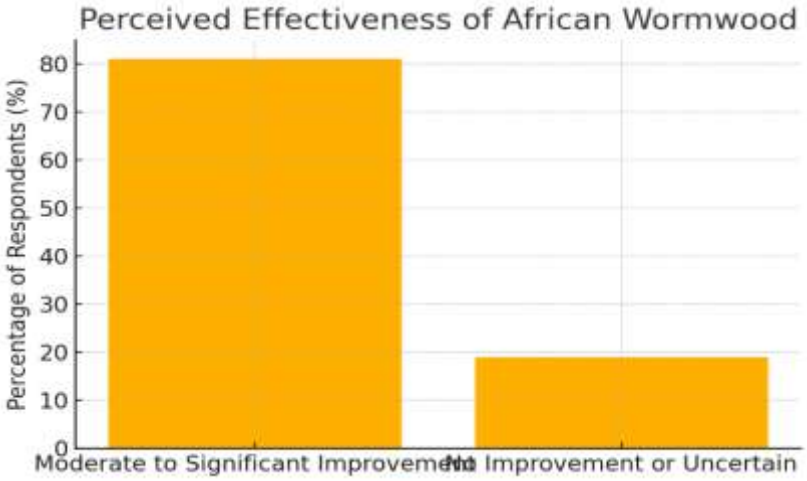

Figure 4: The graph represents the effectiveness of African wormwood

Discussion

This study aimed to explore the ethnobotanical significance, preparation practices, and perceived health benefits of African Wormwood (*Artemisia afra*) in selected communities of KwaZulu-Natal. The findings reaffirm the plant's central role in traditional medicine, particularly in managing respiratory conditions, fever, digestive issues, and its resurgence during the COVID-19

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pandemic as a steaming herb. The high usage of *A. afra* for flu (76%) and chest congestion (65%) supports earlier studies by Gathirwa et al. (2011) and Van Wyk & Wink (2017), which recognized its antimicrobial and anti-inflammatory properties, particularly for upper respiratory tract infections. These studies highlighted *A. afra*'s essential oils, such as 1,8-cineole and thujone, as the primary bioactive compounds responsible for its bronchodilatory and expectorant effects. This validates the plant's popularity in treating colds, congestion, and flu-like symptoms, as reported by participants in this study.

The use of African Wormwood for steaming (51%), especially during the COVID-19 pandemic, corresponds with findings by Mukherjee et al. (2021), who documented increased reliance on traditional herbs like *A. afra* in sub-Saharan Africa when biomedical treatments were inaccessible or distrusted. The fact that 57% of participants prepared it as tea and 38% via inhalation aligns with Mills et al. (2005), who emphasized that methods of administration vary by ailment and cultural practices. The dual role of *A. afra* as both an ingestible and inhaled remedy demonstrates its adaptability within Indigenous health systems. Most compelling is the 81% perceived health improvement, which mirrors Liu et al. (2014), who noted that although clinical trials on *A. afra* remain limited, community testimonies consistently affirm its therapeutic value. However, Kruger & Verhoeven (2019) caution against chronic or unsupervised use due to potential toxicity, especially among vulnerable populations such as children and pregnant women. This reflects participants' concerns around dosage and overuse, highlighting a gap in both policy and education.

Beyond prevalence and preparation patterns, the qualitative strand enriched the findings by situating *A. afra* within lived cultural, social, and experiential contexts.

Theme 1: Beliefs and Cultural Identity

Participants consistently emphasized that *A. afra* use is not merely medicinal but also cultural. For some, steaming rituals during COVID-19 symbolized continuity with ancestral practices. This echoes Ngubane (2020), who documented how medicinal plants serve as cultural anchors in times of crisis.

- *"My grandmother taught me to steam with this plant; it reminds me that our ways still heal us today."* (Participant 4)

Theme 2: Perceived Effectiveness and Trust

Community trust in *A. afra* emerged strongly, with many participants attributing rapid relief of symptoms to its use. This aligns with Sofowora et al. (2013), who note that perceived efficacy is a cornerstone of African ethnomedicine.

- *"After steaming, I could breathe again; I didn't need to rush to the clinic."* (Participant 9)

Theme 3: Safety Concerns and Dosage Uncertainty

While most users expressed confidence, others voiced anxieties about "too much" use or lack of guidelines. This parallel concerns raised by Kruger & Verhoeven (2019) and corroborates calls for dosage standardization.

- *"We know it works, but no one tells us how much is too much. We just guess."* (Participant 11)

Theme 4: Accessibility and Socio-economic Value

Participants highlighted *A. afra* as an affordable and accessible alternative to pharmaceuticals, particularly during COVID-19 when clinics were overcrowded or medicines were unaffordable. This theme reinforces findings by Chinsembu (2016), who noted that traditional medicine often serves as a safety net for under-resourced communities.

- *"I didn't have money for tablets, but the plant is free in my yard."* (Participant 2)

Theme 5: Intergenerational Knowledge Transfer

The interviews revealed that much of the knowledge around preparation and use is passed down orally through families, emphasizing the plant's role in sustaining Indigenous knowledge systems. This resonates with Van Wyk (2011), who argued that preservation of ethnobotanical knowledge is critical for cultural resilience.

- *"I learned from my mother, and now my children see me doing the same."* (Participant 7)

Generalizability

While the findings offer valuable insights into the use of *Artemisia afra* in KwaZulu-Natal, they may have limited generalizability beyond this regional context. Cultural practices, access to traditional healers, and ecological availability of the plant may differ in other parts of South Africa or Africa more broadly. However, the themes of health empowerment through Indigenous Knowledge and the need for integrative approaches to healthcare are widely applicable across similar cultural and socio-economic settings.

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Conclusion

This study reinforces the prominent role of *Artemisia afra* in traditional health systems across KwaZulu-Natal, particularly for managing respiratory ailments, fever, and digestive discomfort. The plant's resurgence during the COVID-19 pandemic as a widely used steaming herb highlights its contemporary relevance and community trust. While anecdotal evidence suggests high effectiveness, the absence of clinical validation, dosage guidelines, and regulation presents serious limitations to its safe integration into broader health systems. Recognizing and validating Indigenous Knowledge, while grounding it in scientific evidence, is key to harnessing the full potential of African Wormwood for good health and well-being.

Study Limitations

This study is subject to several limitations. Firstly, the cross-sectional design captures perceptions and practices at a single point in time, limiting causal interpretation. Secondly, data were based on self-reports, which were influenced by recall bias or social desirability bias, especially among traditional medicine users. Thirdly, the study did not involve chemical analysis or clinical testing to verify the pharmacological properties of the plant. Lastly, the sample was geographically limited to selected communities in KwaZulu-Natal, which reflect national trends or practices.

Recommendations

Based on the findings of this study, several recommendations are proposed to promote the safe and effective use of *Artemisia afra* in community and clinical health contexts. Firstly, there is an urgent need for scientific validation through clinical trials and toxicological studies to confirm the safety, efficacy, and appropriate dosages of African Wormwood for various health conditions. Such research should prioritize collaboration with traditional healers to ensure that the knowledge guiding these practices is preserved and respected. Secondly, national and local health authorities should incorporate traditional medicines like *A. afra* into integrative healthcare models, particularly for communities with limited access to biomedical facilities. This requires the development of regulatory guidelines for cultivation, harvesting, processing, and dosage to ensure standardization and prevent misuse. Thirdly, public health education campaigns are needed to raise awareness about the responsible use of *A. afra*, especially among vulnerable groups such as children, the elderly, and pregnant women. These campaigns should promote safe preparation methods, discourage excessive or long-term use without supervision, and address potential herb-drug interactions. Finally, sustainable harvesting and conservation efforts should be encouraged to protect wild populations of African Wormwood. Community-driven cultivation programs can reduce environmental pressure while supporting rural livelihoods and traditional health practices.

Acknowledgements

I acknowledge the moral support and encouragement from the Deans and HOD of the Department of Nature Conservation, Faculty of Natural Science, Mangosuthu University of Technology.

Funding

This work was not supported by any grant. The author did not receive research support from any company. The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Competing Interests

The author has no relevant financial or non-financial interests to disclose.

Biography

Dr. Sibonelo Thanda Mbanjwa is a dedicated lecturer in the Department of Nature Conservation at Mangosuthu University of Technology (MUT), South Africa. He holds a Ph.D. in Environmental Science and specializes in biodiversity conservation, sustainable development, and environmental education. Dr. Mbanjwa is deeply committed to community engagement, student mentorship, and the integration of indigenous knowledge systems into conservation practices. His work bridges academia and practical application, empowering students and communities through innovative teaching, research, and outreach initiatives.

Author Contributions

I, the author, contributed to the study conception and design. Material preparation, data collection, and research were performed by Mbanjwa S.T. The first draft was written by Mbanjwa S.T.

Data Availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author. Due to ethical considerations and confidentiality agreements, individual participant data cannot be publicly shared. However, anonymized and aggregated data may be provided for academic or research purposes upon institutional approval.

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Conflict of interest

The author declares no conflict of interest.

List of Abbreviations

- **A. Afra** - Artemisia afra

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PUBLISHER DETAILS:

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa