The Role of Medicinal Plants in Healing Coronavirus Pandemic in Songwe Region, Tanzania

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Abstract

This research qualitatively explored the role of medicinal herbal plants in healing COVID-19 in Tanzania, focusing on the Songwe Region as a case study. Study participants included traditional leaders, elders, traditional healers, medical doctors, ward executive officers, village executive officers, and social community workers. Data were collected through in-depth interviews, focus group discussions and documentary reviews. Furthermore, content analysis was utilised as a tool for analysing the data. The study reveals that certain medicinal plants—like cluster fig (mkuyu in Swahili), oleifera (mlonge in Swahili), chibhangalume roots in Kinyiha, and Chindali, Luvumbe leaves in Kinyiha and Mguluka roots in Chindali were used to heal symptoms associated with the COVID-19 pandemic, such as coughing, flu, chills, respiratory distress and fatigue. These herbal remedies were primarily employed to address coronavirus-related maladies and promote overall health and wellness. The findings indicated that participants perceived these plants as productive in healing COVID-19, compared to conventional pharmaceuticals. The study suggests integrating medicinal herbal plants into public health to effectively combat the spread of COVID-19 in Tanzania.

Keywords*: medicinal plants, healing, coronavirus pandemic, Songwe, Tanzania*

Introduction

Since December 2019, the global community has been battling the coronavirus pandemic, commonly known as COVID-19. The pandemic has spread across almost every part of the world. According to Mkandawire et al. (2021), as of August 20, 2021, there were 22 million confirmed cases and one million fatalities globally. The ongoing COVID-19 outbreak has induced a worldwide (Ciotti et al., 2020). The pandemic originated in China and rapidly expanded across the globe, with Europe, particularly Italy, becoming the epicentre at one point (WHO, 2020). The virus's spread has been facilitated by the highly interconnected global transportation network, a hallmark of globalisation (Mkandawire et al., 2021). As a global hub, New York City was among the cities most affected by COVID-19 due to its ties to the effects of globalisation. In 2021, Mkandawire et al. hypothesised that a dialectical relationship exists between COVID-19 and globalisation. Research by Gereffi (2020) and Tsegaye (2020) has further supported this view, revealing that the pandemic has significantly restricted the functioning of the open trade, banking, and mass transport systems. In response, public health interventions such as lockdowns, social distancing, mask-wearing, and hand sanitization were implemented to curb the spread of the virus. Despite these efforts, COVID-19 spread

worldwide, leading to profound social and economic changes within just a few months (Mkandawire et al., 2021).

Moreover, Müller-Mahn and Kioko (2021) maintain that in Africa and other parts of the world, the COVID-19 pandemic was perceived as a threat to health, lives, economic prosperity, social relations, and livelihoods in particular, as the end of the dream of rapid development. Similarly, a study by Mkandawire et al., (2021) found that the pandemic's travel restrictions forced both European and African countries, along with their local representatives, to return home in March 2020. The COVID-19 crisis had many unexpected dimensions, and efforts to mitigate its effects such as infection rates, containment measures, economic downturns, and social disruptions were not always straightforward. For example, Lalaoui et al. (2020) identified several factors that may have contributed to the outbreak and spread of the coronavirus in African countries. These factors included insufficient medical infrastructure for detecting and confirming COVID-19 cases, international air traffic flows, climate, and the presence of a relatively young and rural population.

Various governments implemented varying responses, with preventive measures typically resulting in more severe effects than the pandemic itself, especially for the most impoverished and susceptible individuals in society (Asante & Mills, 2020; Schmidt et al., 2020a; Schmidt et al., 2020b). In response to COVID-19, Africa exhibited a wide range of national approaches and infection trends similar to those observed in the Global North. These efforts encompassed public health recommendations and travel restrictions aimed at controlling the spread of the virus. Schlindwein (2021) documented that Rwanda was the first African country to impose a comprehensive lockdown on March 22, 2020, followed soon after by South Africa and Kenya. The South African government imposed a highly restrictive lockdown enforced by the army. However, neighbouring countries like Uganda implemented less stringent protective measures or even downplayed the situation's urgency, like Tanzania under the former President the late John Magufuli's approach (Schlindwein, 2021). Although these stringent measures were necessary, after their implementation, there was a notable increase in poverty and unemployment. As a result, countries like South Africa decided to rescind the restrictions in late April, even before the pandemic was controlled. Moreover, there was a rise in infection rates, and South Africa had the largest number of infections in Africa, ranking fifth among the nations most impacted globally (Müller-Mahn & Kioko, 2021).

Moreover, the measures adopted to control the pandemic created challenges in providing healthcare services. Bajaria and Abdul (2020) report that in China, a country known for its strict quarantine measures, 23% of individuals living with HIV faced difficulties in accessing their medications. Furthermore, 68% of individuals in China expressed concerns about potential disruptions in medication supply and future access to clinical care. Another factor hindering access to healthcare services was the cost of requiring masks for anyone visiting healthcare facilities (Bajaria & Abdul 2020).

The initial outbreak of COVID-19 in Tanzania was identified on March 16, 2020. Compared to other nations, there was a relatively marginal rise in cases. By April 28, 2020, Tanzania had recorded 299 confirmed COVID-19 cases, resulting in 10 deaths. By May 22, 2020, the number

of cases had increased to 509, with 21 deaths, indicating a continuous increase in infections (Bajaria & Abdul, 2020). Unlike most African countries, Tanzania's government did not impose lockdown measures, recognizing that such restrictions would limit public access to healthcare services (Maluleka, 2020).

Consequently, the government swiftly eased containment measures during the initial surge of the virus. Lockdowns were deemed ineffective due to their potential to immobilize individual and national economies and trigger various social dysfunctions. Indefinite lockdowns have also negatively impacted the immune system, making individuals more vulnerable to infections (Lofti et al., 2020). For instance, places of worship remained open, international travel restrictions were lifted on May 18, 2020, and the requirement for international travellers to self-quarantine for 14 days was omitted. Despite this, the government took decisive actions to mitigate the spread of the virus (Bajaria & Abdul, 2020). During the initial wave of the pandemic, various measures were implemented to contain the spread of the virus, including the prohibition of public gatherings, suspension of in-person classes at educational institutions, and the cancellation of football leagues and political rallies.

Furthermore, the government urged citizens to avoid non-essential travel and overcrowded areas. As part of their effort, restrictions were imposed on international and cross-border travel, with individuals entering the country requiring a 14-day self-quarantine. Initially, individuals predominantly relied on pharmaceuticals, as advised by medical professionals, to manage COVID-19 symptoms. However, after multiple trials and errors in treating COVID-19, they resorted to utilising medicinal plants to alleviate symptoms related to the virus (Kaaya et al., 2021). Consequently, the emergence and global dissemination of the Coronavirus pandemic has necessitated an investigation into the therapeutic potential of medicinal plants in combating the pandemic. The limited effectiveness of pharmaceutical medicines in healing COVID-19 has led to recognising traditional herbal medicines as a viable remedy.

Literature review

Globally, around 80 per cent of the population, primarily in Africa and other developing regions, relies exclusively on traditional herbal medicines for disease healing (Okoye et al. 2014). Africa presents a vast repository of cultural and genetic resources, including medicinal plants. Its unique and diverse indigenous cultures have produced a rich heritage of traditional knowledge on using plants for healing, communication with the gods, and food (Maurice, 2013). Sub-Saharan Africa has an estimated 50,000 unique plant species with healing potential. Of them, 25 per cent, more than 2,000 species, are employed in indigenous African medicines and have been used for centuries to prevent and cure various diseases. Despite this wealth, Africa remains a minor player in the global natural products market, largely due to a lack of practical information (Maurice, 2013).

Medicinal plants for healing come with both beneficial and harmful consequences. Certain plants have been scientifically validated for healing ailments such as bacterial, fungal, protozoal and viral infections, cancer, diabetes, and numerous other conditions (Fennell, 2004). Generally considered non-toxic, these plants contain beneficial properties, including tropine, berberine, hirsteine, hirsutine, isorhychophylline and palmatine. However, even beneficial

medications can become harmful if misused, such as in high doses or over prolonged periods. It is also important to note that certain plants can be toxic or harmful to humans. These plants may contain harmful compounds like anabasine, aristolochic acids, nicotine, sanguinarine and solanine.

Currently, the number of medicinal plants is increasing mainly due to their easy availability, affordability, accessibility, and promising efficacy, comparable to the high cost and adverse effects of pharmaceutical drug agents. Moreover, traditional medicinal plants are considered safer because they are natural. For these reasons, traditional medicinal plants are gaining popularity compared to pharmaceuticals in preventing and healing COVID-19 due to the long-standing use and availability of known medicinal plants throughout history. Moreover, world health scientists are still struggling with biomedicines to heal the disease with limited success. In terms of affordability and accessibility, traditional medicinal plants can be effective in healing COVID-19 (Adu-Gyamfi & Anderson 2019). As Jangu (2012) observed, in Africa, this healing system is rooted in people's culture and beliefs in connection to the land and its flora and fauna, which involve using traditional medicines and knowledge practice outside the biomedical. The medicines are derived from plants, animals or minerals depending on the specific healing needs.

Medicinal plants have been used to treat both communicable and non-communicable diseases since the mediaeval period. Because they can biosynthesize voluminous bioactive phytochemicals (Li et al., 2020). The African continent has various herbs used to heal diseases over the years, depending on the environment, people, and culture (Janzen, 2000). The arrival of Europeans in Africa significantly changed the medical landscape. Initially, Europeans respected African traditional healers and occasionally adopted their remedies. However, in the early 20th century, European doctors became suspicious of African treatment methods. They questioned its effectiveness and efficacy, and the scepticism was further fuelled by the rise of missionary and colonial medicines.

With the expansion of Christianity in Africa, the African healing system was seen as primitive and unable to treat diseases, leading to the promotion of Western medicines as the superior option (Graboyes, 2014). Missionaries used healthcare services to attract people to Christianity. However, they faced resistance, given that Africans had their own system of healing, leading to low conversion rates. Missionaries in most African countries attributed their reluctance to join Christianity to their superstitions. For instance, Christian missionaries in South Africa viewed African witch doctors as hindrances in their task of spreading the gospel (Beck, 1979; Feierman, 1985; Flint, 2008; Langwick, 2011).

Besides missionary resistance to traditional medicines, the marginalisation of traditional healers was reinforced by the colonial policies and bylaws. Colonial authorities feared African healers were very influential and could organise an anti-colonial rebellion. As a result, different colonial laws and orders targeted to weaken the power of traditional healers were enacted. For instance, German East Africa shows that traditional healers were arrested, beaten, and, in most cases, murdered, as it happened during the British rule in Tanganyika, where the British government passed the Witchcraft Ordinance in 1922, which outlawed the practice of African

healing. This legislation decision aimed to prevent the occurrence of another rebellion led by traditional healers, as in the case of the Majimaji war (Beck, 1979; Feierman, 1985; Flint, 2008; Langwick, 2011). Thus, the Western people, through colonialism, introduced a new healing mechanism using modern medicines.

As a result, indigenous people who persisted in using traditional remedies were perceived as irreligious and primitive. However, since the practice of traditional healing was part and parcel of African cultural beliefs and the health care system, Africans did not remain silent. They reacted in different ways against maltreatment done by the colonialists. For example, Africans protested against the marginalisation of traditional healing in Nigeria in 1922 (Arazeem, 2011; Flint, 2008). Regardless of the maltreatment done by the colonial government, traditional healing continued to exist throughout the colonial era. They recognised the value of their healing traditions, as these remedies were deeply ingrained in their cultural identity and had proven effective for generations. Even under external pressures to abandon their practices, many Africans continued to trust their indigenous medicines, highlighting their determination to safeguard their valuable heritage for the well-being of their communities.

Notably, establishing biomedicines in Africa has led to Africans experiencing different health-related challenges (Arazeem, 2011; Flint, 2008). Due to the geographical diversity of different African countries, health services and related services could not reach all people. Moreover, the ineffectiveness of biomedicines in treating and healing some diseases increased hesitancy in Africans, which gave African medicines a competitive advantage over Western medicines (Flint, 2008).

After independence, government policies on traditional healing varied over time. The Tanzania government recognised the importance of traditional healing during the first decade of independence. In 1968, research officers in the Ministry of Agriculture and Cooperatives Development attended the first symposium on African medicinal plants in Senegal (Langwick, 2011). Upon their return, they emphasised the need to scientifically explore the use of African medicinal plants in treating diseases. The Consolidation of traditional healing into Tanzanian healthcare from the 1960s to 1980s was part of the Ujamaa and Self-reliance Policy. In 1971, Umoja wa Waganga Tanzania (UWATA) was formed as an organisation of traditional healers in the country (Arazeem 2011) with the aim of fostering collaboration and integration between traditional and western medicines as well as improving healthcare access in Tanzania while preserving cultural heritage in healing practices.

Furthermore, the Traditional Medicines Research Unit was formed in 1974 and 1982, the government placed traditional medicines under the Ministry of Culture (Jangu, 2012). A similar recognition happened in Nigeria in 1966. The Nigerian minister of health authorised the University of Ibadan to research the medicinal properties of local herbs to regulate the use of traditional medicines. By the 1980's, Nigerian policies were enacted to accredit and register traditional healers. Such incidents paved the way for the establishment of the National Traditional Healers' Board at the federal level (Arazeem, 2011). Thus, in both governments, the consideration of traditional medicine is emphasised.

This is not to suggest that traditional healers received preferential treatment for their services in post-colonial Tanzania; various underlying forces influenced the introduction of policies to monitor traditional healing. One such factor was the increase of social crimes, such as self-inflicted harm and murder. For example, between 2007 and 2010, traditional healing practices were linked to the killing of Albino, especially among the Sukuma people in Tanzania (Jangu, 2012). This contributed significantly to disregarding the failures of biomedicines. Furthermore, increased competition within the increasingly commoditised medical landscape led biomedical doctors to campaign against patients' reliance on traditional medicines. Evidence from Kyela District, Tanzania, shows that biomedical doctors associated traditional healing with witchcraft, which has been perceived as a source of illness among the people (Marsland, 2007).

However, the eruption of various diseases, such as global flu outbreaks that challenge biomedical doctors, high child mortality and morbidity, poor infrastructures, lack of political commitment, corruption and limits of biomedical knowledge, reminds people of the need to invest in both biomedicines and medicinal plants. Since the first COVID-19 report in Wuhan, China, in 2019, efforts to prevent and heal the disease have been ongoing. However, no direct biomedical cure for COVID-19 has been found. This pattern is consistent in Tanzania, where the response to new diseases typically relies on biomedicine. However, with COVID-19, the initial biomedical approaches did not yield results, prompting some individuals to turn to indigenous medicine, as in Tanzania. This trend is also widely connected to the virus's mutations, which have complicated treatment efforts. In their attempt to save lives, biomedical doctors did their best, often without achieving their target goals (Burrows and Engelke, 2020). More recently, the failure of biomedical doctors to develop viable solutions for COVID-19 has given traditional healing practices a competitive advantage (Kaaya et al., 2021).

Amidst the ongoing COVID-19 epidemic, prejudices about the suitability of traditional medicines persist among global entities and populations (Mlozi, 2022). The emergence and global spread of the coronavirus pandemic highlighted African healing mechanisms. In Africa, this healing practice is deeply ingrained in local culture and beliefs, emphasising the link between people and the land and the use of materials derived from its flora and fauna. It involves the use of medicines and knowledge practice outside the biomedical framework. Depending on specific healing requirements, these medicines are derived from plants, animals or minerals (Jangu, 2012). In this form of healing, individual health is connected to metaphysical and supernatural elements (Adu-Gyamfi & Anderson, 2019).

While countries worldwide imposed strict measures such as lockdowns and the suspension of international flights to combat the disease, Tanzania took a different approach, focusing on social distancing and other hygienic measures. The country rejected lockdowns, curfews and border closures (MHSW, 2020). For instance, the Ministry of Health and Social Welfare established steaming points in national parks and at Muhimbili National Hospital (Mbise, 2021). Additionally, private individuals set up streaming points to offer services to those who sought them. Due to the combined use of biomedicines and traditional medicinal plants, statistics in Tanzania showed a significant decrease in COVID-19, from a peak of 480 cases on April 28, 2020, to fewer than 200 by May 2020 (URT, 2020; Lema, 2021). These outcomes suggested that medicinal properties effectually curbed the progression of the disease. As a

result, the government decided to re-open tertiary education institutions by June 1, 2020, with caution that hygienic measures, as periodically issued by health experts, be strictly observed.

The World Health Organisation recognizes the numerous benefits of traditional, complementary and alternative medicines. Africa has a long-standing history of traditional medicine and practitioners who play an important role in providing healthcare to the population. Medicinal plants such as Artemisia annua are considered potential treatments for COVID-19 and should be tested for both efficacy and potential side effects (Adu-Gyamfi & Anderson, 2019). Herbs, roots, and animal products are believed to possess inherent healing properties. These natural elements are carefully selected and prepared by traditional healers, often regarded as having supernatural powers, drawing on generations of knowledge passed down through oral tradition. Furthermore, Mlozi (2022) shows that in Tanzania, commonly used plants for healing COVID-19 include eucalyptus species, pepper, berries, ginger, garlic, onions, and lemon.

Despite political disagreements, COVID-19 continues to pose a significant public health threat in Tanzania. While the daily number of new cases remained low at the beginning of the epidemic in February and March 2021, the infection rate increased significantly in June and July, reaching an average of 100 new infections per day (Kaaya et al., 2021). Although the incidence has since been decreased to a few cases per day, concerns persist that the actual numbers may be higher due to limited widespread testing. Even with the introduction of biomedicines globally, many people in Africa, particularly in Tanzania, continue to rely heavily on traditional medicines. Several factors contribute to this reliance, including high medical costs, long waiting times, limited experience and training among some healthcare providers, and financial incentives that lead some providers to focus on private clinics. The efficacy of traditional healing often depends on the indigenous healer's knowledge of the illness, the patient's knowledge of their condition, the composition of the medicines, and whether the patient's body responds positively to the treatment (Adu-Gyamfi & Anderson, 2019).

Despite several studies on the containment and healing of the COVID-19 epidemic, particularly in Africa and Tanzania, little research has been conducted on the potential of medicinal plants in treating the virus. Most research has focused on the causes, transmission, and prevention of the virus using pharmaceutical methods (Mlozi 2022; Mkandawire et al.2021; and Sytar 2021). Furthermore, no pharmaceutical approach has been confirmed to heal COVID-19 in Tanzania. The study investigates alternative modalities of traditional medicines for healing COVID-19 in Tanzania, with the main objective of examining the role of medicinal plants used to heal COVID-19 and its related symptoms in the study area. The findings aim to empower Tanzanians afflicted by viral infections, such as severe pneumonia and influenza, to use medicinal plants as an alternative therapeutic approach. Moreover, the findings contribute to the existing body of knowledge on using medicinal herbal plants to treat the pandemic.

Methodology of the study

Research design and participants

This study employed a cross-sectional design within a mixed-method research approach. The mixed-method research approach was applied for triangulation and complementarities

purposes (Creswell, 2013), ensuring that the strengths of the other addressed the limitations of one method. The design was used to investigate the role of medicinal plants in treating the Coronavirus pandemic in the Songwe region. Participants were recruited from three districts in the Songwe region: Ileje, Momba and Mbozi.

Study area

This study was conducted in three districts of the Songwe region: Momba, Mbozi and Ileje. Songwe is one of the 31 administrative regions in mainland Tanzania, divided into four districts. The area is located in the extreme southwest corner of the country in the Southern Highlands. It borders Zambia and Malawi to the south, Rukwa and Katavi regions to the West, Tabora to the North and Mbeya to the East.

Several factors informed the selection of the Songwe region as the study area. Firstly, the region has a robust traditional healing system, and many individuals possess knowledge of traditional healing (Marsland, 2007). Furthermore, the area is a frontier, connecting Zambia and Malawi, with Tunduma as the gateway to Zambia and Isongole as an entry point into Malawi. The area has witness a significant influx of truck traffic, contributing to the transmission of COVID-19. Songwe also has one of the highest HIV/AIDS prevalence rates. According to a recent TACAIDS report (2020), the prevalence of HIV/AIDS infections among the adult population is 9.2%. In 2019, the national HIV/AIDS infection rate was 48%, but the Southern Highlands displayed higher infection rates of 9.1% (Mbunju & Mpambije, 2020).

The region is experiencing a surge in COVID-19 cases. HIV/AIDS and COVID-19 are both contagious diseases, but their modes of transmission differ. HIV/AIDS exacerbates the severity of COVID-19, increasing the likelihood of hospitalisation in affected patients. For instance, Bhaskaran et al. (2021) reported that the mortality rate of individuals with HIV who contract COVID-19 is approximately 80% higher than that of individuals without HIV. Furthermore, a South African cohort study found that COVID-19 mortality among HIV-infected people was twice that of non-HIV-infected people. Studies conducted in Madrid, Spain, and England also confirmed that people living with HIV are at a higher risk of contracting and dying from COVID-19 (Bhaskaran et al., 2021). Consequently, the people in these areas face significant challenges due to the COVID-19 pandemic, with HIV/AIDS further weakening their immune systems, making them more vulnerable to the virus.

Research approach and sampling procedures

The study employed a qualitative research approach. Qualitative research focuses on understanding how people make sense of their world and their experiences (Merriam, 2009). This approach allowed for a deep and detailed examination of the study topic, participants, activities, and the socio-cultural, and political context of the study area. It was particularly useful in exploring issues that cannot be fully captured through statistical investigations (Tewksbury, 2009).

The study employed a multistage sampling technique combining random and purposive sampling. The Songwe region and its three districts were purposively selected. Simple random sampling was used to select wards and villages from three districts. Traditional healers,

COVID-19 patients and key informants such as medical doctors, Ward Executive Officers, Village Executive Officers, traditional leaders (mamwene), CHAWAKIWATA leaders, elders and social workers were selected purposively for Focus Group Discussions (FGDs) and in-depth interviews, as they were considered to have crucial information related to the research theme.

Data collection methods and analysis techniques

Data were collected through in-depth interviews, FGDs, field observations and documentary reviews. In-depth interviews were conducted with ten traditional healers, three medical doctors, twelve Ward Executive Officers, twenty-four Village Executive Officers, three CHAWAKIWATA leaders, six traditional leaders (mamwene) and three social and community workers. Interview guides were prepared in Kiswahili and translated into Chindali and Kinyiha to facilitate communication with traditional healers, who were native speakers of Ndali and Nyiha. An expert reviewed the translations to ensure accuracy and validity. Interview sessions lasted between 30 minutes to one hour and were tape-recorded with verbal consent from participants.

FDGs were conducted with fifty-four traditional healers, organized into nine groups with six members each–three groups from each district (Momba, Mbozi and Ileje). The discussions focused on how COVID-19 and challenges faced by traditional healers.

Field observations were also conducted to verify the data collected through other methods. These observations focused on resources such as herbs, roots, and animal products believed to possess healing properties. Documentary reviews were conducted to supplement the data obtained from interviews and FDGs.

Data analysis

Qualitative data analysis was employed to process the collected data. Interviews, FGDs and documentary reviews were analysed using content analysis, as suggested by Denscombe (2007). The data were organised into manageable units, coded, summarised and categorised into key themes based on participants' responses and study objectives. The recorded dialogues were deconstructed into fundamental units of information for further analysis. An expert in traditional medicine and English validated the coherence of the transcriptions, ensuring accuracy in the translations and thematic development.

Ethical consideration

This study adhered to ethical research protocols, as outlined by Creswell and Poth (2018) and Mills and Gay (2016). Research clearance was obtained from the Vice Chancellor of the University of Dar es Salaam. Permission was then sought from the Regional Administrative Secretary (RAS), who authorised access to the District Executive Directors. Introductory letters were presented to the heads of traditional healers in the respective districts. Participants were informed about the nature of the study and allowed to discontinue their participation at any time. All data were anonymized to protect the participants' identities. Lastly, all scholarly sources used in the study were properly acknowledged.

Results and discussion

The role of medicinal plants in healing COVID-19

The objective of this study was to examine the role of medicinal plants in the healing of COVID-19 in the study area. Findings from in-depth interviews and FGDs revealed the widespread use of various medicinal herbal plants to heal COVID-19 and its related symptoms. The choice of herbal plants in the area normally depended on access to those plants. The pandemic served as a reminder for leaders and citizens to return to traditional medicines. Many Tanzanians rediscovered and relied on their traditional medicines in the early days of the outbreak. A notable method used in the study area was herbal steam inhalation, locally known as kupiga nyungu in Swahili and ukwijhinika in Chindali. This practice, involving herbal components such as eucalyptus and Artemisia, gained widespread popularity. Steaming points were established in private and public spaces across districts.

The results of the current study align with earlier findings by Jangu (2012), indicating that in Tanzania, since the outbreak of COVID-19, there has been a struggle to find ways to combat the disease. This pattern is consistent with responses to the emergence of other new diseases. Traditionally, people have relied on biomedicines since its introduction to Africa. However, during the early stages of the COVID-19 pandemic, biomedical treatments did not yield positive results, leading some individuals, like those in the Songwe region, to supplement biomedicine with indigenous remedies. This does not mean doctors failed to provide any treatment to COVID-19 patients. Rather, scientists developed different remedies based on the symptoms of the pandemic. Alongside biomedical treatments, traditional medicinal plants were also used in the study areas, contributing to the healing process. The inability of biomedical doctors to offer immediate, effective solutions to COVID-19 created an opportunity for traditional medicine to serve as an alternative. In response, traditional herbalists promptly filled the gap left by scientific medicine, becoming significant providers of therapies for COVID-19-related symptoms. As noted, different herbal plants have been used as sources of medicine since ancient times, and their role in addressing the COVID-19 pandemic highlights their enduring importance.

The results show that within the designated research region, COVID-19 symptoms were healed through medicinal herbal plants. A key informant, a leader among traditional healers in the Songwe region, emphasised that traditional healers' extensive knowledge and skills in medicinal practices have been widely acknowledged and valued throughout the current pandemic. In addition to Eucalyptus species, pepper, berries, ginger, garlic, onions, lemons and oranges– rich in vitamin C–were extensively used. Self-immolation (the practice of inhaling streams) was also commonly employed.

These findings align with Maurice's (2013) study, which reported that herbal medicines are usually used to treat acute diseases prevalent among the rural poor in villages, such as diarrhoea, snakebite, pneumonia, parasitic infections, tuberculosis, and pregnancy complications, sickle-cell anaemia, and rheumatic heart disease. On the other hand, diseases such as diabetes, hypertension, and various types of cancer are considered diseases of affluence.

In traditional medicine, the first step in managing such conditions involves promoting lifestyle changes, followed by administering appropriate medicinal plants.

Furthermore, the COVID-19 pandemic promoted the use of traditional medicinal plants as supplements to biomedicines. There is no direct biomedical cure for COVID-19, largely due to the virus's ongoing mutations over time. Despite different biomedical treatments, the lack of recognised healing options for COVID-19 patients created space for the use of remedies, commonly referred to as "traditional healing". However, the term "traditional" lowers the status of this healing practice by implying outdated or old-fashioned methods. In recognition of the tremendous contributions made by traditional healers to publish health, it is more appropriate to refer to this approach as "natural remedies".

Information gathered from key informant interviews highlighted that traditional herbal medicines such as *willigis kiwaya*, also known as eucalyptus (*mkaratusi*), are used to treat flu and coughs. This remedy is administered through inhalation, causing irritability in the nasal passages, which helps relieve symptoms. The findings of this study concur with those of Kaaya *et al*. (2020), who reported that people in Moshi used *mchunguchungu* to treat COVID-19. Their research further expounded that traditional medicines, primarily derived from plants, were used to treat illnesses and enhance general health and well-being.

Participants in the current study indicated that some plants, such as eucalyptus and Artemisia, were as effective in treating COVID-19 as some biomedical treatments. For instance, a traditional healer identified medicinal plants like *Mlingoti Mweupe* and Eucalyptus (*Mkaratusi*), whose leaves are boiled and inhaled to help alleviate COVID-19 symptoms.

For example, *Mkuyu* in Swahili, or cluster fig in English, is effective for treating asthma, dry cough, bronchitis, and laryngitis (*mizighi.blogspot.com,* accessed September 2, 2021). In one instance, 200 grams of immature cluster fig leaves were used to reduce body temperature. The remedy was prepared by grinding the leaves and boiling them in one to two litres of water. The recommendation dosage was half a teacup taken three times a day.

Furthermore, the leaves of the *Artemisia tree,* combined with cluster fig leaves, were used to treat malaria and fever. Based on the existing research, *Artemisia* has long been recognised as a renowned remedy for malaria and is believed to hold potential in treating COVID-19. Key informants from one district reported that medicinal plants for curing fever were mixed to provide relief to COVID-19 patients, given the symptoms overlap between COVID-19 and fever, such as a rise of body temperature. Medicines that regulate body temperature and increase oxygen levels were widely used.

Evidence shows that, from the earliest time of the outbreak, many people used natural remedies like garlic fasting, lemon, and gingers to prevent infection and combat bacteria in the body. Another form of treatment included inhalation therapies and tasting herbal medicines to regulate breathing.

The results also revealed that boiled water mixed with herbal plants such as *Mlingoti Mweupe,* Muhogohogo *and Mkaratusi* were used to treat flu and severe viral pneumonia. This practice

was confirmed during an in-depth interview with the Medical Doctor in charge of one of the Districts, who noted:

> *We have been receiving many patients with complaints of fever, flu, chest pain, fatigue and headache. Notably, some of these individuals reported using herbal medicines. (Medical Officer, District 1, October 12, 2021).*

These findings illustrate that medicinal plants in the study area are crucial in providing relief from viral diseases. The study further identified specific medicinal plants used to treat COVID-19, including Chibhangalume roots in Kinyiha and Chindali languages, Luvumbe leaves in Kinyiha and Mguluka roots in Chindali. In response to how the medicine was prepared, a traditional healer from Vwawa in the Songwe Region explained:

> *You grind the medicines after drying them to make powder, and the patient sniffs that powder to treat flu, fever, viral pneumonia, and influenza. The process involves inhaling a concoction of boiled medicines to heal flu, injury and headache. In Chindali, the practice is referred to as ukwijhimika or ukwifukisha (Traditional healer, Vwawa Songwe Region, October 20, 2021).*

The above statements show how medicinal plants were prepared and administered in the study area for healing purposes. For treating fever, cough and other COVID-19-related symptoms, such as severe pneumonia, respondents asserted that specific mixtures of medicinal plants were used based on the patient's medical history. In Kinyiha, commonly used plants included *Rwangwa* roots, *Mhogopoli* roots, and Kasapania roots. Other traditional medicines included *Chibhangalume* roots, *Luvumbe* leaves, *Mguluka* roots and *Tulatula* fruits. The preparation involved grinding the plants into a powder, which the patient would sniff for five to ten minutes. If the patient persisted, the treatment was modified with a new mixture containing *Rwangwa* (red), *Mhogopoli* and *Kasapania*.

The findings align with studies conducted outside Tanzania. For example, Adu-Gyamfi and Anderson (2019) reported medicinal plants could be incorporated into food, ribbed into the patient's gums, added to bath water, or worn nearby as protective amulets. Similarly, research in Ghana, Mali, Zambia, and Nigeria reveals that the first line of treatment of children with high fever caused by malaria often involves herbal medicines. Specifically, in Nigeria, about 522 effective medicinal plants have been documented for treating different diseases, including infections related to HIV/AIDS (Arazeem, 2011).

Notwithstanding, information gathered from traditional healers at Vwawa Township, located in the Mbozi district, indicated that they successfully treated patients with severe pneumonia, fever, and headache within three months. These healers utilised traditional medicines, notably *Chibhangalume* roots and *Tulatula* fruits, administered through herbal steam inhalation, a method referred to as *ukwijhinika* in Chindali.

In terms of affordability, people proffered this traditional healing system due to its cost-effectiveness compared to pharmaceuticals. The popularity of traditional medicines was attributed to their availability, low cost, ease of preparation and their alignment with patients' medical history. Furthermore, an interview with the leader of traditional healers in the region

indicated that the *Unamwafipa* and *Unamwachikali* roots were among the medicines used to treat COVID-19-related symptoms. The roots were prepared by heating stones until red hot and placing them into boiling water at 100 degrees Celsius. The patient was then wrapped in a heavy cloth, allowing the water vapour to aid in healing. The healing technique, also known as *ukwijhinika*, was used to treat flu, smallpox, fever and severe pneumonia. The process was typically performed early in the morning, with each session lasting 5-10 minutes after placing the stones in boiling water.

In a similar vein, Hinkanen (2009) documented the widespread use of medical plants in Tanzania for treating diverse ailments. For example, *Lwenyi* and *Kipumbasi* are medicinal plants used by the Sukuma of Mwanza, Geita, Simiyu and Shinyanga regions to treat conditions such as *'degedege*' (convulsions) and *'nengonengo'* (infertility).

Concerning the use of traditional medicines, Mkandawire *et al.* (2021) argue that other African countries, especially those in Eastern and Southern Africa, have also provided evidence indicating that the utilisation of traditional medicines can strengthen the immune system of individuals infected with HIV/AIDS.

Notwithstanding, field observations also revealed the widespread use of natural remedies and nutrient-rich foods believed to strengthen the immune system of individuals with HIV/AIDS. These nutrient-dense foods included plant oils from soybeans, cashew nuts and shea butter, and various wild fruits. Similarly, Kaya (2007) found that *muhanse* M4 $^{(R)}$, as a patented medicine, had long been regarded as an immunity booster, particularly in the Mufindi and Kilombero areas of Iringa and Morogoro, respectively. According to Kaya, both M4 $^{(R)}$ and *Munufu* were approved and prescribed by the Traditional Medicine Research Clinic based in Dar es Salaam.

Another traditional remedy cited was the indigenous African potato (*hypoxias*), widely used by the Zulu people of South Africa. This was traditionally used to treat chronic viral and bacterial diseases, including bladder and prostate cancers, as well as Sexually Transmitted Illnesses (STIs). Further research by Stellenbosch University in South Africa on HIV care reported that traditional herbal medicines were effective in boosting CD4 counts, stabilising patients, and promoting weight gain (Kaya, 2007).

The current study presents findings comparable to those related to the utilisation of medicinal plants (anti-pharmaceuticals) endorsed by the President of Madagascar, Andry Rajolina (Mkandawire *et al*. 2021). The discovery of local herbal medicines with anti-malaria and antiviral properties derived from the Artemisia plant gained popularity in Madagascar despite not receiving formal approval from the World Health Organisation (WHO). Mkandawire *et al.* (2021) highlight that this situation underscored the role of traditional herbal medicines within modern science, despite external restrictions and scepticism.

Similarly, the Maasai people of East Africa used boiled baobab barks to relieve back pain. The tea brewed from strychnos myrtoides is commonly used by the Zigua, Ndorobo and Maasai communities to treat malaria. In Ethiopia, a study by Kaya (2007) reported that a mixture of coffee and honey is used as a remedy for diarrhoea. The preparation involves mixing 50 to 100

grams of freshly ground coffee powder with equal honey, taken orally. Kaya (2007) found that diarrhoea often subsided after a single dose of this remedy.

The Tanga AIDS Working Group (TAWG) has also made significant strides to reduce the suffering of HIV/AIDS patients through the use of traditional medicines. Since its founding in 1990, the group has treated 2000 patients with medicinal plants (Kaya, 2007). Building upon Kaya's findings, Mkandawire *et al*. (2021) observed that the initial lack of vaccine or cure for HIV/AIDS in Malawi drove people towards traditional healers and herbalists, who became crucial source of treatment of HIV symptoms in the absence of biomedical solutions.

One traditional healer from Ileje District in Songwe described the tensions between traditional and biomedical healing:

> *Biomedical practitioners strongly condemn traditional healing, associating it with witchcraft, which they believe causes illness. However, the eruption of different diseases, such as global influenza outbreaks, challenges biomedical doctors and reminds people to rely not only on biomedicines but also on medicinal plants. This situation justifies the need for a complementary relationship between biomedical doctors and traditional healers to promote human health. The same approach could be applied during the ongoing COVID-19 pandemic to identify medicinal plants that can be used for healing the COVI-19 pandemic to identify medicinal plants that can aid in treating COVID-19 and related respiratory illnesses. (Traditional healer, aged 82, Isongole village, October 18, 2021).*

Generally, traditional medicines have been used to heal various diseases in Tanzania long before the introduction of biomedicines. Although biomedical treatments are not rejected, the medicinal value of plant bark, leaves, and roots has been recognised for centuries. This perspective is supported by both doctors and traditional healers interviewed throughout this study. Common medicinal plants include onions, carrots, eucalyptus, ginger, and pepper, among others—the preparation of these traditional medicines adhered to hygienic measures to prevent contamination and ensure safety.

Information from focus group discussions (FGDs) with traditional healers in Mpemba, located in Tunduma Town Council, revealed that medicinal plants were employed to treat what was understood as severe or viral pneumonia, later identified as COVID-19. One traditional healer explained:

> *For example, some patients were unable to breathe, while others had high temperatures. However, through the use of traditional medicines, the patients recovered within a brief duration. It is worth noting that the health ministry's efforts were not initially acknowledged during the early stages of the pandemic (Traditional healer respondent, aged 58, Mpemba village, October 14, 2021).*

The above accounts indicate that medicinal plants served the patients in the study area, as evidenced by first hand testimonies. Using the steaming method, findings from Songwe

disclosed that specific plants found in the region were boiled in water, and the patient was covered under a heavy cloth to inhale the medicinal steam, encouraging sweating to expel the illness.

During the FGDs with traditional healers, a tree called Mhimoli mibani was identified as essential steam therapy. In this method, the herbal leaves were boiled, and the patient was instructed to sit under a heavy cloth, such as a blanket, to inhale the steam from the evaporating herbal mixture. This treatment was typically repeated at least once daily until the patient recovered. However, some participants admitted uncertainty about the days needed to complete the treatment.

Regarding the efficacy of these remedies, government officials expressed cautious optimism about their effectiveness in treating illnesses. However, they also emphasized the need for proper knowledge of plant identification to ensure safety. One government official from District 2 commented:

> *Despite the use of traditional healing methods, I cautioned patients about using the correct plant leaves. For instance, some people in my ward suffered harm after mistakenly picking the wrong tree leaves for steaming. (Government official, District 2, October 28, 2021).*

The above accounts reflect participants' optimism about using specific traditional herbal medicines to treat diseases. Another widely recommended natural healing method among traditional healers in the study area involved using lemon, garlic, ginger, red hot pepper, onion, and salt. The study found that these ingredients had different preparation methods, all reported to be effective in treating COVID-19. A traditional healer described these practices during FGD:

> *While some would grind ginger and garlic and mix them with lemon juice, others would add ginger to hot tea and drink the concoction. Another approach involves mixing all the ingredients and drinking half a glass in the morning and another half in the evening. This was believed to help open the blocked chest, ease breathing and heal the disease. (Traditional healer, aged 61, Isongole village, October 14, 2021).*

Regarding the role of medicinal plants, another traditional healer emphasized the importance of combining herbs to enhance their efficacy:

> *Some medicinal herbal plants need to be mixed with others or with honey to increase their strength against diseases. If a medical composition does not meet all its requirements, its effectiveness decreases. For example, mixtures of Artemisia leaves and cluster fig leaves are used to treat fever, malaria and pneumonia. However, some medicinal plants that need to be included in the medicine are expensive or require a traditional healer to have government approval, while some traditional healers fail to meet such economic costs, while others fail to follow government procedures. Hence, some healers sell*

> *their medicines without ensuring the correct composition. (Traditional healer, aged 75, Vwawa, October 24, 2021).*

Another healer shared a personal account of using traditional herbs to aid recovery from severe illness:

> *My mother, aged 83 years, was hospitalised for six days and required oxygen therapy. With the help of natural herbs, she recovered, despite the severity of her condition during the infection (Traditional healer, aged 55, Mpemba, October 27, 2021).*

The findings on the efficacy of traditional medicines in treating COVID-19 and related flu illnesses were largely determined through trial and error, drawing from past experiences of treating flu with various herbal combinations. The trial-and-error approach arose because most COVID-19 patients were uncertain about which specific contributed to their recovery, as different mixtures of herbs were often used. For example, up to five herbal medicines could be mixed depending on the patient's medical history, such as mlingoti mweupe (white mast), mkaratusi (eucalyptus) and cluster fig.

A patient shared the following experience:

> *I was admitted to the hospital for one week, but I didn't experience any relief. The doctors told me that my condition was so severe that I could not be cured. Afterwards, my grandmother took me to the traditional healer. The healer used different types of herbs, and my condition improved within a very short period (Patient healed with herbs, aged 45, Vwawa, October 25, 2021).*

The ultimate measure of the efficacy of traditional healing lies in the post-healing outcomes. If the medicines lead to recovery, they are deemed effective, if not their efficacy is questioned. Although some patients do not provide direct feedback to their healers, they often express gratitude indirectly through tangible gifts, such as money and livestock, and intangible gestures of expression. These acts serve as a way of acknowledging the healer's role in their recovery.

However, the lack of scientific testing, proper dosing guidelines, and regulation oversight among traditional healers makes the efficacy of traditional medicine more speculative. For example, a healer may recommend taking up a cup of medicine daily without specifying the size of the cup in accordance with the patient's age or condition. Similarly, Adu-Gyamfi and Anderson (2019) reported that the efficacy of traditional healing depends on several factors: the healer's knowledge of the illness, the patient's knowledge of their condition, the composition of medicines, and the patient's physiological response to treatment. Therefore, the effectiveness of traditional healing is contingent on the proper composition and preparation of medicinal plants.

Some medicinal plants need blending with others or with substances such as honey to increase their effectiveness. If the composition is incorrect, the treatment's efficacy may be compromised. For example, leaves of the Artemisia tree are often mixed with cluster fig leaves to treat fever and flu.

Respondents in the study pointed out that the healing approaches could be categorized into two: modern medicine and traditional healing. During the COVID-19 pandemic, traditional healers in Songwe received many patients, demonstrating the demands of their services. However, their contributions were not formally documented. Furthermore, no cure has yet been scientifically proven to cure COVID-19, leaving both biomedical and traditional approaches to play complementary roles in managing the disease.

Generally, the findings suggest that various medicinal herbal plants were used across the study area to heal COVID-19. Each area used specific herbal plants known for their healing properties. Common preparation methods included grinding tree bark, leaves, and roots into powder form or boiling herbal plants for steam inhalation and sniffing. Despite the existence and use of these medicinal plants, the government provided limited consultation or collaboration with traditional healers in the context of COVID-19 management.

This approach reflects a top-down model, where decisions are made by authorities without meaningful input from grassroots stakeholders such as traditional healers. With the government emphasising both traditional healing and biomedical approaches in responding to COVID-19, many traditional healers felt excluded from the decision-making process. They expressed concerns about not being adequately recognized despite the existence of legal associations like Chama Cha Waganga wa Tiba Asilia Tanzania (CHAWATIATA), which translates to the Organization of Traditional Healers in Tanzania.

Conclusion and recommendations

The present study contributes to a better understanding of the role of medicinal plants in healing COVID-19 in the Songwe region. During the pandemic, traditional healers continued experiencing healings by leveraging their experience with flue remedies and incorporating new plants. The study findings reveal that Tanzania, particularly the Songwe region, had long relied on medicinal herbal plants for healing. However, the outbreak of COVID-19 in 2020 prompted traditional healers in Tanzania to investigate COVID-19-related illnesses and propose certain medicinal plants for healing.

The findings demonstrate the widespread use of herbal remedies in mitigating COVID-19 symptoms in the region. In some cases, people suffering from severe pneumonia and other COVID-19 symptoms reported recovery after using herbal treatments prescribed by traditional healers. Although biomedicines remain useful, the role of medicinal herbal plants in healing COVID-19 cannot be overlooked. Some challenges associated with biomedicine created opportunities for traditional healing practices to stay relevant.

The study suggests that while some traditional medicines are effective, others are less so than biomedicines. Therefore, the study recommends further scientific research on medicinal plants known to heal specific diseases in the past, with efforts focused on preserving, cultivating, standardising and legalising their use through appropriate channels.

Given the absence of biomedicines with proven efficacy against COVID-19 during the pandemic, traditional medicine, especially in the study areas, has played a significant role in mitigating the severity of symptoms and controlling the spread of the disease. There is also a

need to integrate traditional healing practices into broader healthcare strategies, promoting a culturally sensitive and inclusive approach to global health interventions in similar contexts.

Furthermore, it is necessary for the government to officially recognise and support the traditional healing system while enhancing practitioners' expertise through scientific collaboration and training. However, further research is needed to assess the effectiveness of traditional healing system methods comprehensively and ensure their safe and standardised application.

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