

Mainstreaming Indigenous Knowledge System in Coping With Pandemics

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ABSTRACT

Pandemics have existed from time immemorial causing loss of human life world-wide. As of October 2022, COVID-19 alone which is still upon us caused 7 million deaths globally and *looking back in history other pandemics have also exterminated a sizeable number of human population with HIV and AIDS at its peak (2005-2012) killing 36 million people, 1968 flu pandemic killed 1 million people, 1956-1958 Asian flu killed 2 million, 1918 flu pandemic killed between 20-50 million people, 1910-1911 caused loss of life to 800 000 people, 1889-1990 flu pandemic killed 1 million people, 1346-1353 killed between 25 and 50 million people.* The list is hardly exhaustive of pandemics that struck each generation of human beings and the destruction they caused to human life. Nevertheless, in such moments, the world's focus has always turned primarily to western medicine for solutions and even credited it single-handedly for bringing the respective pandemics to an end. Ironically, the role played by traditional medicine hardly receive any recognition, yet according to WHO around 80% of the world's population is estimated to use traditional medicine today. Despite that huge proportion of global population depending on traditional medicine for dealing with whatever health challenge they come across, this repertoire of indigenous knowledge system (IKS) is being consistently overlooked in theorisation of community approaches and resilience to global pandemics. This paper reviews and draws insights from existing literature to demonstrate that current conceptualisations and approaches to coping with pandemics do not give adequate attention to the role that the indigenous knowledge systems play in the fight against pandemics. Results of this study indicate that IKS indeed plays a critical role in the management of pandemics and hence should be considered in the development of an integrated approach to the management of pandemics.

Key words: Pandemics, indigenous knowledge system, mainstreaming

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I. INTRODUCTION

The coronavirus disease (COVID-19) pandemic, caused by the SARS-CoV-2 virus, has painfully confirmed what many reports and papers expressed since the 2009 H1N1 and 2014-2016 Ebola pandemics that the world is gravely under-prepared for large outbreaks of emerging infectious diseases (Moon et al., 2017; Nuzzo et al., 2019). Even though insights on the exact impacts of the COVID 19 pandemic are still tentative and evolving, it has already become clear that both the disease and some emergency countermeasures have had substantial socio-economic costs, often hitting the marginalised and most vulnerable in society the hardest (Bambra et al., 2020). Past and present frameworks or models have failed to provide lasting solutions in terms of coping with pandemics specifically in countries which are resource constrained (Litman, 2020; Qui et al., 2017).

The effectiveness of response programmes on this pandemic has been brought to test. The Congressional Research Service (2020) argues that, unnecessary delays and inadequate preparation reduced the effectiveness of these responses, and communities faced many practical problems in preventing infections and addressing the pandemic's social and economic impacts.

The shortcomings of modern allopathic healthcare measures in dealing with pandemics have increased the limelight on the traditional methods of pandemic management. Today, as much as 80% of the world's population still depends on traditional medicine for their primary health care needs (Chauhan et al., 2014; Folashade, Omoregie, & Ochogu, 2012; Hishe et al., 2016; Maroyi, 2013; Shetty, 2010). Maroyi (2013) asserts that Zimbabwe continues to experience an upsurge in demand for herbal medicines, with Nkatozo (2010) highlighting that about 80% of Zimbabweans still depend on herbal medicine. Close analyses of these studies highlight the critical role that traditional knowledge systems play in the management of diseases. However, even though ethno-medicine and the traditional ways of diseases management have gained a lot of recognition especially in post-independent Zimbabwe, Sewani-Rusike (2010) posits that very little research has been done to

assess the contribution of IKS in the management of pandemics. Despite the limited scholarship, growing pockets of research suggest that cultural coping was positively associated with health outcomes (Oman & Syme, 2018), and benefitted patients in terms of quality of life, sense of meaning, mental health, acceptance, source of comfort, and hope (Roger & Hatala, 2017). As a result, what is of intellectual curiosity in this study is the dynamics of hybridisation of allopathic medicine and IKS in fostering about an integrative approach in pandemic management. There is evidence to indicate that IKS may be a great resource in diseases management (Chipungu et al., 2018; Roger & Hatala, 2017; Maunganidze, 2016). Thus, this paper seeks to review the complementary role that IKS plays in combating pandemics.

1.1. BACKGROUND TO THE STUDY

Throughout, the course of history, pandemics have wreaked havoc on communities (Lavell et al., 2020; Duan & Zhug, 2020; Toroko & Baker, 2020)). Indeed, very few phenomena throughout human history have shaped human societies and cultures the way outbreaks of infectious diseases have, yet, remarkably little attention has been given to these phenomena in social science studies (see Duan & Zhug, 2020; Lorec et al., 2020). More worrisome, however, is the successive failure of the various approaches adopted to deal with the pandemics (Alonge et al. 2008, Lavell & Mansilla, 2020).

Pandemics are disease outbreaks that become widespread as a result of the spread of human-to-human infection. The pandemic related crises have been associated with enormous negative impacts on health, economy, society and security of national and global communities (see Noy & Shields, 2019; Armitage & Nellus., 2020).. Besides the costs of lives and health, epidemics and pandemics have devastating effects on societal and individual wellbeing more largely. They strongly impact economies, livelihoods and psychosocial wellbeing across entire communities.

A number of pandemics recorded in human history, such as influenza pandemics are unpredictable but recurring events that can have severe consequences on societies worldwide (see Brooks et al., 2020; Toroko & Baker, 2020). Influenza pandemics have struck about three times every century since the 1500s (Verikios, Sullivan, Stojanovski, Giesecke, & Woo, 2015). Recent years have seen at least six large-scale outbreaks—hantavirus pulmonary syndrome, severe acute respiratory syndrome, H5N1 influenza, H1N1 influenza, Middle East respiratory syndrome, and Ebola virus disease epidemic (see Xiao et al., 2019; Qiu et al., 2017, Lucey & Gostin, 2016). The influenza H1N1 2009 virus (A/2009/H1N1) was the first pandemic influenza of the 21st century. It has affected the whole world and caused more than 18,000 deaths (Rewar et al., 2015; Qiu et al., 2017). Ebola killed more than 11 000 people and cost the world more than USD \$2 billion, according to World Bank calculations (Maurice, 2016). In 2016, the Zika virus broke out and consequently threatened the health of people in 34 countries (Troncoso, 2016; Qiu et al., 2017). These outbreaks make scientists and governments worry about a repeat of the devastation of the Spanish flu of 1918 (Lin, McCloud, Bigman, & Viswanath, 2016). In fact, the rate of emerging infectious disease outbreaks seems to be increasing significantly over time (Moon et al., 2017).

Despite the failure of pandemic management initiatives including allopathic medicine, little has been said of the indigenous knowledge systems component -of pandemic management. Indigenous Knowledge Systems (IKS) refer to the thoughts and beliefs existing among local indigenous people (Siambombe et al., 2018) that transcends generations, including knowledge of indigenous plants, food preservation and disease control (Odero, 2011) among others. Several definitions of IKS are attempted in literature with Milupi et al. (2017) viewing IKS as comprehensive knowledge of a particular society and community.

IKS has spearheaded the emergence of primary healthcare systems in most African countries (WHO, 2008). This role has encouraged continuity of life from one generation to the other in diverse cultural and societal spheres (Lima et al., 2017). Sahai (2013) postulated that IKS dissemination of medicinal plants differs depending on the flora and agro-ecological regions. To this effect, Rifiati et al. (2018) advised that IKS have been side-lined, and ignored, hence modern communities failing to fully acknowledge its contribution to orthodox scientific knowledge. Therefore, Moyo and Kizito (2014) recommended an integrative approach which infuses IKS into the discourse on current diseases management approaches.

1.3 PROBLEM STATEMENT

Resource constrained nations across the globe are finding it difficult to cope with pandemics (Alonge et al., 2019). In Africa specifically weakened healthcare systems need adaptation of frameworks to cope with COVID-19 (Dahab et al., 2020). Despite the existence of a plethora of literature on pandemics (see Duan & Zhug, 2020; Lorec et al., 2020; Brooks et al., 2020), no known serious study has reflected on the role of indigenous knowledge systems in the fight against pandemics. Using a content analysis method this paper reviews literature to demonstrate that current conceptualisations and approaches to coping with pandemics do not give adequate attention to the role that the indigenous knowledge systems can play in resource constrained nations. The study findings indicate that sustainable efforts at combating pandemics in resource constrained

countries should consider hybridisation of IKS and western medication to forge an integrated approach to combating pandemics.

II. CONCEPTUAL ISSUES

2.0.1 Pandemic

The term pandemic has been subjected to varied interpretations. The diverse interpretations have led to the proliferation of a plethora of definitions. (Noy & Shields. 2019; Lorec et al., 2020; Brooks et al., 2020; Armitage & Nellus., 2020). Without going into specifics or details about the varied nature of the definitions the extant literature, most of the definitions seem to have a common denominator of a pandemic as an epidemic of an infectious disease that spreads across a large region, for instance multiple continents or worldwide, affecting a substantial number of people. Nevertheless, at this stage it would be insightful to capture some of the conceptual congruencies.

Doshi (2009) views a pandemic as an ‘epidemic’ occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people. Although the definition offers us an insight into some of the defining characteristic of pandemics such as wide geographical coverage, as well as affecting a number of people, the use of the term ‘epidemic’ is a misnomer. The term ‘epidemic’ adds to the ambiguity of the definition. Further, the definition is not exhaustive on the characteristics of pandemics. According to WHO (2020), pandemics also are characterised by geographic extension’, ‘disease movement’, ‘novelty’, ‘severity’, ‘high attack rates’, ‘explosiveness’, ‘minimal population immunity’, ‘infectiousness’ and ‘contagiousness’. Thus, Doshi (*Ibid*)’s definition is not only confusing but shallow in scope. The key features of a pandemic assist us to understand the concept better, if we examine similarities and differences among them, hence leaving some characteristics without offering an explanation adds to the challenge of conceptualizing what pandemics are. Thus, it can be said that Doshi (2009)’s definition lacks precision.

The dilemma noted in Doshi’s (2009) definition of pandemics is not an isolated case. Several scholars tend to define pandemics based on a single or more defining characteristics of pandemics. A good example, is that of Taubenberger and Morens (2019) who define the term pandemic as simply as a disease that extends over large geographic areas—for example, the 14th-century plague (the Black Death), cholera, influenza, and human immunodeficiency virus HIV/AIDS. In a recent review of the history of pandemic influenza, pandemics were categorized as trans-regional and global (Taubenberger & Morens, 2019). Thus, it can be construed from the above that Taubeberger and Morens (2019) anchors their interpretation of the term pandemic on a single defining characteristic of pandemics, that of ‘wide geographical coverage’. Thus, such kind of famished definitions starves one of clear understanding of what pandemics are. They limit understanding of the phenomenon of pandemics. However, despite this shortcoming, the use of examples in the definition helps to clarify the term.

The term pandemic has been applied to severe or fatal diseases (eg, the Black Death, HIV/AIDS and SARS) much more commonly than it has been applied to mild diseases. Rewar et al (2015) defines pandemics as diseases with high mortality and morbidity caused by a virulent new viral strain against which the human population has no immunity. The same shortcomings seen in Doshi’s (2009) definition can be observed in this definition. The definition suffers from limitations in scope, rendering it unfit to provide clarity as to what pandemics are. The definition is silent on the other defining characteristics.

2.1 IMPACTS OF PANDEMICS

A synthesis of extant literature highlights the existence of numerous negative impacts of pandemics. The section below presents the impacts of pandemics on communities.

2.1.1 Health Effects

Studies show that one of the devastating impacts of pandemics have been felt in the health sector across the world. The Covid 19 pandemic has caused an unprecedented global health crisis. It has brought the world to its knees, the global community was not even prepared for this crisis. Horemovic (2019) posits that pandemics have infected millions of people, causing wide-spread serious illness in a large population and thousands of deaths. For instance, the ‘Black Death’ plague exterminated almost half the European population in the 14th century (Ross, Ross, Olveda, & Yuesheng, 2014). Pandemics have the potential to create high morbidity and mortality globally, and in fact they may account for a quarter to a third of world mortality (Verikios et al., 2015). Kern (2016) argued that, in less developed nations, pandemics have the potential to, and the likelihood of deaths ranging within 5 to 10 percent. For instance, Wong and Leung (2007) found out that during the SARS outbreak in 2003, there were more than 8000 infected individuals, with over 700 deaths (almost 9%) globally in just 6 months. Such statistics show the devastating impacts and strains pandemics have on healthy systems across the world.

Developing countries, the world over have had their fair share of pandemics. Moreover, other major threats in modern times have been pandemics of Ebola and Dengue (Horemovic, 2019). The prevalence of the lethal and deadly form of the Dengue has surged intensely in developing nations. The 2015–2016 dengue epidemics were the worst in the history of Latin America. The first cases were chronicled in Brazil in May 2015 and caused more than 1.5 million cases up to December 2015 (Troncoso, 2016). However, the outbreak of Ebola in West Africa was an exceptional public health emergency of international concern (Horemovic, 2019). In October 2015, WHO stated that there were 28,581 Ebola Virus Disease (EVD) confirmed, likely and suspected cases, with 11,299 deaths in West African countries (Liberia, Guinea, Sierra Leone) and the estimated case fatality proportion was 40% (Nabarro & Wannous, 2016). More than 11,000 people died in nine nations as the response to the Ebola zoonotic ‘spillover’ was delayed (Ross, Crowe & Tyndall, 2015).

Currently, WHO (2021) reported 176, 531,710 confirmed cases of Covid 19, including 3, 826,181 deaths as of 17 June 2021. The COVID 19 pandemic has been the center of attention and intrigue, as one of the greatest catastrophes ever, if not the greatest ones in the entire history of humankind (see Xiao, et al 2019, Brooks 2019; Duan & Zhug 2020). The pandemic has triggered shock waves across the globe. Its impact on societies has generally been horrendous, to say the least (see Duan & Zhug, 2020; Lorec et al., 2020). The above statistics revealed the devastating health effects of pandemics including Covid 19.

2.1.2 Economic Impacts

The impacts of pandemic on societies have not only been limited to health impacts, evidence suggest that economic systems have also suffered in like measure affecting livelihoods in the process. Pandemics pose severe threat not only to the population of the world, but also to its economy (Horemovic, 2019). They can lead to volatility of the economy through direct costs, long term burden, and indirect costs (Horemovic, 2019). For instance, the Ebola outbreak has severely destabilized the economics throughout West Africa. Gostin and Friedman (2015) found out that in Sierra Leone in 2015, USD 6 billion was recorded for direct costs (hospitals, staff, medication), and the direct costs alone amount to 3 years of funding for WHO, and were well over 20 times the cost of WHO’s emergency response cuts in its 2014-15 budget. Kern (2016) opines that it has been calculated that there was an economic loss of USD 1.6 billion for Sierra Leone, Liberia and Guinea compared with the economic growth in 2014. The Global Health Risk Framework for the Future (GHRF) Commission estimates that annually, on average pandemic outbreaks cost the world about USD 60 billion in direct costs (Maurice, 2016). Such magnitudes of the costs involved can be said to have a debilitating effect upon struggling economies, especially in developing countries like Zimbabwe.

2.1.3 Social Impacts

A scan of existing literature highlights that the social impacts of pandemics are devastating. They in most cases include travel restrictions, and closure of schools, markets and sporting activities (Horemovic, 2019). Horemovic (2019) argues that, movement was a challenge and the travel comprising visiting families and friends, carrying goods to markets were restricted by military check points. Wong and Leung (2007) opines that the closure of airports and cancellation of flights and other ports of entries affected a lot of people’s travel, livelihood, and family life. The impacts of the closure of travel are felt more in developing countries which remain dependent upon tourism as a generator of income. Tourism in developing countries contribute more to GDP (WTO, 2018), hence its disruptions spells major challenges for the developing countries.

The public games including sporting like the Tokyo Olympic Games were cancelled because public gatherings are a major factor. Enforced dose contact at work and household crowding were linked to a higher prevalence of self-reported influenza-like illness in the 2009 H1N1 pandemic (Kumar, Quinn, Kim, Daniel & Freimuth, 2012) and Covid 19 pandemic (WHO, 2020). Tradeoff between the social costs of interventions and the cost of uncontrolled spread of the virus were involved in the decisions to mitigate influenza outbreaks in Ebola outbreak (Prieto & Das, 2016).

Thus, it can be said that current efforts to manage pandemics have proved ineffective, hence warranting the need to interrogate mechanism for managing pandemics. The failure of ‘the copy and paste’ system in the management of pandemics call for the development of an integrative framework for coping with pandemics in a resource constrained country.

2.2 ROLE OF IKS IN PANDEMIC MANAGEMENT

In the postmodern era, “culture” is no longer defined by ethnicity, geography, nationality, or any skin color group, but by the unique resources available for humans to make sense of their world (Rein, 2016) or the adaptive ecosystem (Tucker, 2013). The influence of culture on one’s psychological processes might affect one’s health perceptions and coping behaviours (Milstein et al., 2019). A plethora of evidence suggests that cultural coping was positively associated with health outcomes (Khodaveirdyzadeh et al., 2016; Oman & Syme, 2018), and benefitted patients in terms of quality of life, sense of meaning, mental health, acceptance, source of comfort, and hope (Roger & Hatala, 2017). Similar benefits of cultural coping have been found in some

Malaysian studies. A case study conducted by Ting and Ng (2012) showed that the incorporation of spiritual resources in psychotherapy was significantly beneficial and socially acceptable by the Chinese in Malaysia (CIM) community, thus reducing the stigma associated with seeking psychological help. A few studies on Muslims in Malaysia highlighted that religiosity and spirituality play a significant role in their health beliefs and health behaviors (Ahmadi et al., 2019).

Another study on religion and mental health among CIM older adults by Tan et al (2020) showed that belief in a higher power was negatively associated with psychological distress, indicating that religious beliefs could be an essential resource in helping Malaysians to cope with life stressors. Thus, culture has been shown to be central to coping with life stressors and hence central in informing health related behaviours. Coping strategies serve as the self-regulated pathway between illness representation and health outcomes. Therefore, it is inferred that cultural coping might also moderate the stress caused by the illness perception toward pandemics, hence becoming central in the development of ideal frameworks for coping with pandemics. Evidence from above show that culture has a role to play in health management and hence pandemics cannot be an exception.

Kahissav et al. (2017) argue that we must consider cultural perceptions and ways they affect how symptoms are recognized, access to care, treatment provided, and fear of stigmatization. Cross-cultural studies point to the fact that each specific culture has its own beliefs related to particular explanations for health and sickness (Kahissav et al., 2017; Workneh et al., 2018). According to Napier et al (2014) public health interventions should consider cultural beliefs and assumptions. Sharing similar sentiments Shaikh and Hatcher (2005) posit that these interventions should be addressed at the local level to encourage education and participation and ensure the interventions are culturally appropriate for the community. It is important to assess the role of culture and avoid correlating disease with questionable cultural causations. This may lead to blaming specific populations for their high prevalence rate or stigmatizing of certain groups (Sovran, 2013).

According to Wong et al (2006) and Heppner (2008), culture might help understand the different strategies adopted by social groups in order to cope with unexpected events. As an example, Markus and Kitayama (1991) established in their research that citizens belonging to cultures with a high degree of individualism, might feel more inclined to develop a self-construal approach and behave in a more independent, rather than interdependent, style. Kurman and Hui (2011) confirm the fact that individuals, under stressful scenarios, will turn into their default cultural values in order to better cope with unexpected events.

It is widely known that tradition and culture play a pivotal role in determining individual and community-level conduct, such as attributions to illness, health-seeking behaviours and community willingness to comply with measures instituted to curb the spread of disease (WHO, 2020). Cultural beliefs and values contribute, to a large extent, to the success or failure of the country's ability to contain the spread of pandemics.

Kagoro (2020) argues that African countries missthe "cultural practices" element in their strategies as they have used the "cut and paste" strategy from the West in managing pandemics. Such strategies have suffered due to different cultural backgrounds. Hence, the need to consider local cultural practices, myths and realities in order to develop a robust and integrative strategy for managing pandemics.

III. RESEARCH METHODOLOGY

This paper draws insights from existing literature to demonstrate that current conceptualisations and approaches to coping with pandemics do not give adequate attention to the role that the indigenous knowledge systems can play from a religious, spiritual and traditional perspective to prevent and deal with cases of pandemics. This study employed a general review of literature on the role of IKS in coping with pandemics. Qualitative content analysis was used. It is a research method for the subjective interpretation of the content of a text data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2015; Patton, 2016). Mayring (2002) argues that content analysis uncovers patterns, themes and categories important to social reality.

In order to get relevant articles from the internet, the researcher focussed on lead terms such as, 'pandemics', 'impact of pandemics', 'cultural practices in pandemic management', 'role of culture in pandemic/diseases management', 'traditional pandemic coping strategies', 'cultural resilience strategies to pandemics social work', among other similar terms. Search terms relating to IKS in coping with pandemics were also entered, including 'religion', 'spirituality', 'religiosity', and 'religious beliefs'. Generally, the study focused on material published from 2010-2022. Several journal articles were reviewed.

Finally, reference lists of studies that were identified by any of the aforementioned methods were searched for additional relevant studies. Studies that examined the role of IKS in coping with pandemics were included. Studies included in this study focused on the role of IKS as conduits to the formal health system.

The study also included studies that focused on the perspective of religion and spirituality on health problems and how interventions with a spiritual bias are being used. A total of 20 articles were utilised. This number is commensurate with content analysis (Krippendorff, 2018).

IV. MAJOR INSIGHTS FROM LITERATURE

4.1.1 Role of traditional medicine in diseases control

Herbal medicines throughout the ages have been manipulated for their properties as the first line of defence against various diseases (Asase et al., 2010; Au et al., 2008; Maroyi, 2011, 2013). Literature strongly indicates that traditional medicine over the ages has continued to play a pivotal role in healthcare. Today, as much as 80% of the world's population still depends on traditional medicine for their primary health care needs (Chauhan et al., 2014; Folashade et al., 2012; Hishe et al., 2016; Maroyi, 2013; Shetty, 2010). Thus it can be argued that African traditional herbal medicines still in today's world perform an essential role in satisfying basic health care of traditional communities. Herbal medicine is cost effective for poor resource countries such as Zimbabwe (Mafuva & Marima-Matarira, 2014). Maroyi (2013) clearly indicates a widespread use of traditional medicine in Zimbabwe by both urban and rural communities as the scholar goes on to say that even today many patients remain committed to the consumption of African traditional herbal medicine. Evidence presented in literature asserts that many Africans remain pluralistic consumers (consuming both traditional medicine and western medicine) as western medicine has not replaced traditional medicine.

In the past, communities using IKS were able to manage and survive pandemics that befell their communities (Bhebhe & Rukuni, 2020). Traditionally, collective effort was used, coupled by support received from traditional leaders and spirit mediums. Thus, IKS were used to cure diseases using medicinal plants, taken for granted by the current generation in most communities (Maroyi, 2013; Mafuva & Marima-Matarira, 2014; Bhebhe & Rukuni, 2020). Several herbal plants have been used in the fight against pandemics, and more recently the COVID-19.

4.1.2 Leaves and stems of Lippia Javanica

Leaves and stems of Lippia Javanica are also sold as herbal medicines in the medicinal plant "muthi" markets in South Africa (Moeng, 2014). Traditionally, Lippia Javanica is commonly used to treat fever and malaria and repel insects throughout its distributional range (Maroyi & Mosina, 2014). The same Lippia Javanica is, therefore, being used in Zimbabwe by steaming three to four times per day as it is believed that the shrub contains zinc which fights against viruses (Mfengu et al., 2021; Verma et al., 2020). In some cases, dry leaves of Lippia Javanica were noted as being used as tea leaves and consumed as such. This method is still considered more effective in controlling SARS-CoV and coronavirus by many people worldwide (Benarba & Pandiella, 2020), although scientific investigations are still underway.

4.1.3 Artemisia, ginger, garlic, paw-paw leaves, neem leaves, oranges and lime

In Madagascar, a combination of Artemisia, ginger, garlic, paw-paw leaves, Neem leaves, oranges, and lime, have been used to fight against the Covid-19 pandemic. These were mixed and boiled for approximately 30 minutes then used for steaming and inhaling to fight against the virus. In Zimbabwe, Zumbani (Lippia Javanica) was boiled for at least 15 minutes, and either steam-inhaled or consumed orally as Covid-19 organics. Nee Leave Studies have demonstrated a reduced risk of covid-19 infection in participants receiving neem capsules, which demonstrates its potential as a prophylactic treatment for the prevention of Covid-19 infection (Nesari et al., 2021). However, the findings warrant further investigation in clinical trials.

Pawpaw Leaves Extract (PLE) has been proposed as a complementary alternative medicine to combat the hyper coagulation related to venous and arterial thrombotic complications and to restore platelet level after a thrombocytopenic event commonly seen in severe covid-19 patients (Shukor & Shukor, 2020). Ginger is a flowering plant whose rhizome, ginger root or ginger, is widely used as a spice. Garlic is a plant in the Allium (onion) family (Orish, Orisakwe, Chinna, Eudora & Nwanaford, 2020). These leaves and roots of plant materials therefore have been used as aqueous decoctions where the acclaimed anti-covid-19 remedies with notable antioxidant and anti-inflammatory properties were found to be beneficial. The effectiveness of Neem has been proved and has been adopted by many people in Madagascar and in other countries.

The Neem Leaves of the Neem plant were mixed with other plants to produce a remedy that people consumed orally to fight Covid-19 in Madagascar. The Neem tree (*Azadirachta indica*) leaves were mixed with other plants, boiled, and people drank to treat malaria and many diseases. The same concept was used to treat around 40 diseases in Kenya. Roots were also boiled and used to fight against coronavirus.

4.1.4 Steaming

The use of steaming and steam inhalation clears the virus in the throat and lungs, dealing with any difficulties in breathing. Orisakwe et al. (2020) reported that researchers in Madagascar used mixed remedies to fight Covid-19 through oral drinking. This method was similarly reported in countries such as Nigeria, Cameroon, and Zimbabwe, where people mixed various indigenous tree leaves, roots, flowers, and twigs to fight the coronavirus (Fokou et al., 2020; Bhebhe & Rukuni, 2021). The Coronavirus was first regarded as a lung

disease, but it was later discovered that it affects the whole body, as such, and for most African communities, turned to IK remedies given that they quickly move to all body parts (Orisakwea et al., 2020).

It was noted that most people prepare different drinking recipes such as mixing onion (*Alium Cepa*) with lemon and orange juice for drinking (Fokou et al., 2020). *Alium Cepa* can be placed on a pillow during the night to freshen breathing air and open airwaves. The same concept was applied in stages to Covid-19 patients with breathing challenges. In Cameroon, most people were reported as undertaking steaming, eating garlic, onions, Moringa leaves, and Mango (*Mangifera indica*) leaves in porridge, and tea, to fight the coronavirus (Fokou et al., 2020). In Zimbabwe, peppermint, garlic, water, and honey were commonly used daily to fight the coronavirus infections (Bhebhe & Rukuni, 2020). Both the infected and uninfected people used the remedies as means of controlling the spread of the virus. Most of the remedies used contain secondary metabolites such as bioflavonoids, steroids, polyphenols, antioxidants and terpenoids, which are all antiviral, and can reduce viral power, replication and minimise the spread of the virus (Kwape et al., 2016; Khanna et al., 2020). Flavonoids were effective in controlling SARS-CoV (Yu et al., 2012) and thus was also used in controlling coronavirus. This fact was supported by Khanna et al. (2020) and Adem et al. (2020), who reported that polyphenols and flavonoids are essential and effective in controlling coronavirus.

4.2 DISCUSSION AND CONCLUSION

Two major themes emerged from the study; IKS used in coping with pandemics and the effectiveness of IKS in coping with pandemics. The implications of harnessing IKS in the management of pandemics cannot be over emphasized.

4.2.1 Effectiveness of IKS in coping with pandemics

Pandemics have affected many countries' health systems, and became a significant threat to human security compared to other diseases such as the deadly diseases notably HIV/AIDS, cancer, and diabetes. African governments need to adopt innovative management of the health systems through the inception of IK and herbal medicines to fight the pandemics (Olawale & Olaopa, 2019). Control of pandemics such as the current COVID-19 lacked effective vaccines or drugs as such called for appropriate interventions. Indigenous knowledge has been a source of medicinal agents for thousands of years, as such could help circumvent the threat of pandemics such as COVID-19 (Fokou & Ducos, 2020).

Although IK faced criticism at first, with most doctors and health authorities disregarding the use of IK remedies, the idea gained popularity because most people had seen its effectiveness in the treatment of other diseases such as cancer, and sexually transmitted infections (STIs) (Ellen & Harris, 2020). The effectiveness of IK remedies in treating other diseases made it well accepted by many people in the treatment of pandemics such as the current COVID-19, and the high rate of recoveries from the coronavirus suggested that IK remedies were effective in fighting the coronavirus. Western and orthodox scientific means appeared to have failed to produce sustainable ideas in controlling the coronavirus as it has taken long to develop a vaccine. The Indigenous knowledge system is a local idea rooted in a particular place and can be borrowed to other places by many people but can only be understood by its effectiveness by people in the area it was developed (Ellen & Harris, 2020).

The use of IK is thus of paramount importance in the control of pandemics. IK has thus been used to cure viral infections, a good example being use of the *Lippia javanica*, and Neem leaves to control coronavirus in Zimbabwe and Madagascar (Bhebhe & Rukuni, 2021; Khan, 2021) respectively. The use of orthodox scientific ideas need not be side-lined because there is need to have them integrated with IK, or vice versa to improve its effectiveness (Mafongoya & Ajayi, 2017).

4.2.2 Proposed framework for integration of IKS and modern medicines

Integration of IKS and modern medicines can be a good move for most rural people who are resource poor and not able to raise funds to buy full package of modern-day medicines. IKS medicines contain various chemicals which play a major role in fighting against pandemics such as the current COVID-19. A good example is the use of Zumbani which contain zinc and vitamin C which are major micro-nutrients to fight against viruses (Mafongoya & Ajayi, 2017). Taking up tablets like Azithromycin and integrating with Zumbani has potential to speed up fight against the virus reducing days to recovery.

To improve the use of IK remedies and their effectiveness, African governments need to fund the commercialisation of IK in most of these countries as well as improve their use. These remedies can be used to produce tablets that are effective against the virus. Still, there is a need to do laboratory experiments. It can only be done by legalising IK remedies, funding and research (Dzobo & Chirikure, 2021). Research in IKS can be central in advancing the effectiveness of IK remedies and medicines used in controlling pandemics such as the current COVID-19.

There is need for 'integrative' medicines in the treatment and control of pandemics such as COVID-19, where indigenous and western 'science' are incorporated. Integration has been adopted to control diseases by

some Asian countries such as China in their health systems (Chinese Journal of Integrative Medicine, 2011). It is undisputed that both indigenous and modern methods are vital in the management of pandemics such as COVID-19. IKS and modern methods can be combined in the management of diseases and pandemics. Medicines identified by spirit mediums, diviners and herbalists can be subjected to laboratory tests in order to establish their efficacy. The drugs and vaccines can be distributed to end users through both traditional and modern channels such as herbalists and pharmacies. Integrating IK and scientific methods will help in containing pandemics considering that the majority of African use traditional medicines. Today, as much as 80% of the world's population still depends on traditional medicine for their primary health care needs (Chauhan et al., 2014; Folashade et al., 2012; Hishe et al., 2016; Maroyi, 2013; Shetty, 2010). Maroyi (2013) asserts that Zimbabwe continues to experience an upsurge in demand for herbal medicines yet the traditional remedies remain untapped for their economic potential both at domestic and national level. Nkatazo (2010) asserts that about 80% of Zimbabweans still depend on herbal medicine. Herbal medicines are said to be affordable for economically poor countries like Zimbabwe (Mafuva & Marima-Matarira, 2014).

The challenges associated with pandemic vaccines such as the struggle in developing effective COVID-19 vaccines makes it clear that integrating IK and modern science is unavoidable (Tan et al., 2021). However, despite the purported efficacy of traditional practices of diseases management in developing countries, there remains a lack of systematic information on the prevalence, efficacy and safety of herbal plants used as an intervention (Ghazeeri et al., 2012). In-depth systematic studies to discover and authenticate the ethno-medicinal pharmacological compounds of interest are imperative in order to improve the primary healthcare of local communities (Chipungu et al., 2018; Maroyi & Cheikhoussef, 2015). Thus literature clearly shows that a lot remains to be done in the field of traditional medicine before they become accepted in mainstream medical practice. These studies may provide the break-through in the discovery of novel drugs. Only a few studies have been carried out in a systematic manner (Maroyi, 2013).

From the analysis of literature, it can be argued that traditional medicine has great potential in terms of anchoring development of resilient strategies against pandemics as well as drug development. To emphasise the potential such traditional herbal remedies have, Maroyi (2013) further posits that significant levels of global pharmaceutical knowledge such as the discovery of drugs like quinine came as a result of observations made on traditional medical practices. However, in the absence of any scientific proof of their effectiveness, the validity of these remedies remains questionable (Chipungu et al., 2018). In the absence of scientific validation, people remain sceptical to consume these traditional herbal remedies. Thus it can be said that there is still need to conduct studies to increase the knowledge concerning traditional medicine so that communities globally can benefit immensely from this unexplored resource.

V. CONCLUSION

Evidence from both extant literature and study findings suggest that IKS can be a vehicle for diseases management among communities since time immemorial. Thus, it can be concluded from the study findings that IKS can be instrumental in providing sustainable ways of managing pandemics especially for resource constrained countries. The lack of comprehensive knowledge on IKS such as traditional herbal medicine on the knowledge market indicates that there is need to conduct ethno-botanical studies to provide answers to the pending questions and knowledge gap highlighted and map the way forward on how these traditional herbal remedies can successfully be exploited for both pandemic management and drug development for the medical sector in general. There is need to carry out research studies that facilitate the collection of IKS practices on pandemic/diseases management. Lessons can be drawn from other successful nations such as India and China that have gone down the same road with much success as seen by the fact that their herbal products now enjoy global success. This review paper is also expected to stir interests in other quarters such as the health sector. Several drugs such as quinine were developed from observations made on traditional medicine practice. Collaboration is key in developing vibrant pandemic management strategies. Findings reveal that current practices are inadequate to deal with the growing frustrations of managing the current COVID-19 pandemic. There is need to revamp current initiatives and inject new thoughts into how these IKS's can be harnessed for sustainable pandemic management strategies globally. There should also be symbiotic and synergistic solutions involving all stakeholders on strategy to manage pandemics. This is a sine qua non for establishing an effective system for managing pandemics.

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