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# Leveraging Indigenous Knowledge for Strengthening Respiratory and Immune Health Responses: Lessons from BRICS and SADC Member States During Global Health Crises

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**Abstract:** This paper explores the parallel use of modern biomedical approaches and Indigenous Knowledge Systems (IKS) in strengthening respiratory and immune health responses during incidences of global health crises. Drawing from experiences of selected BRICS and SADC countries particularly Zimbabwe, South Africa, and China, the study highlights the critical role played by traditional medicine in community-based health resilience. African Indigenous Knowledge is predominantly oral, passed down through generations, while Chinese traditional medicine has a documented lineage, offering insight into the evolution and formulation of herbal remedies. A qualitative methodology was applied to a small, purposive sample to examine how individuals incorporated traditional practices to prevent and manage, respiratory and immune-related health challenges. The findings, supported by existing literature, indicate that a significant portion of the population relies on herbal medicine due to its affordability, accessibility, and cultural familiarity. The increasing integration of physical and digital spaces globally has influenced how communities' access and disseminate health knowledge. In particular, social media platforms have emerged as key tools for circulating information, shaping public perceptions and responses in ways that differ from past health emergencies. Despite the dominance of biomedical paradigms, Indigenous Knowledge and traditional health practices continue to play a vital role in public health systems, particularly in resource-constrained settings. This study underscores the importance of formally recognizing and integrating Indigenous health knowledge into broader frameworks for managing current and future health crises.

**Keywords:** indigenous knowledge systems (iks); traditional medicine; respiratory health; immune health; herbal remedies; health resilience; community health responses

## 1. Introduction

Indigenous Knowledge (IK) refers to long-standing traditions, skills, and philosophies developed by Indigenous peoples through direct contact with their natural environment. It is cumulative, context-specific, orally transmitted, and non-formal coexisting with formal scientific systems even in urban centres (De Avila-Pires, 2007; Nakata et al., 2021). Far from being static, IK is dynamic and continuously evolving, reflecting the lived realities of indigenous communities across the globe. Indigenous populations, found in Africa, the Americas, Asia, and Oceania have cultivated rich epistemological systems rooted in their historical, spiritual, and ecological worldviews (Kirmayer et al., 2014; Ndlovu-Gatsheni, 2021). In Africa, IK has long been central to addressing

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health and environmental challenges. Traditional medicine remains the first line of healthcare for up to 80% of the population in many African countries, offering holistic approaches to healing and disease prevention (WHO, 2013; Aboyade et al., 2016). As noted by Houghton (1995), African communities have for generations relied on herbal and traditional remedies to prevent and manage diseases affecting both humans and animals. Similarly, in the global South, Indigenous and rural communities have developed strategies to navigate environmental and epidemiological changes through adaptive use of local resources (Eimer & Schüren, 2013; Chinsembu, 2020).

These practices are often based on deeply embedded knowledge systems that emphasise balance between the physical, emotional, and spiritual aspects of health. This holistic approach has been increasingly recognised as vital during global health emergencies, where conventional healthcare systems may be overstretched or inaccessible (Gyasi et al., 2021; Tambo et al., 2021). For example, during the Covid health crisis pandemic, traditional health practitioners in Africa and parts of Asia played a key role in community-based care, promoting immune-boosting herbs and respiratory therapies (Manderson & Levine, 2020; Ssemugabo et al., 2022). Despite the effectiveness of IK during such crises, colonial legacies and dominant biomedical paradigms have historically delegitimised these systems. Many Indigenous communities were taught to regard their knowledge as inferior or unscientific (Sithole, 2007; Tangwa, 2007). Yet, recent health emergencies have prompted a re-evaluation of these assumptions, highlighting the value of IK in strengthening health resilience, particularly in vulnerable and underserved populations (Mutungi et al., 2022; Tchuenchieu Kamgain et al., 2023).

South Africa, unique in being both a member of the SADC and BRICS blocs, serves as a vital site for observing diverse cultural responses to health crises. As a melting pot of cultures from countries such as Zimbabwe, Mozambique, Malawi, and India, South Africa embodies a convergence of traditional practices shaped by both regional and global experiences. This diverse cultural landscape allows for the analysis of how Indigenous and diasporic communities responded to global health threats using plant-based medicine, spiritual healing, dietary adjustments, and social rituals (Maphosa et al., 2022; Ramabulana et al., 2023). This study investigated how Indigenous Knowledge was used by communities in SADC and BRICS countries to manage respiratory and immune health during recent global health crises. It explores how IK offered contextually relevant, affordable, and trusted responses, particularly where formal healthcare access was limited. It also evaluates the integration (or lack thereof) of Indigenous health strategies into national response frameworks and considers how future pandemic preparedness plans can better incorporate IK. The goal is to contribute to the emerging discourse on epistemological pluralism in global health, fostering more inclusive, community-grounded health systems.

Indigenous Knowledge (IK) refers to the complex set of understandings, skills, and philosophies developed by Indigenous peoples through prolonged interaction with their natural and social environments. These knowledge systems are non-formal, context-specific, cumulative, and dynamic, often passed down orally from generation to generation (De Avila-Pires, 2007). Far from being confined to remote areas, IK exists alongside formal scientific knowledge even in modern urban spaces. As such, it represents a form of epistemology that transcends geographic boundaries and offers culturally embedded solutions to real-world problems, including those related to human health and wellbeing. Globally, Indigenous peoples, oftenreferred to as natives, original inhabitants, or aboriginals, are found across all continents, particularly in countries and regions shaped by colonial histories. These populations have preserved their cultural and knowledge systems in parallel with modern institutions introduced through colonization (De Avila-Pires, 2007). In the African context, traditional knowledge, especially in the areas of herbal medicine and health care, has been integral to community survival and resilience. As Houghton (1995) observes, African communities have long relied on plant-based medicine for the prevention and treatment of both human and animal diseases.

In the southern hemisphere, Indigenous communities have interacted symbiotically with their environments for centuries, harnessing local biodiversity to address everyday needs, whichinclude

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food, shelter, and health (Eimer & Schüren, 2013). This continuous engagement with the natural world has contributed to the development of rich IK systems tailored to each region's ecological and sociocultural realities. Much of this knowledge remains undocumented but lives on through oral traditions and customary practices that are still widely used today, especially in the face of recurring health challenges. Historically, Indigenous peoples have shown the ability to withstand and respond to epidemics, environmental disasters, and other disruptions through culturally embedded health practices. Traditional responses to disease ranging from isolation and plant-based treatment to spiritual and communal rituals, illustrate the adaptive nature of IK. However, colonial occupation and Western-centric development paradigms led to the marginalisation of these practices, often dismissing them as unscientific or irrelevant in modern society. This resulted in a generational decline in the perceived legitimacy of Indigenous Knowledge, especially in formal health systems (Sithole, 2007; Tangwa, 2007).

Recent global health crises, particularly those involving respiratory and immune health, have underscored the importance of re-examining the value of Indigenous health systems. As modern biomedical responses have sometimes faltered under the weight of fast-evolving threats and inequitable healthcare access, many communities have turned inward, to local and Indigenous knowledge systems, for culturally resonant and accessible health solutions (Nyika, 2009; Gyasi et al., 2021). These systems offer alternative pathways for enhancing immunity, treating respiratory ailments, and managing community-based care in times of health-related uncertainty. South Africa, as a member of both the Southern African Development Community (SADC) and the BRICS bloc (Brazil, Russia, India, China, and South Africa), serves as a unique intersection of cultural, political, and public health experiences. The country is home to a diverse population that includes migrants from other SADC nations such as Zimbabwe, Malawi, Mozambique, and the Democratic Republic of Congo, among others. This cultural diversity creates fertile ground for studying the ways in which Indigenous Knowledge is utilized and adapted in response to global health threats.

This paper focuses on understanding how communities in selected BRICS and SADC countries, particularly Zimbabwe, South Africa, and China, have leveraged Indigenous Knowledge to strengthen respiratory and immune health during recent global health crises. By analysing the localised use of herbal remedies, spiritual healing practices, and dietary regimens, the study aims to highlight the resilience and resourcefulness embedded in traditional knowledge systems. It also examines the influence of digital technologies, such as social media, in the transmission and validation of IK during health emergencies. While Indigenous Knowledge is a vast and evolving field, this study narrows its scope to the role of IKS in mitigating the effects of pandemics and other respiratory-related health threats. The intention is to contribute to the growing discourse on integrating traditional knowledge into national and international health policies, with a focus on community resilience, health equity, and cultural relevance in policy design and implementation.

### *1.1. Review of Relevant Literature from SADC, BRICS and Beyond*

Global health crises, such as the health crisis pandemic, have amplified the need for inclusive, context-sensitive, and holistic health systems that recognize and integrate diverse epistemologies. In particular, Indigenous Knowledge Systems (IKS), anchored in local experiences, ecological familiarity, and socio-cultural practices, offer rich, underexplored potential in supporting immune and respiratory health, especially in regions with fragile biomedical infrastructures like many in the SADC and BRICS nations (Khupe, 2017; Chilisa, 2019).

Indigenous medical systems, often rooted in ethnobotany and holistic wellness paradigms, have long functioned as primary healthcare modalities across much of the Global South (WHO, 2021). According to UNESCO, approximately 80% of the African population continues to rely on traditional medicine, a trend mirrored in India and China, where Ayurveda and Traditional Chinese Medicine (TCM) are deeply institutionalized (UNESCO, 2021; Kebede et al., 2022). These systems emphasize preventive care, immune modulation, and restoration of bodily harmony—principles that are now being increasingly validated by biomedical research (Kim et al., 2021; Heiat et al., 2021).

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#### 1.1.1. Epistemological Considerations and the Marginalization of IKS

Historically, IKS has been marginalized due to its oral transmission, local linguistic frameworks, and ontologies that often diverge from Euro-Western empiricism. Khupe (2017) and Chilisa (2019) argue that IKS represents an epistemic system that is not only scientific but also adaptive and contextually situated, evolving in response to changing socio-ecological realities. However, colonial legacies have institutionalized Western medicine as the gold standard while framing traditional practices as 'unscientific' or even 'superstitious' (Mwaka et al., 2021). In SADC nations, restrictive colonial-era policies like the Witchcraft Suppression Act continue to criminalize traditional healing (Mwaka et al., 2021), undermining opportunities for integrated healthcare approaches. In Zimbabwe, the Witchcraft Suppression Act was first enacted in 1899, with the aim of suppressing traditional practices, but was later amended in 2006 to acknowledge the existence of witchcraft, though the core provisions remained the same. Thus, despite this, recent policy shifts and scholarly attention have begun to reevaluate the contributions of IKS, especially in the face of global health emergencies where biomedical solutions may be delayed, inaccessible, or inadequate (Emeagwali, 2020; Chatora & Chimbari, 2022).

#### 1.1.2. Traditional Medicine and Immune Health During Health Crises

The onset of health crises revealed stark gaps in global preparedness, especially in low-resource settings, prompting a resurgence of interest in local remedies known for their immune-boosting properties (Yimer et al., 2021). Scientific investigations have validated the antiviral, anti-inflammatory, and immunomodulatory effects of many traditional herbs used/recommended in/by African and Asian IKS. For instance, Artemisia afra, Hypoxis hemerocallidea (African potato), and Pelargonium sidoides have shown pharmacological efficacy in treating respiratory tract infections (Van Wyk & Wink, 2015; Oyebode et al., 2016; Ngarivhume et al., 2015).

Empirical evidence also supports the health benefits of plant-based, whole-food diets common in Indigenous communities. Kim et al. (2021) found that individuals on predominantly plant-based diets experienced less severe health symptoms, likely due to improved immune function. This corroborates long-standing indigenous dietary practices that incorporate nutrient-dense, phytochemical-rich foods and herbs (Rankoana et al., 2015; DiPietro & Mondie, 2021). Furthermore, Heiat et al. (2021) estimate that 25% of modern pharmaceuticals are derived from traditional remedies, underscoring the deep scientific value embedded in IKS. These include compounds from medicinal plants such as Catharanthus roseus (source of vincristine) and Salix alba (source of aspirin), which originated from indigenous medical traditions and were later standardized for global use (Fabricant & Farnsworth, 2001).

#### 1.1.3. Digital Platforms and Knowledge Transmission

The digital revolution has also played a pivotal role in reshaping access to IKS. During the Covid health crisis, the dissemination of traditional remedies via social media platforms like WhatsApp and Facebook catalyzed a new wave of ethnobotanical engagement, both within and beyond indigenous communities (Chatora & Chimbari, 2022). While concerns remain about misinformation, these platforms democratized access to knowledge that was once restricted to specific lineages and oral networks.

#### 1.1.4. Comparative Integration Across BRICS Nations

Among BRICS countries, China provides a robust model for integrating traditional and modern health systems. Traditional Chinese Medicine (TCM), with documented roots dating back over two millennia, was used extensively during the Covid health crisis. State-sanctioned protocols included herbal formulations like Lianhuaqingwen and Jinhuaqinggan for mild cases and Xuebijing for severe symptoms (Brewster, 2020; Shahrajabian et al., 2020). Clinical trials further validated these

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treatments' efficacy, prompting their inclusion in the national health response (DiPietro & Mondie, 2021).

India's Ayurvedic sector also responded proactively, with the Ministry of AYUSH issuing guidelines for immunity-boosting regimes. However, unlike China, India's fragmented healthcare governance and limited documentation of clinical outcomes have hampered wider integration (Patwardhan et al., 2020). In contrast, Brazil's reliance on non-pharmaceutical interventions during the pandemic largely overlooked the wisdom embedded within the Amazon's indigenous populations, whose plant-based medical knowledge spans centuries (Szylovec et al., 2021). Despite their use of herbal disinfectants and isolation practices, these communities received minimal formal support or recognition from federal authorities.

South Africa, while home to rich ethnomedical traditions, continues to experience tension between biomedical and indigenous healing systems. The health crisis, however, prompted renewed engagement between state structures and traditional healers, though this has yet to translate into policy coherence or integration (Molefe & Lunga, 2022).

#### 1.1.5. Toward an Integrated and Decolonial Health Paradigm

The pandemic has illuminated the importance of pluralistic, decentralized health strategies, particularly in culturally diverse regions. IKS-based health responses offer not only therapeutic solutions but also culturally resonant models of wellness that resonate with local belief systems, thus enhancing public compliance and trust (Power et al., 2020; Shange, 2020). Moreover, a decolonial approach to health policy must recognize the epistemic authority of Indigenous communities and create institutional pathways for validating, protecting, and integrating their knowledge.

A synthesis of lessons from BRICS and SADC nations suggests that IKS can serve as a critical complement to biomedical science in strengthening resilience during global health crises—especially in enhancing respiratory and immune health. The path forward requires not merely documentation and validation but also political will, regulatory innovation, and transdisciplinary collaboration.

#### 1.1.6. Empirical Support for Traditional Diets

Empirical research supports the efficacy of plant-based diets in mitigating severe health crisis symptoms. Kim et al. (2021) found that individuals adhering to plant-rich diets were significantly less likely to experience severe illness compared to those with high-protein, low-vegetable diets. These findings corroborate indigenous dietary regimes that emphasize the immunity-enhancing role of specific plants, herbs, and traditional foods (DiPietro & Mondie, 2021). Rankoana et al. (2015) assert that IKS-based healthcare includes detailed knowledge of plant and animal resources for disease prevention, forming the bedrock of primary health services in marginalized communities.

## 2. Methodology

Recognizing the complex, dynamic, and socially embedded nature of Indigenous Knowledge Systems (IKS), this study employed a qualitative exploratory research design to uncover how traditional medicine was mobilized as a health resilience mechanism during the health crisis pandemic within BRICS and SADC contexts. This methodological approach is particularly suitable for studying culturally situated and non-quantifiable phenomena (Chilisa, 2020; Kovach, 2021), and aligns with calls for decolonizing health research by valuing local epistemologies (Nhemachena et al., 2023; Nyamnjoh, 2022).

Data were collected using a multi-modal strategy to ensure both methodological triangulation and responsiveness to health crisis-related ethical constraints. Specifically, virtual semi-structured interviews, Google Forms-based open-ended questionnaires, and WhatsApp voice note submissions were utilized. This approach enabled the capture of rich narrative data while adhering to World Health Organization (2020) social distancing guidelines. The use of digital ethnographic methods also

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aligns with recent scholarship that supports remote qualitative data collection as a valid and effective strategy in global health crises (Creswell & Poth, 2021; Archibald et al., 2021).

Participants were purposively selected from across BRICS and SADC regions to ensure diversity in sociocultural contexts, age, gender, and types of traditional healing systems engaged. Given the deeply personal and sometimes stigmatized nature of illness disclosure, particularly around health crisis, the study also employed convenience and snowball sampling techniques to access individuals who had survived the virus and had utilized Indigenous or traditional medicine as part of their recovery (Palinkas et al., 2015; Etikan, 2016).

A total of thirty-eight participants from selected countries and cultural backgrounds contributed their perspectives. Though the sample is not representative of all BRICS and SADC populations, it provides an adequate depth for an exploratory qualitative analysis. The triangulation of data sources—through interviews, textual responses, and audio narratives—enhanced the credibility and richness of the findings (Denzin & Lincoln, 2018). These methods allowed for the identification of recurring patterns, shared cultural logics, and localized innovations in health practices that were not easily visible through quantitative approaches.

Data were transcribed, translated where necessary, and subjected to thematic analysis, guided by Braun and Clarke's (2021) six-phase approach. Coding was conducted inductively to allow themes to emerge directly from the data, but was also informed by theoretical constructs from resilience theory and Indigenous knowledge frameworks (Berkes, 2018; Leach et al., 2022). In Zimbabwe, ethical clearance was obtained from the Midlands State University review board, and participants gave informed consent via digital means. Anonymity and confidentiality were strictly observed throughout the research process.

Table 1 illustrates the varying degrees of institutional support, usage, and integration of traditional medicine among BRICS and SADC countries during the health crisis pandemic. China emerges as the global leader in formalizing and leveraging its traditional medicinal systems, incorporating Traditional Chinese Medicine (TCM) into national health crisis response protocols (Brewster, 2020; Shahrajabian et al., 2020). Similarly, India institutionalized its Ayurvedic, Unani, and Siddha traditions through the AYUSH Ministry, although its implementation varied across states (Ministry of AYUSH, 2020).

**Table 1.** Comparative Integration of Traditional Medicine in BRICS and SADC Countries During HEALTH CRISIS.

| Country | Level of Institutional Support | Traditional Medicine Use in the case of a health crisis | Documentation & Integration | Key Interventions/Outcomes | Sources |
|---|---|---|---|---|---|
| **South Africa** | Low to Moderate | High (especially in rural areas) | Poorly documented | Traditional remedies used widely; limited policy support or regulatory recognition | Rankoana et al. (2015); Chatora & Chimbari (2022) |
| **Brazil** | Low | Low (Indigenous knowledge excluded) | Negligible | Relied on non-pharmaceutical interventions; Indigenous groups disproportionately affected | Szylovec et al. (2021); UNDESA (n.d.) |
| **China** | High | Strong (TCM + allopathic integration) | Well-documented | Patented HEALTH CRISIS herbal remedies; national guidelines for | Brewster (2020); Shahrajabian et al. (2020) |

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| | | | | | |
|---|---|---|---|---|---|
| | | | | integrated treatment (TCM) | |
| **Russia** | Low | Limited | Sparse | No formal recognition of traditional knowledge in HEALTH CRISIS response | WHO (2021); Shahrajabian et al. (2020) |
| **India** | Moderate | Moderate to High (AYUSH) | Partially documented | AYUSH ministry promoted herbal remedies; integration in some regional public hospitals | Ministry of AYUSH (2020); Yimer et al. (2021) |
| **Zimbabwe** | Low to Moderate | High (informal use widespread) | Poor documentation | Traditional medicines used for prevention; government skeptical; public turned to healers | Mwaka et al. (2021); Chatora & Chimbari (2022) |
| **Namibia** | Low | Moderate | Poorly documented | Use of wild plants and herbs; no state-supported integration | WHO (2021); Kebede et al. (2022) |
| **Mozambique** | Low | High in rural communities | Poor | Local use only; traditional healers not included in formal pandemic response | WHO (2021); Yimer et al. (2021) |

### *2.1. Findings and Conclusions*

Whilst the Chinese community have made strides in recording indigenous knowledge and improving traditional medicine, in other BRICS countries, knowledge on traditional medicine is oral and therefore not standard. The following Table provide findings from document reviews:.

In contrast, countries like South Africa, Zimbabwe, and Mozambique witnessed widespread informal use of indigenous remedies during the last Covid19 pandemic, particularly in rural and marginalized communities. However, this occurred with minimal documentation and weak policy support (Rankoana et al., 2015; Chatora & Chimbari, 2022). Brazil and Russia demonstrated a clear neglect of indigenous and traditional medical systems, with Brazil's Indigenous communities especially vulnerable due to systemic exclusion (Szylovec et al., 2021).

These disparities underscore the need for more inclusive, evidence-informed health policies that recognize the cultural legitimacy and therapeutic value of Indigenous Knowledge Systems, particularly in regions where access to biomedical services is limited.

### *2.2. Indigenous Knowledge Systems and the Use of Traditional Medicine in the Management of Health Crisis in the SADC Region*

Empirical research from the SADC region indicates that many individuals referred to Indigenous Knowledge (IK)-based remedies for health crisis management as "home remedies." These remedies encompassed not only herbs but also widely available fruits, vegetables, and spices. The pivotal element across all accounts was the perceived efficacy of these remedies in alleviating HEALTH CRISIS symptoms. Most participants reported using similar treatments, though some variation was observed based on seasonal availability, affordability, and cultural preferences.

For example, **Participant 1** used *Bidens pilosa* (commonly known as Blackjack), which is abundant during the Southern African rainy season (November to May). The leaves were boiled, and the extract consumed every four hours. This plant is believed to enhance immune function due to its known antioxidant and antimicrobial properties (Afolayan & Komane, 2020). Additional practices included drinking warm water to ease throat discomfort, and the use of *Lippia javanica* (Zumbani or

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Umsuzwane) tea and boiled guava leaf extract (*Psidium guajava*) to manage fever and regulate blood pressure.

**Participant 2** confirmed similar practices and highlighted the significance of nutrition in immunity. They reported consuming traditional grains such as rapoko (finger millet) and sorghum, as well as bananas to support hydration and electrolyte balance. Onion was used both through direct ingestion and external application (e.g., in socks or under pillows) to alleviate nasal congestion. **Participants 3 and 4** emphasized steaming therapy, commonly involving guava leaves and eucalyptus (*Eucalyptus grandis*). This method—where patients inhaled steam under a blanket—was perceived to weaken the virus in the nasal and respiratory tract. However, concerns were raised about dehydration, leading to adjustments in technique, such as steaming from smaller containers. **Participant 5** used eucalyptus oil for chest congestion and breathing difficulties, while **Participant 6** claimed the application of snuff (*Nicotiana tabacum*) induced sneezing to clear airways, suggesting both physiological and psychosomatic benefits. **Participant 7**, possibly due to a medical background, emphasized alkalizing foods to counteract the virus. They recommended high-pH foods such as garlic (pH 13.2), avocado (15.2), banana (9.9), and lemon (8.2), aligning with the hypothesis that SARS-CoV-2 thrives in acidic environments. Though such pH claims may lack robust virological substantiation, the emphasis on immune-boosting foods is supported by research (Kim et al., 2021; DiPietro & Mondie, 2021). **Participant 8** introduced a traditional Indian remedy, combining garlic, ginger, turmeric, cinnamon, black pepper, cayenne pepper, honey, onion, and lemon to create a homemade "antibiotic." While not indigenous to Africa, the pharmacological properties of these spices—especially their antiviral, anti-inflammatory, and immune-modulating actions—are well documented (Choudhary et al., 2021).

In South Africa, *Artemisia afra* (Mhlonyane or Lengana) became highly sought after in urban and rural markets for its reported ability to manage respiratory conditions. **Participant 9** emphasized the widespread cultural acceptance and use of traditional medicine, reflecting the growing urban appreciation for indigenous health systems during the pandemic.

**Table 2.** Empirical Findings from SADC Indigenous Knowledge Responses to health crisis.

| Herb/Shrub/Tree | Scientific Name | Perceived Medicinal Uses |
|---|---|---|
| Zumbani/Umsuzwane | *Lippia javanica* | Treats fever, coughs, bronchitis, sinusitis, asthma |
| Mhlonyane/Lengana | *Artemisia afra* | Treats respiratory infections and asthma |
| Muruguru | *Carissa edulis* | Juice from roots treats pneumonia and chest pains |
| Rukato | *Asparagus africanus* | Root extract for diarrhea and pneumonia |
| Mutsine/Blackjack | *Bidens pilosa* | Antioxidant; treats throat/chest infections, respiratory inflammation |
| Rufandichimuka | *Myrothamnus flabellifolius* | Tea for colds, bronchitis, and throat inflammation |
| Guava/Mugwavha | *Psidium guajava* | Fever relief, coughs, and colds |
| Munyii | *Berchemia discolor* | Used for body pains; fruits consumed as food |
| Bute/Umdombo/Snuff | *Nicotiana tabacum* | Induces sneezing to clear respiratory pathways |
| Mupuranga | *Eucalyptus grandis* | Clears colds and throat/chest infections |
| Lemon tree | *Citrus limon* | Alleviates throat infections and respiratory symptoms |

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(Source: Primary data).

These herbal responses reflect a hybrid model of healing that incorporates indigenous, homeopathic, and modern understandings of health and immunity. The covid10 pandemic coincided with the digital era, allowing communities to rapidly disseminate treatment strategies via social media. The commercialisation of herbs like *Lippia javanica* into teas and lozenges testifies to their perceived utility and growing demand.

Empirical evidence further supports the use of natural products. According to EUROCAM (2020), phytochemicals in natural products strengthen immunity and help prevent viral infections. Iwuoha and Aniche (2020) reported that in SADC regions, individuals recovering from health crisis credited herbal interventions—such as steaming garlic, turmeric, ginger, and lemon—with their recovery.

### *2.3. A Critical Review of Herbal Remedy Use, Consistency, and Policy Gaps in IKS-Based Health Responses*

The reliance on Indigenous Knowledge Systems (IKS) for managing health symptoms in Southern Africa, while culturally grounded and contextually relevant, reveals a number of critical challenges related to consistency, standardisation, and integration into national health systems. The data from the SADC region illustrate both the ingenuity of local communities and the fragmented nature of IKS applications during public health crises.

#### 2.3.1. Inconsistencies in Herbal Practices and Dosages

One of the most notable findings is the variation in the types of herbs used, the methods of preparation, and dosage regimes, often dictated by local ecological availability, seasonal cycles, and generational knowledge transmission (Mabhaudhi et al., 2019). For example, while Lippia javanica (Zumbani/Umsuzwane) and Artemisia afra (Mhlonyane/Lengana) were widely used, the methods of application ranged from steaming, boiling, and tea preparation to inhalation and topical use—each without formal dosage guidance. These inconsistencies can compromise therapeutic efficacy and raise concerns regarding safety, especially when herbs are taken in concentrated forms over prolonged periods without medical supervision (Patwardhan et al., 2005; Mahomoodally, 2013). Furthermore, the empirical accounts suggest a reliance on trial-and-error, community anecdotes, and social media-driven practices rather than clinical evidence. Such unregulated variability highlights the tension between deep cultural knowledge and the lack of biomedical validation—a recurring issue in ethnopharmacology (Moyo et al., 2015). While participants credited their recovery to these remedies, the absence of controlled studies or pharmacokinetic profiles limits the ability to generalise efficacy across the region.

#### 2.3.2. Epistemological Gaps and Integration Challenges

The rich botanical diversity and cultural acceptance of herbal medicine in the SADC region underscores the significance of IKS. However, its deployment during health crisis also reveals epistemological gaps between IKS and formal health systems. In particular, national pandemic responses in South Africa, Zimbabwe, Zambia, and Mozambique, among others, were predominantly aligned with World Health Organization (WHO) guidelines, which marginalised non-Western medical systems (WHO, 2020). This dichotomy reveals a broader historical legacy of colonial medical dominance and insufficient policy space for the validation and regulation of IKS (Chinsembu, 2016).

Health policies across SADC countries have largely failed to institutionalise traditional medicine within their public health strategies, despite its widespread use. For instance, the lack of standardised pharmacopoeias, clinical trials, and training curricula for traditional healers hinders formal recognition (Moshabela et al., 2017). South Africa's Traditional Health Practitioners Act (Act No. 22 of 2007) provides a framework, yet its implementation has been slow, and many traditional healers remain excluded from formal pandemic preparedness strategies (Van Niekerk, 2020).

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2.3.3. Regulatory and Quality Control Gaps

Another pressing issue is the lack of regulation and quality control in the commercialisation of IKS-based remedies. The recent pandemic led to a surge in the sale of herbal teas, steaming kits, and natural immune boosters in informal and formal markets. However, quality assurance, toxicity screening, and interaction effects with biomedical drugs were largely absent (Adeleye et al., 2022). The commodification of plants such as Artemisia afra and Eucalyptus oil, without regulatory oversight, creates risks for misuse, misinformation, and even herb-drug toxicity, particularly among patients managing co-morbidities like hypertension or diabetes (Ernst, 2000). These gaps are compounded by insufficient investment in pharmacological research and innovation systems capable of translating traditional knowledge into validated health products (Wekesa et al., 2021). Without partnerships between ethnobotanists, pharmacologists, and community custodians of IKS, efforts to bridge traditional and biomedical approaches will remain fragmented and ad hoc. A deeper structural issue also relates to the political economy of health knowledge production. Western biomedical paradigms dominate funding, research publication, and public health decision-making in the Global South, often relegating IKS to the periphery (Leach et al., 2012). The health crisis pandemic revealed a crisis of imagination in health governance, where scientifically unproven Western remedies such as hydroxychloroquine received disproportionate attention, while African herbal interventions were largely ignored or dismissed without rigorous investigation (Dandara et al., 2021). This marginalisation reflects broader issues of knowledge hierarchy, power, and epistemic injustice, where African health knowledge is seen as informal, anecdotal, or "unscientific" (Ndlovu-Gatsheni, 2018). Yet, the widespread use of herbal remedies and their perceived benefits demand a serious reconsideration of research and health policy priorities. The path forward requires multi-layered policy reforms that balance cultural respect, scientific rigour, and public health protection. First, national governments and regional bodies like SADC should establish centres of excellence for traditional medicine, supporting clinical validation, intellectual property protection, and healer training (WHO, 2013). Second, policy harmonisation across the region is essential to facilitate cross-border collaboration in herbal pharmacology, disease surveillance, and treatment innovation. Public health curricula should also be revised to include IKS competencies, ensuring that medical professionals are equipped to engage with local healing systems respectfully and scientifically (Kayombo et al., 2013). Equally important is the need for inclusive participatory mechanisms where communities, elders, and traditional healers co-create research agendas and treatment protocols (Gibbs et al., 2020).

The Covid-19 pandemic illuminated the crucial role of Indigenous Knowledge Systems (IKS), particularly the use of herbal medicines, in community-level responses across the SADC region. Despite the absence of institutional support, communities drew upon centuries-old plant-based remedies to manage respiratory symptoms and enhance immunity. This localised resilience demonstrated not only the cultural embeddedness of traditional medicine but also its potential contribution to health system resilience during crises.

However, the study also exposed significant limitations. Inconsistencies in herbal usage, lack of dosage standardisation, insufficient clinical validation, and policy marginalisation of IKS remain critical barriers. These challenges are deeply rooted in historical exclusions, epistemic hierarchies, and the biomedical dominance that shape national health policies. Without urgent and deliberate action, the potential of IKS to complement formal health systems will remain untapped, and communities will continue to rely on informal practices without safeguards.

The findings call for a paradigm shift—one that embraces transdisciplinary collaboration, fosters epistemological inclusion, and elevates the role of IKS in public health planning, research, and policy. The SADC region has a unique opportunity to lead in the integration of traditional medicine into formal health systems in ways that are culturally appropriate, scientifically sound, and ethically grounded.

2.3.4. Recommendations

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This study makes the following recommendations but they should not be limited to the following.

- Establish Regional Centres of Excellence for Traditional Medicine Research: Governments and regional bodies such as SADC should invest in institutions dedicated to the scientific validation, standardisation, and documentation of medicinal plants used in Indigenous Knowledge Systems.
- Integrate IKS into National Health Policies and Emergency Response Plans: Health ministries should revise their policies to formally recognise traditional medicine as a complementary system, including it in pandemic preparedness and response frameworks.
- Develop and Implement Quality Control Protocols for Herbal Products: National regulatory agencies must develop guidelines for the safe processing, packaging, and sale of herbal products, ensuring efficacy, dosage consistency, and prevention of herb-drug interactions.
- Facilitate Collaborative Research between Traditional Healers and Scientists: Transdisciplinary research teams involving ethnobotanists, pharmacologists, and traditional healers should co-produce knowledge to bridge the gap between empirical science and Indigenous practice.
- Protect Intellectual Property and Traditional Knowledge Rights: Legal mechanisms should be instituted to protect the intellectual property rights of Indigenous communities and ensure benefit-sharing in cases of commercialisation of herbal remedies.
- Strengthen Training and Certification Pathways for Traditional Health Practitioners: Formalised training and certification programs should be developed to improve the safety and legitimacy of traditional medicine practice, aligned with public health standards.
- Include IKS in Public Health Education and Health Worker Training: Medical and public health curricula should incorporate modules on Indigenous health systems, fostering mutual respect and integrative care approaches among future healthcare professionals.
- Encourage Community Participation in Health Governance Public health policies should be co-designed with community members, ensuring that local voices, especially those of women and elders who are custodians of IKS, shape decisions.
- Promote Cross-Border Harmonisation of Traditional Medicine Frameworks: SADC member states should collaborate to harmonise regulatory approaches, share research data, and support joint clinical trials of regionally used medicinal plants.
- Mobilise International Funding to Support IKS Research and Innovation: Governments and development partners should allocate targeted funding streams to support innovation in Indigenous health systems as part of broader health systems strengthening strategies.

Given that much of IKS is passed down orally, often informally, there is limited understanding of how it is preserved, adapted, and transmitted in different contexts. This gap highlights the need for research into the methods of documenting, sharing, and safeguarding IKS, particularly in times of global health crises (Yimer et al., 2021). Additionally, gender dynamics within traditional medicine warrant deeper exploration. Women, as primary caretakers and knowledge bearers of medicinal plants in many African societies, play a pivotal role in the application of IKS. Understanding the specific contributions and challenges women face in disseminating this knowledge would help address the gendered barriers to accessing and utilizing traditional healthcare (Walters et al., 2021).

Research should also focus on the commercialisation of Indigenous herbal products. While many herbs like Zumbani have been marketed as tea and other consumer products, there is a need for studies evaluating the equity of this commercialization. Research should address how value chains can be developed to benefit local communities while preventing the exploitation of Indigenous knowledge (IFAD, 2020). Comparative policy analysis is another key area. While some countries,

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such as China, have successfully integrated IKS with modern medicine, many African nations lag in formalizing these practices. Future research should examine successful policy models from countries like China and assess how these models can be adapted to the SADC and BRICS regions, balancing cultural respect with scientific validation (DiPietro & Mondie, 2021; Rankoana et al., 2015).

Incorporating digital and AI tools into the documentation and dissemination of medicinal plant knowledge could be transformative. Creating comprehensive, digital databases of medicinal plants would help preserve IKS while making it accessible to future generations of researchers and practitioners (Dandara, Dzobo & Chirikure, 2021). A critical research gap also exists regarding herb-drug interactions. With the increasing use of both traditional remedies and modern pharmaceuticals, especially among vulnerable populations, research on potential negative interactions is crucial. Understanding these interactions could guide healthcare providers in preventing adverse effects in patients who use both systems simultaneously (Kim et al., 2021). Finally, the development of traditional medicine protocols should be prioritized in national pandemic preparedness strategies. Such protocols would standardize the use of IKS in healthcare, ensuring that it complements, rather than conflicts with, modern medical approaches in response to health emergencies (WHO, 2013). The protection of intellectual property rights surrounding Indigenous Knowledge is another area in urgent need of research. Indigenous communities must be empowered to protect their medicinal knowledge, ensuring that it is used ethically and that they receive fair compensation for its commercial use (Dhewa, 2020).

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