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REVIEW ARTICLE

The Interrelationship Between Culture and the Use of Medicinal Plants in Healing: Perspective From Selected Cultures And Countries

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ABSTRACT

The use of medicinal plants has been an integral part of human culture and healing practices across the globe for thousands of years. Traditional knowledge governing medicinal plants use is passed down from one generation to another orally, through practice and experience, with indigenous communities, herbalists, and healers contributing significantly to the development of traditional remedies. Across different cultures and countries or regions, medicinal plants are employed to treat various disease conditions or in the prevention of diseases and the practice is deeply rooted in the understanding of plant properties and their therapeutic effects. In many parts of the globe, particularly in rural and remote areas, the dependence on medicinal plants continues to thrive because of their accessibility, cost and traditional beliefs attached to the plants. This global practice, while diverse in its application, demonstrates a universal appreciation for the healing potential of medicinal plants and belief system. However, the growing commercialisation and exploitation of medicinal plants have led to concerns about sustainability and the preservation of traditional knowledge. Understanding and respecting the cultural significance, ecological impact, and potential of these plants are crucial for their continued use and conservation. This review explores the selective cultural perspectives and practices about medicinal plant use, highlighting the importance of culture and the application of medicinal plants in the prevention and treatment of disease conditions.

INTRODUCTION

Culture can be described as a set of values, beliefs, customs, arts and social behaviours that define a group of people. It defines how a person within a community perceives things or people, interacts with other people and make decisions (Hofstede, 2001; Zegada & Marcelo, 2018). It has impact on various aspects of life, practices, ethics and key issues in the society such as politics or even in the acceptance of certain medical treatment. It provides a sense of identification and belonging by generating common experiences, traditions, language, diets and allows individuals to connect with their community (Zegada & Marcelo, 2018). It guides the way people communicate and interpret information which in turn affect interactions and understanding among persons from different cultural backgrounds (Laland et al., 2011). It sets expectations for behaviour such as the way of greeting elders, dressing, talking, male and female responsibilities and manner of responses in various occasions (Mesoudi et al., 2004). It affects the pattern and approach of decision-making, giving attention to certain decisions based on cultural norms and values. For instance, the decision of who should marry first in a family based on seniority. It also permits people within the community to adapt to their environment and solve their problems the way they best deem fit. Interestingly, culture affects business, education and healthcare (Tomasello et al., 2005; Wiersinga et al., 2020). For instance, in the provision of healthcare services, it is important to be culture sensitive in providing

appropriate healthcare that respect patients' belief and practices (Lee et al., 2002; Carrasquillo et al., 1999; Mesoudi et al., 2004; Runciman; 2010).

Human beings do not live in isolation. There is always a relationship of some sort either directly or indirectly with one another or with the environment. It is therefore important to understand and appreciate that all health care activities designed to offer health and healing, and the relevant support systems found their foundation in the cultural environment of the society (Ibeneme et al., 2017). All processes and structures that are put in place to combat diseases or promote health depend largely on social norms, cultural values and culturally acceptable guidelines for interpretations (Nestler, 2002). A biomedical process that may be accepted in the western culture may found a totally different interpretation and acceptance in another culture. For example, obesity is considered a metabolic problem in the western culture whereas among a particular Nigerian ethnic group, women are encouraged to be fat as a symbol of fertility (Brink, 1995; Bhaskaran et al., 2014).

Sociocultural model or ethnomedicine

There are two principal assumptions in ethnomedicine regarding disease and health system and the explanation of disease processes; these are personalistic and naturalistic systems. In personalistic system, disease is believed to be caused by a purposeful intervention of an agent. This agent could be a ghost, evil spirit, ancestor or a human agent such as a witch (Molina, 2016; Ibeneme et al., 2017). The belief is that the sick person is the victim and that he/she or his/her parents must have done something wrong. This kind of belief is very common in Africa. In some cases, it is believed that only the application of specific medicinal plants by specialised traditional healer can remove the sickness (Sob et al., 2011; Focho et al., 2009; Erickson, 2016). On the other hand, naturalistic system explains illness in impersonal terms, believing that is it due to imbalance in the body's elements. It believes that good health happens when the body's elements are in balance with the age of the person, condition and environment (George et al., 2017).

Traditional medicine is a collection of health practices, approaches, knowledge and beliefs that incorporate plants, animal and mineral-based medicines, spiritual therapies, manual techniques and exercise used in a single approach or in combination to treat, diagnose and prevent diseases or maintain well-being (Mahwasane et al., 2013; Nawrot et al., 2022). According to WHO (2024), traditional medicine is the sumof the knowledge, skill and practices based on the theories, beliefs and experiences indigenous to different cultures whether explicable or not used in the maintenance of health or in the prevention, diagnosis, improvement or treatment of physical and mental illness. Culture is known to play an important role in the use of medicinal plants including the way and manner they are used, their efficacy and the value placed on the plants (Kone & Afindehou, 2008). Knowledge of the applications of medicinal plants is passed from one generation to another and forms part of the cultural heritage of the family or community. Indigenous knowledge includes oral traditions about the origins and cultural importance of specific plants for general or specific applications in the treatment or prevention of general or specific disease (Bessong et al., 2005; Mati & de Boer, 2011). As part of the relationship between culture and the use of medicinal plants; plants can be viewed as a source of pride and identity of a family or community. The socio-cultural context may also influence the efficacy of specific treatment. For instance, more expensive plant preparations may generate stronger placebo impact thancheaper plant preparations (Lewu & Afolayan, 2009; Efange, 2002; Dibong et al., 2011; Kuschik, 2016).

Reports show that the use of medicinal plants by a specific group is fundamentally motivated by biological variables such as the chemical composition or the ecological distribution of plants. However, other studies have shown the importance of cultural factors such as the curative meaning attached to a plant, beliefs, religion or the historical context. Such aspects could play an important role in the use, diffusion or even in the effectiveness of a plant remedy (Ali et al., 2007; Akrout et al., 2010; Ekor, 2013).

Cultural factors such as language, social networks and the curative meaning attached to plants may influence the irregular diffusion of traditional knowledge and may explain why some species are only used in the regions despite their availability throughout the territory. These cultural factors made a remedy available and are determinant in its medicinal effectiveness (Bank, 2002; Quave et al., 2012; Reyes-Garcia et al., 2013; Quiroga et al., 2012)..

Various parts of the world's biological diversity are inhabited by indigenous and traditional people, providing an inextricable link between biological and cultural diversity. Cocks and Wiersum (2003) reported that in peri-urban resettlement areas in South Africa, 50% of the available wild plant species are used for religious, ritual and spiritual purposes, relating to culture and belief system. Also, it is important to understand the relationship between humans and the environment, including the way people use the resources available to them from biologically diverse environments (Bank, 2002). It is important to recognise the spiritual importance of sacred sites and plant species as well as the use of wild harvested plants for spiritual, ritual and religious purposes (Posey, 1999; Abdollahi et al., 2003). In relation to culture, it is important to take note of the trade of traditional grass brooms for instance within urban centres in the Eastern Cape Province of South Africa. The broom is given to a bride as a wedding gift. The ceremonial presentation of the broom is symbolic of traditional Xhosa culture and symbolises respect for the ancestral faith in the home of the newlywed couple. The broom is also used to apply protective medicine to the home by ritually splashing an infusion of plant material against the walls and roof of the house(Cocks and Dold 2006). This shows the strong relationship between cultural practices and the use of various medicinal plants and their preparations in traditional medicine (Cocks & Dold, 2004; Vouffo et al., 2008; Tala et al., 2007). There are reports of qualitative accounts of the continued adherence to culturally inspired uses of medicinal plants (Hammond-Tooke 1989; Ried et al., 2010; Hutchings 1989; Sob et al., 2011; Simbo, 2010; Nawrot et al., 2022).

Culture and medicinal plants usage: Examining various selected contexts

South Africa

Traditional healing is commonly practiced in South Africa. About 80% of the African population make use of the services of traditional healers (Zulu, 2006; Lewu & Afolayan, 2009). South African government in partnership with various stakeholders have recognised the importance of Indigenous Knowledge Systems (IKS) in the development of the country. The role of traditional kings, traditional chiefs and medicinal healers in the social, economic and political development of communities and the environment are recognised for their value in society (Carter, 2008). Indigenous Knowledge (IK) refers to traditional, cultural, local and community knowledge (Sillitoe et al., 2005; Zulu, 2006). It is a body of knowledge produced and owned by local people in their specific communities and passed on from generation to generation, through practice and oral method. Indigenous knowledge system has been undermined in an era of modernisation and globalisation and continues to be under threat of being lost in many parts of the world (Carter 2008). South African indigenous communities are facing enormous Western challenges after colonisation and apartheid, resulting in drastic changes that impact individual and community identity, leading to a loss related to cultural, language, traditional management and knowledge structures (Masoga 2005).

Cocks and Dold (2006) collected information on the use of medicinal plants by Xhosa people in two studies in the Eastern Cape Province, South Africa. The authors reported that increased urbanisation does not necessarily imply a loss of traditional cultural values relating to the use of medicinal plants in the treatment of various disease conditions. The authors stated that although it is widely acknowledged that some urban indigenous Africans make use of traditional medicine, the urban household survey reveals that about 67% of urban dwellers in the study used medicinal plants during a one-year period. The majority of the 64 medicinal plants used by the participants were used to treat nonphysical afflictions. Due to the large diversity of plant species required for nonphysical purposes, many of the plants were bought at informal medicinal plant markets. The study shows that urban dwellers, especially those from poor households, are prepared to spend money to obtain the plants, demonstrating that elements of traditional worldviews relating to health care and well-being are still strongly adhered to in urban areas. A smaller percentage of plants were grown in home gardens and were used mainly to treat physical ailments such as the common cold and coughs. Some plants were also collected from natural vegetation in neighbouring areas. The highest level of medicinal plants used was recorded amongst poor households, followed by middle income and wealthy households. This may partly be due to the fact that pharmaceutical medicines are not within the financial reach of poor people, and wealthy households, being financially and socially more secured, are less likely to encounter misfortune requiring protective medicinal plants. It is important to note that middle income and wealthy households also use medicinal plants but use them to treat symptoms linked to witchcraft, indicating that with an increase in wealth, members of a household can experience the

threat of witchcraft, attributed to jealousy than do poor households. Although wealthy households use the plants less frequently, however more than half of the wealthy urbanised households used them, indicating that Xhosa beliefs and practices are still retained by the different category of participants. The study demonstrates the significant role that wild plants play in providing health services and a feeling of 'well-being' among urban groups and the strong link between cultural belief and the use of medicinal plants. Some of the medicinal plants used by the Xhosa people in the treatment of diabetes include *Albucasetosa*, *rtemisiaafra, Brachylaenadiscolor, Catha edulis etc* (Sagbo and Hussein, 2022) while some of the plants used in the treatment of bacterial infections include*Grewia occidentalis* L., *Malva parviflora* L., *P. pungens* (Kaulf) Presl. and *Cheilanthesviridis* (Forsk.) Swartz etc. (Grierson & Afolayan 1999).

The first written records of Zulu people (one of the major ethnic groups in South Africa) medicinal plant usage were published as early as 1885, refers to as the age-old oral transmission of herbal knowledge as the heritage of experience. The relationship between the mind and the body of an individual and between an individual and his or her social and physical environment is found in traditional Zulu attitudes and belief to health and diseases (Zobolo and Mkabela, 2006). In Zulu traditional practise, plant material may be taken, inhaled, bathed with, sprinkled, worn or simply grown, reflecting the relationship between culture and the use of medicinal plants. In the practice of traditional medicine among the Zulu people of South Africa, women are not left out. Women, as primary educators in indigenous communities, have sustained their frameworks and associated knowledge systems for centuries, even while undergoing major social transformative changes beyond their control. To assess the involvement of women in traditional medicine, Zobolo and Mkabela (2006) conducted surveys in the rural areas. Data was obtained by randomly interviewing elderly women and teenage girls from 80 homesteads using closed, structured questionnaires. The survey collected information on the ages of elderly women and teenage girls. Uses and types of plants grown in the homesteads as well as rituals regarding harvesting and protection of the field were also investigated. Various types of medicinal plant species including shrubs, herbs and creepers were grown by women in the homesteads. Although modern medical facilities are accessible, majority of the people depend greatly on indigenous medicinal plants. The study revealed that elderly women possessed more knowledge (64.4%) than girls (7.5%) on plant uses. Knowledge on rituals pertaining to harvesting and field protection was 28.6% for elderly women and 1.79% for girls. The younger generation regards indigenous knowledge as primitive and outdated and are not interested in it. The inclusion of indigenous knowledge into school curricula could remove the negative attitude of young people towards traditional medical practice. This study reveals that in Zulu culture, both men and women are allowed to practice traditional medicine. Some of the medicinal plants used in the treatment of various diseases by the Zulu people include Dovyaliscaffra, Zanthoxylum davyi, Anastrabeintegerrima, Clausena anisate, Solanum incanum L etc (Albuquerque et al., 2006).

Malaysia

People depend directly or indirectly on plants for various reasons. In Malaysia, there are about 70 species of edible herbs. Adnan and Othman (2012) investigated the relationship between plants, plants use and the Malay culture. Report shows that Malaysia's flora and fauna are among the most diverse in the world. It has one of the world's richest and most varied biophysical resources (Premilla, 2002) and its rainforest provides an excellent condition for luxuriant plant grow. Also, Malaysia is set apart with vast of resources of plants either medicinal plants or any usage of plants to form the essence of ethnobotany. Malaysia is a multi-racial country; therefore, ethnobotany is widely used in a broad manner. It is important to note that every ethnic group or race in Malaysia practice and establish its ethnobotany system in its own unique way and belief. The Chinese and Indian group within Malaysia have rich and well-documented tradition usage of plants. The same is true of Malay culture. In the Malay culture, plants and humans are intimately linked. The Malay people commonly use plants for food, medicine, ritual and cosmetics, therefore a study on the relationship between plants and the Malay culture helps to preserve the integrity of the culture and protecting the natural heritage and its knowledge (Bill, 2003; Engel., 2007).

In this study, Adnan and Othman (2012) used a case study to identify and to observe plants in a Malay territory. In this study, Kampong Bharu was chosen primarily due to its status as an urban village in the heart of Kuala Lumpur city centre. Samples of Malay homes were randomly selected according to specific criteria such as the zoning of the area and the appropriate size of the courtyard. Before the

fieldwork, a set of the questionnaire was structured and forms the guideline during the interview session. Interviews obtained information with regards to ethnobotany plants such as basic demography, plants name, and plants prescribed which include type of plant used, part of plants used, medicinal uses, ritual and other garden setting were collected through questionnaires, interviews and discussions among the house owners. At the micro stage, plant inventory and analysis in every house were done to find the similarities in term of species, functions, character and component to conclude as the character for every house. The data was analysed at the macro stage and compare the similarity in every house in the village, to create an overall Malay landscape character. This study recorded 50 plants by means of its use and relative importance to the Malay society in an urban area. This study found that plants continue to be a significant healing, therapeutic remedies for alleviating ailments and other applications such as consumption, beautification, utilities and rituals to humankind and shows the relationship between the Malay culture and their use of medicinal plants for various purposes. Some of the plants used by the Malay people in the treatment of various diseases include Centella asiatica, Piper betle, Andrographis paniculata, Eurycoma longifolia, Labisia pumila, Areca catechu, Cinnamomum verum etc. (Ramirez 2007).

Ethiopia

Traditional practice and knowledge passed orally from generation to generation has been documented in Ethiopia as in most African countries (Mesfin et al., 2014). In certain instances, families or member within a family may specialise in specific treatment, for example fixing of broken bones. In Ethiopia, traditional knowledge has developed because of human interaction with its environment and each community has its own specific approach to health and disease and traditional remedies from plants play an important role in the health of millions of people in Africa and other countries of the world (Hedberg et al., 2006; Alemayehu et al., 2015).

Eshete and Molla (2021) reported that there is limited development of therapeutic products from traditional medicinal plants and the indigenous knowledge on the practice of medicinal plants is being lost due to migration from rural to urban areas and that there is a lack of adequate ethnobotanical surveys in many parts of Ethiopia. Consequently, records of traditional use of medicinal plants are urgently needed to preserve the knowledge. The sociocultural appeal, the cultural acceptability of healers, local pharmacopeias, accessibility, low price, and effectiveness against various health challenges are factors promoting widespread use of medicinal plants (Deribe et al., 2006). The Ethiopian traditional medical system is characterised by variation and is shaped by the environmental diversities of the country, sociocultural conditions of the different ethnic groups and historical developments that are linked to migration, introduction of foreign cultureand religion (Teklehaymanot and Giday, 2007).

Ethiopian indigenous people have a long history of traditional plant usage for treating ailments. To better understand and appreciate this, Eshete and Molla (2021) performeda research study to identify, document, and analyse the cultural importance of medicinal plants and their associated indigenous knowledge among Guji Semi-Pastoralist People, in Suro Barguda District, West Guji Zone, southern Ethiopia. The results of the study are as follows:

The authors noted that in the study area, many medicinal plants (98 medicinal plant species) were reported to be used in the treatment of human ailments and the finding indicated the presence of considerable medicinal plant diversity. That various plant parts were used forremedy preparation in the district, however, 36.2% ofthe preparations were obtained from leaves. That the output of preference ranking exercise on medicinal plants that were used against toothache showed that *Clerodendrum myricoides* (Hochst.) Vatke were the most preferred species, followed by *Scherebra alata* (Hochst) Welw and *Carissa spinarum*L, indicating that indigenous people of the study area had sufficient knowledge of the healing potential of medicinal plants for different diseases. That medicinal plant species recorded for the treatment of human ailments in the district were cited for one or more uses other than medicinal use. That the highest fidelity level value was recorded for Combretum molle R.Br. ex G.Don in treating gastrointestinal disease therapeutic category, followed by Fagaropsis angolensis (Engl.) Dale used to treat breathing system diseases. These values provide an insight into the high healing potential of these plants against the specific disease. That traditional practitioners diagnose their patients through observation and asking the patient about the feelings of the disease and then prepare the plant-based medicine to administer based on their cultural

knowledge on symptoms, specific illnesses and therapeutic medicinal species held in the knowledge of indigenous people. That traditional practitioners showed varying degrees of traditional medicinal plant knowledge based on differences in age, experience, gender, and education level. That more ethnomedicinal knowledge was observed in elderly members of the community than in younger groups; experienced practitioners than the public; and more with the illiterate than the literate. Because of the cultural norm and secrecy of the traditional system, this knowledge was transmitted along the selected male line of the family members due to which males could be more knowledgeable than females among the study participants.

India

Report indicate that culture do play an important role in the use of medicinal plants by shaping traditional medical systems such as Ayurveda and Siddha, influencing plants that are treated as medicinal, their preparations, route of administration and the beliefs linked to their efficacy are fundamentally found in India's rich cultural heritage and the knowledge is passed along family lines from one generation to another (Kala, 2004). This also depend on differences in regional customs, caste system and specific ethnic group (Kala, 2004; Rao et al., 2004; Jablonski, 2004). The basic mode of knowledge regarding most medicinal plants in India comes from ancient texts such as Vedas which provide detailed therapeutic properties of several medicinal plants (Sammal et al., 2004). Interestingly, different groups in India have specialised knowledge of medicinal plants based on the local flora and cultural practices. Various traditional healers also play key role in identifying, preparing and administering medicinal plants, relying on family lineage and cultural knowledge (Kala & Mathur, 2002). Report indicate thatcertain medicinal plants are used for religious purposes, additionally reinforcing cultural significance in the use of medicinal plants (Rao et al., 2004; Samal et al., 2004). In certain instances, access to and knowledge about medicinal plants could be influenced by social categorisation with certain communities possessing more in-depth and specific knowledge than others (Prajapati et al., 2003). For instance, the Holy basil (Tulsi) is regarded as sacred plant in Hinduism and is widely used for its medicinal properties (Nautiyal et al., 2002; Prajapati et al., 2003). Also, Ginger (Zingiber officinale) is commonly used in treating digestive problems, applying different methods according to regional customs, showing the role of cultural differences in the use of medicinal plants. Some of the medicinal plants used by Indian include *Origanum vulgare, Saussureaobvallata, Ocimum sanctum, Cedrus deodara, Cynodondactylon, Aegle marmelos, Juniperus communis, Musa paradissica, Nardostachys grandiflora, Zanthoxylum armatum, Ficus benghalensis* and *Ficus religiosa, rocus sativus, Curcuma zedoaria, cimum sanctum L* (Kala, 2004; Farooquee et al., 2004).

Mediterranean culture

Medicinal plants are commonly used in Mediterranean couture to promote good health, treat and prevent diseases. Reports indicate that Mediterranean diets are rich in fruits and vegetables and have linked Mediterranean populations with reduced incidence of chronic diseases including cancer, coronary heart disease, and cardiovascular disease (Moss et al., 2003. The beneficial effects of the Mediterranean diet have been linked to high intake of antioxidants from fruits and vegetables, nuts and medicinal plants (Cheung & Tai, 2007). For example, Rosemary has drawn much attention in the region. Rosemary (*Rosmarinus officinalis* Linn. Family Labiatae) is a perennial plant native of the Mediterranean area. Rosemary extracts are used routinely for cooking, preservation of foods, cosmetics, or in herbal medicine for anti-inflammatory and antimicrobial applications and for the prevention and treatment of diabetic and cardiovascular diseases (Cheung & Tai, 2007; Hsieh et al., 2007). At least 30 components have been identified in essential oils, which have been shown to possess olfactory properties that influence cognitive performance including memory (Moss et al., 2003).

The Mediterranean regions have rich inventory of herbal medicinal products. The mild climate and the biogeography, geology, and ecological characteristics make the Mediterranean basin unique in reference to its biodiversity and plant species with medicinal potential (Leonti &Verpoorte, 2017). The use of herbal medicine in the Mediterranean region is an integral part of folk culture, where plants and herbs are largely used for the treatment and/or prevention of several diseases. In the Mediterranean region, medicinal plants have long been utilised to treat various infectious diseases, with approximately 25% of commonly prescribed drugs containing plant-derived compounds

(Mukhtar et al., 2008). Several plants have demonstrated activity in the management of diseases(Nawrot et al., 2022). A study by Gonzalez-Tejero et al (2008) samples different medicinal plants used by people in the Mediterranean region. A total of 985 species of traditional use were reported and 406 species (the greatest use percentage) were employed medicinally in the localities studied), indicating the interest that traditional phytotherapy continues to have in this region. Some of the plants used by people in the Mediterranean region include Rosmarinus officinalis, Thymus vulgaris, Origanum vulgare, Lavandula spp, Salvia officinalis, Laurus nobilis, Mentha spp, Crocus sativus, Hypericum perforatum etc (Wiersinga et al., 2020).

Bolivia

It has been reported that in Bolivia, culture plays a significant role in deciding the medicinal plants to use for specific purpose or ailment by determining plants that are viewed as medicinal, the methods of preparation and route of administration (Bussmann, 2013). Each indigenous group has unique traditional knowledge and practices based on cultural traditions and environment, indicating that people in Bolivia could use medicinal plants as curatives or palliatives based on cultural background (Bussmann & Paniagua-Zambrana, 2014). For instance, during Covid-19 pandemic, the indigenous peoples of the Plurinational State of Bolivia living in rural areas applied ancestral wisdom, traditional medicine and medicinal plants to treat covid-19 coronavirus. Through this approach, the grandparents revitalized indigenous knowledge, realized its value, gave it a new life and shared it with the younger population. In a study by Bourdy et al (2000), assessed medicinal plants used by the Tacana people in Bolivia. Of the 450 plant species collected during the survey, 33% had medicinal uses. The plants were prepared using different methods according to their belief and culture and used according to their belief and culture. For instance, in the case of topical or external administration, different modes of preparation were used. The selected parts of the fresh plants could be simplymashed, crushed or grated while the resulting paste is fixed to the affected area by a piece of cloth or strip of Moraceae species. In the case of latex or resinous sap, it is simply applied to the skin, and covered by a cloth, or paper. It is generally believed that this poultice will fall off by itself when the sickness is cured.The authors concluded that the knowledge and use of medicinal plants is still very much alive with the Tacana despite the rapid acculturation and deterioration of their language. Some of the medicinal plants used in Bolivia in treating different ailments include Justicia boli6iana Rusby, Dendropanaxarboreus L, Jessenia bataua, Vernonanthura patens, Tanaeciumnocturnum, Ricinus communis L, Senna hirsuta L etc (Bourdy, 1998).

In a study conducted in Bolivia by Thomas et al (2009), it was reported that some plant families clearly hold more medicinal species than predicted by chance. In this study, plants with a shrubby habit are significantly overused and usage is linked to the year-round availability of shrubs, as compared to most annual and herbaceous plants that disappear during the dry season. The authors also indicated that perception of medicinal plant efficacy varies from one species to another and that all local participants recognise that some species are more effective for treating symptoms or health conditions than others. The authors concluded that the quality of remedies should be considered when ranking plants according to their cultural importance, meaning that culture do play a role in the selection and efficacy of plants for medicinal purposes.

China

Report from China indicate that culture significantly influences medicinal plants usage via deep-rooted traditions in medicine, religion and symbolism in which specific plants are associated with meaning while others are considered sacred depending on the ethnic group or region, leading to diversity of plant-based practices (Mi et al., 2021).According to Zhang and Yang (2012), there are about 11,000 species of medicinal plants in China. Over the long history and development of different linguistic groups, Chinese have accumulated traditional knowledge of using medicinal plants to treat diseases and to resist the harsh natural environment. On this basis, they have created beautiful ethnomedicines (Pei, 2001).

The traditional Chinese medicine is the most common example in the extensive use of plants with different plant parts believed to have specific healing properties (Ozukum et al., 2019). It has also been observed that different religious traditions relate specific plants with spiritual meaning (Cheng et al., 2022). It is important to note that in China, some plants represent longevity, wealth and good fortune leading to such plants being planted in gardens and homes of people. It is also reported that

different ethnic groups have their unique plants based on traditions and beliefs with differences in medicinal use in ritual practices and cultural interpretations in the application of specific plants (Shu et al., 2018). For example, Prunus persica represent longevity and are therefore planted near homes to drive away evil while the Panax quinquefolius L is used as tonic to promote good health. On the other hand, Artemisia annua is well known for its anti-malarial properties and is widely used in traditional medicine (Zu et al., 2021).

In a study among Dulong people in Northwest Yunnan, China, Cheng et al (2022) used relative frequency of citation to identify the most culturally significant medicinal plants and used informant consensus factor to evaluate agreement among informants. A total of 105 medicinal plant species belonging to 69 families were recorded. Among the 69 families, Asteraceae (8 species), Polygonaceae, Ranunculaceae, and Rosaceae (4 species each) were the dominant families. The whole plants were the most frequently used part in the preparation of medicines and the most common preparation method was decoction while the most frequent application route was oral administration. In addition, the authors reported that 62 medicinal plants used by the Dulong people for medicinal purposes were also consumed for dietary use. The study reflect that the Dulong people have rich traditional knowledge about medicinal plants, which plays an important role in their healthcare.

Jamaica

Plants have historical significance in medicine for thousands of years. The oldest medical pharmacopeias of the African, Arabian, and Asian originmainly used plants and herbs to treat pain, oral diseases, skin diseases, microbial infections, different types of cancers and reproductive disorders (Shu et al., 2018; Robinson & Zhang, 2011; Reid et al., 2010). This practice is true for people in Jamaica.

In several countries globally, especially in rural poor settings, the use of medicinal plants is the only form of traditional medicine. The WHO (2011) estimated that between 70 and 95% of the global population use medicinal plants as medicine. Anecdotal evidence supports the medicinal claims of these plants. Interestingly, there have been scientific evidence to support the efficacy of some of these plants (Robinson & Zhang, 2011; Reid et al., 2010; Shu et al., 2018; Cheng et al., 2022). It is reported that about 25% of medicines on the global market are synthesised from plant materials (Ekor, 2013). Through ethnobotanical screening, thousands of plants and their biologically active compounds have been identified. Of the estimated 300,000 plants species that exist globally, around 15% have been evaluated for their pharmacological activity (Barnes et al., 2007; De Lucia et al., 2012). It is estimated that two-thirds of the global plant species have medicinal value (Newman & Cragg, 2014).

Report indicates that there is increasing attention on Jamaica due to its wide diversity of medicinal plants. Plant-based decoctions have been a significant part of Jamaican traditional culture and medicine basically to treat the common headache, nausea, pain, reproductive system disorders and digestive issues etc (Newman & Cragg, 2014; Reid et al., 2010). Common medicinal plants used in traditional Jamaican medicine include *Momordica charantia* L. (Cerasee), *Aloe barbadensis* Miller (*Aloe vera* (L.) Burm.f./), *Cannabis sativa* L. (Ganja), *Cola acuminate* (P.Beauv.) Schott and Endl. (*Bissy), Morindacitrifolia* L. (Noni), *Pothomorphe* umbellata (L.) Miq. (Cowfoot Leaf), *Cinnamomum tamala* (Buch. -Ham) T.Nees and Eberm. (Bay leaf) and *Zingiber officinale* Roscoe (Ginger) etc (Newman & Cragg, 2014; Reid et al., 2010). An ethnomedicinal survey by Picking et al (2011) assessed commonly used medicinal plants in Jamaica and confirmed the significance of plants in primary health care in the country. According to the authors, the survey showed that respondents used 116 medicinal plants for various ailments. Of these, 94% (107 plants) were distributed across 51 plant families. The top 5 families with the most frequent plant families

identifiedinclude *Fabaceae*, *Lamiaceae*, *Asteraceae*, *Malvaceae*and *Piperacerae*(Picking et al, 2011). Common plants of the *Fabaceae* family include Legumes, Maranga, Strong Back, Dandelion and Medina. Common herbs of the *Lamiaceae* family include Basil, Sage, Rosemary, Oregano, Thyme, Mentha and Lavender. The *Lamiaceae* family is commonly known as the Mint family. Some plants of the *Asteraceae* family include of Marigold, Spanish Needle, and Quaco Bush. Common plants of the *Malvaceae* family include Bissy, Sorrel, and Hibiscus (Picking et al., 2011). Of the 107 plants identified by survey respondents, 8 are endemic to Jamaica, for example *Piper amalago* L. (Pepper elder), *Rhytidophyllumtomentosum* (L.) Mart. Jamaica is home to many established medicinal plants such as ginger, garlic, ball moss and fever grass (Picking et al., 2011). This makes the country

specifically attractive for meaningful scientific research on the medicinal value of plants and the development of phytomedicine. This could have great economic and medicinal benefits for the country and the whole of the Caribbean. It is important to note that traditional use of these medicinal plants in Jamaica is attributed to the passing of knowledge from traditional Asian and African medicine (Robinson & Zhang, 2011; Mitchell et al., 2010).

Nigeria

Medicinal plants have played a very important role in Nigerian traditional medicine for several years, forming the foundation of healthcare in several rural settings (Ukaoma et al., 2013; Obeta et al., 2020). Medicinal plants do play significant part in the healthcare among the three major ethnic groups in Nigeria, namely Hausa, Igbo and Yoruba, although each of the ethnic group have their distinct culture, traditional practices as well as belief system (Malti et al., 2004; Igoli et al., 2005; Negbenebor et al., 2017; Etukudoh et al., 2020; Obeta et al., 2020).

Among the Hausa group, culture influences the use of medicinal plants in various ways such as religion, belief and traditional practices (Malti et al., 2004). The use of medicinal plants is the first option among the Hausa group when a person is sick (Last, 1999; Negbenebor et al., 2017) and the efficacy of medicinal plants is strongly linked to the will of Allah (Garba et al., 2016). Medicinal plants are vital to rural and urban populations of the Hausa people and are served by several distinct types of traditional healers. Medicinal plants are used in different forms for treating a variety of diseases. For example, the Neem tree (Azadirachta indica) and the Mango [Mangifera indica] tree which are widespread and well known are consumed and used for medicinal purpose because these plants have been shown to contain medicinally active elements (Negbenebor et al., 2017). Different parts of plants such as the roots, root, bark, stem, latex and sap, leaves, buds, flowers, and seeds are used to treat various disease conditions. The part of the plants is prepared in different ways. The leaves and bark can be mashed and pounded, boiled or inhaled and different modes of application and administration are also adopted (Donga et al., 2011).

The Yoruba culture is one of the largest and most influential ethnic groups in West Africa, with a rich tradition of using medicinal plants for thousands of years (Elujoba, 2000; WHO, 2000; Olaniyan, 2003; Adeniyi, 2019). This cultural practice is deeply interrelated with the spiritual, social, and daily life of the Yoruba people. The use of medicinal plants in Yoruba culture is rooted in a holistic approach to health, combining physical, spiritualand mental well-being (Akinjogbin, 2002).

The Yoruba people have a strong belief in the interrelationship of the spiritual and physical worlds. Various plants are believed to possess spiritual significance, and their medicinal properties are usually linked to the spiritual healing of an individual (Omotoye, 2010). Traditional healersuse medicinal plants for physical healing properties, spiritual purification and protection (Jegede, 2010). Medicinal plants are believed to be gifts from the gods or ancestors, who impart knowledge of their healing properties to chosen practitioners or individuals (WHO, 2000; Amanze, 2007; Akinjogbin, 2002; Babalola, 2003).

The Yoruba people have developed a sophisticated knowledge system of herbal medicine passed down from one generation to another. Elders, particularly herbalists, hold knowledge of how to prepare, mix, and apply various plant-based remedies for treating disease conditions and maintaining good health. This knowledge is often kept within the family or community, and young apprentices learn from older generations (Aremu, 2008). Some medicinal plants used in Yoruba culture include Ocimum gratissimum-used for treating colds, fever, and digestive issues; Corchorus olitorius- known for its nutritional benefits and used in soups for its digestive properties; Mucuna pruriens-used to treat stomach problems and in traditional ceremonies; Zingiber offinale-used for its anti-inflammatory and digestive properties, Vernonia amygdalina-used to treat various disease conditions, including malaria, high blood pressure, and digestive problemsand Moringa oleifera-known for its antioxidant and anti-inflammatory properties (Babalola, 2003; Olaniyan, 2003).

The deep knowledge of medicinal plants of Yoruba people has demonstrated an influence beyond West Africa (Hedberg et al., 2006). Many of the plants used in Yoruba traditional medicine are now being studied globally for their health benefits. Also, as the world increasingly focuses on natural and alternative medicine, the traditional knowledge of the Yoruba people has gained recognition, and many of their herbal remedies are being used in modern complementary and alternative healing

practices (Dopamu, 2003; 2004). The Yoruba culture's relationship with medicinal plants reflects an important respect for nature, spiritual well-being, and ancestral knowledge (Jegede, 2002). It is a holistic system that combines physical, mental with spiritual health (Okunade, 2004). As scientific research continues to explore the medicinal properties of these plants, the wisdom and knowledge gained from Yoruba tradition may continue to influence both traditional and modern medicine (Okunade, 2004; Omotoye, 2010; Adeniyi, 2019).

Igbo culture is one of the principal ethnic groups in Nigeria with a rich and deep-rooted tradition of using medicinal plants in their everyday life (Iwu et al., 2005). The Igbo people have developed a sophisticated understanding of nature, which includes a vital connection with plants and the environment (Ukaoma et al., 2013). The use of medicinal plants in Igbo culture goes beyond just healing; it is an integral part of their spiritual, social, and cultural practices (Iwu, 2005). The traditional knowledge passed down through generations plays a crucial role in maintaining health, preserving spiritual balance and for treating variousdisease conditions (Abarikwu et al., 2008; Etim et al., 2020).

The Igbo people believe in a spiritual space that is interrelated with the physical world (Iwu et al., 2005). The belief in the divine, deities, and ancestral spirits shapes their worldview and traditional practices. Plants are seen as physical healers but with spiritual significance. Traditional healersare believed to be spiritually gifted and are tasked with harnessing the medicinal properties of plants as well as performing spiritual rituals (Obeta et al., 2020).Certain plants are believed to be special gifts from the gods or ancestors, containing protective and healing properties. For example, before using a medicinal plant, prayers or offerings could be offered to invoke the spirit of the plant or the relevant deity that governs it (Badger-Emeka et al., 2018; Obeta et al., 2020).

Traditional herbal knowledge in Igbo culture is passed orally, from elders to younger generations, especially within families. Eldershave extensive knowledge about the identification, preparation, and application of various plants. This knowledge also involves the understanding of the right times to harvest plants, how to properly process them, and the most effective ways to use them (Ikeagwulonu et al., 2020).Young members of the community learn from observing and participating in the preparation of remedies. This apprenticeship model helps ensure that the knowledge of medicinal plants is preserved (Omeh et al., 2014).

Several plants are used in Igbo culture for medicinal purposes, in the form of decoctions, teas, poultices, or baths. Some of the most used medicinal plants include Vernonia amygdalina used for its cleansing properties and to treat a variety of ailments like fever, malaria, high blood pressure, and digestive issues. It is also used in spiritual rites to cleanse individuals of bad luck; Azadirachta indica known for its antibacterial, antiviral, and anti-inflammatory properties. It is used in treating skin conditions, fevers, and malaria, Carica papaya used for its nutritional value and for its medicinal properties in treating digestive issues, skin conditions, and infections (Nworu et al., 2008; Etim et al., 2020).

The use of medicinal plants in Igbo culture is accompanied by spiritual rituals. For example, when treating an illness, a traditional healer might combine the medicinal properties of a plant with incantations or prayers to invoke the healing spirits (Iwu et al., 2005). This holistic approach blends the physical and spiritual aspects of healing, ensuring that the root causes of the disease are addressed. For example, a sick person might be given a herbal remedy while a spiritual cleansing ritual is performed to remove any negative energies or evil forces believed to be causing the illness. (Iwu et al., 2005; Omeh et al., 2014).

Traditional healers in Igbo culture serve as experts in both herbal medicine and spiritual healing, mostly often consulted for more complex or chronic illnesses, where the cause is believed to be either physical, spiritual, or a combination of both. The *Dibia*'s role is not just about prescribing medicinal preparations but diagnosing the root cause of the problem, which can involve spiritual insight, divination, or dreams (Ezekwesii-Ofili & Okaka, 2019).

Currently, several Igbo communitieshave integrated traditional medicine with Western medicine. While Western healthcare is more widely accepted and practiced, traditional healers continue to be consulted, especially in rural areas or when people feel that Western medicine is not yielding the expected outcomes (Iwu et al., 2005; Etukudoh et al., 2020).

It has been reported that several plants used in Igbo culture have attracted the attention of modern scientists due to their potential health benefits. Plants such as Vernonia amygdalina and Moringa oleifera have been studied for their anti-inflammatory, antioxidant, and antimicrobial and diabetic properties (Omodanisi et al., 2017). The Igbo people's knowledge of medicinal plants has contributed to global interest in herbal medicine, and many of these plants are now being used in the development of natural health products (Obeta et al., 2020). As modern medicine evolves, the Igbo's traditional use of medicinal plants remains an essential part of their cultural identity and continues to influence global health practices (Ikeagwulonu et al., 2020).

Cameroon

Culture plays a significant role in the use of medicinal plants in Cameroon, with traditional beliefs, customs, and practices influencing how and why plants are used for healing (Efange, 2002; WHO, 2001; Keute & Efferth, 2010). Its diverse ethnic groups and cultural practices have developed significant knowledge about local medicinal plants and their medicinal properties over centuries (Ngono-Ngane et al., 2001; Kuete, 2010; Jiofack et al., 2008; 2009; 2010).In many ethnic groups, traditional healers are highly respected individuals who play a crucial role in maintaining health and well-being (Nkongmeneck et al., 2007). The extensive knowledge of medicinal plants is applied in the treatment of various disease conditions. The traditional healers are seen as intermediaries between the physical and spiritual worlds and diseases are mostly perceived as physical and spiritual disturbances, and the healing process involves both medicinal plants and spiritual rituals (Simbo, 2010; Jiofack et al., 2011).

Medicinal plants are deeply linked to the spiritual and cultural beliefs of Cameroonian communities. Many plants are believed to have sacred properties, and their use in healing rituals can be connected to ancestral worship, protection from evil spirits, and ensuring balance in an individual's life. For example, certain plants may be used during initiation rites or other important cultural ceremonies, with their healing properties connected to both material and spiritual spaces (Mpondo &Dibong, 2012).

Knowledge of medicinal plants is often passed down from one generation to the next, within families or communities. This knowledge is usually not written down but passedorally via apprenticeships, and practical experience (Focho et al., 2009). Elders in the community play a vital role in maintaining and passing on the knowledge in the identification, preparation and usage of medicinal plants which ensures the continuity of herbal practices (Noumi & Ebwele, 2011).

The use of medicinal plants can also be linked to social identity. Certain plants may be associated with ethnic groups, and the use of these plants can be seen as an expression of cultural heritage (WHO, 2011; Mpondo & Dibong, 2012). In certain instances, plant-based treatments are seen as an alternative to orthodox medicine, which may be perceived as foreign or disconnected from traditional values. This practice is very common in rural areas where access to modern healthcare services is limited and the use of medicinal plants serves as a more accessible and affordable mode for healthcare (Dibong et al., 2011).

Different ethnic groups in Cameroon use different plants based on their local environment and cultural practices. For example, the Bantu-speaking people, such as the Bassa, may use different plants than the Fulani, who have distinct cultural and geographical contexts (Titanji et al., 2008). Cameroonian flora is diverse, offering an abundance of medicinal plants and some of the commonly used plants include Moringa oleifera, Vernonia amygdalina and Zingiber offinale (Vouffo et al., 2008; Metuno et al., 2008).

Globalisation and the increasing commercialisation of medicinal plants have influenced their use in Cameroon. Some local plants have become popular in the global market because of their health benefits, such as Vernonia amygdalina (Tala et al., 2007; Wanda et al., 2005). This has led to a growing interest in cultivating and marketing these plants (Kamdem et al., 2012; Sob et al., 2011; Ntie-Kang et al., 2013).

Tunisia

Culture plays a significant role in the use of medicinal plants in Tunisia. The influence of culture on traditional medicine and its practice is deeply rooted in historical traditions, religious beliefs, and social customs (Abdallah & Chaieb, 2007; Abdel-Kader, 2003).

Tunisia has a long history of herbal medicine as indigenous practices are passed down through generations regarding the use a variety of medicinal plants for treating disease conditions. This knowledge has been integrated into daily life and continues to be appreciated in rural and urban settings (Akrout et al., 2001; 2003, 2004).The union between Arabic and Berber cultures in Tunisia has enriched medicinal plant knowledge. The Berber people, known for their deep connection to the land, have long used plants like thymein their healing practices (Akrout et al., 2004).Tunisia's historical link to the Carthaginian civilization, known for its advanced agricultural and medicinal practices, also influenced the use of medicinal plants (Abdelwahed et al., 2006). Islamic scholars also contributed to herbal medicine knowledge. Islam plays a vital role in everyday life, and Islamic teachings also guide the use of plants for medicinal purposes in Tunisia, thus religious framework encourages the use of natural remedies alongside conventional medicine (Abdollahi et al., 2003).

Further to physical healing, medicinal plants are also used in spiritual or ritualistic contexts. For example, some plants are believed to protect against bad luck. These cultural beliefs shape the selection and use of medicinal plants in daily life (Adhvaryal et al.,2007).Knowledge about medicinal plants are often passed down within families from older parents to younger ones as part of cultural customs. The use of herbal remedies is seen as an important aspect of nurturing and care in Tunisian families (Ahmed et al., 2001).Traditional markets play a crucial role in the exchange of medicinal plants and herbal remedies, serving as meeting places where knowledge is shared and where plants are sold for both medicinal and culinary purposes (Akbay et al., 2002).

It has been reported that women in rural area are the primary caretakers in reference to the use of medicinal plants and are regarded as the custodians of knowledge concerning herbal remedies (Akrout, 2004; Al-Mustapha & Al-Thunibat, 2008). In contemporary Tunisia, there is a growing trend of integrating traditional plant-based remedies with modern pharmaceuticals with some people preferring medicinal plants as a complementary approach for treating conditions such as digestive issues or respiratory problems (Alcicek, 2011). Tunisia's rich cultural heritage has made medicinal plants part of its tourist appeal, with some visitors seeking authentic Tunisian herbal treatments. This has boosted local interest in sustainable harvesting and cultivating medicinal plants for both local use and export (Aniya et al., 2000; Akrout et al., 2010).As global awareness of natural and organic products grows, more Tunisians are turning to traditional herbal remedies. This trend is particularly popular among younger generations who are interested in the cultural and environmental sustainability of their health choices (Al-Quran, 2008).

There is a growing herbal cosmetic market in the country, with many companies using local plants like olive oil to produce creams, shampoos, and lotions. This links the traditional use of plants with modern consumer goods (Amaral et al., 2006). The cultural framework in the country fosters the continued appreciation and utilisation of plant-based remedies in modern Tunisian society, blending ancient wisdom with contemporary practices (Amer & Mehlhorn, 2006; Amiriti & Aberchane, 2008)

Iraq

Culture plays a significant role in the use of medicinal plants in Iraq and the relationship between culture and the use of plants for medicinal purposes is rooted in traditions, beliefs and practices that have developed over thousands of years (Albuquerque et al., 2007; Mikaeli et al., 2013; Saman & Ali, 2015).

Iraq has a rich history, with ancient civilizations such as the Sumerians, Babylonians, and Assyrians, who made significant contributions to the development of traditional herbal practice (Hanlidou et al., 2004; Selvi et al., 2019). The use of herbs like thyme has been well-reported in ancient texts, and this cultural inheritance continues to influence modern traditional practices (Mati & Boer, 2010). Knowledge of medicinal plants is integrated into local customs and passed down through families with elders in a community or family playing a vital role in preserving and passing this knowledge to younger generations (Ismail, 2004).

Both Islam and Christianity have references to the healing properties of plants in their sacred texts. There is a strong emphasis on using plants for physical and spiritual healing (Selvi et al., 2019).

Majority of Iraqis use medicinal herbs such as black seed *(Nigella sativa)* for both medicinal and spiritual purposes (Ismail, 2004). Certain plants, such as the olive tree and its oil, are valued in both religious and cultural contexts. Olive oil has healing properties and is used in traditional remedies for skin conditions, wounds and digestive issues (Quinlan, 2005).

In rural areas, the use of medicinal plants is more common and integral to daily life. Majority of rural Iraqis depend on herbal medicine due to limited access to health facilities, especially in remote areas, hence they use plants from their surroundings for conditions such as fever, digestive problems and for improving skin health (Yarali, 2003; Mati &de Boer, 2011). Even in urban areas, cultural preferences drive people to use medicinal plant preparations with conventional treatments (Mohammed & Kawarty, 2020).

Medicinal plants are regularly sold in local markets for their therapeutic qualities; the markets serve as hubs for traditional remedies (Mosaddegh et al., 2012). The markets are also places where individuals seek advice from local herbalists, who use their knowledge of plants to recommend treatments for various health conditions (Behcet & Arik, 2013).

Herbal practices in Iraq are not just about physical healing but are deeply linked to cultural identity and social rituals (Mati &de Boer, 2011). For example, in certain communities, herbal preparations are part of wedding ceremonies, childbirth practices, and other significant life events. Herbs are also used in daily rituals such as in cooking, because it is believed that the medicinal plants would bring health benefits to the body and spirit (Akbulut &Bayramoglu, 2013; Abu-Rabia, 2015). Interestingly, traditional plant-based remedies remain deeply rooted in rural communities and among those facing limited access to healthcare. The cultural significance of plants for medicinal purposes continues to play a vital role in Iraqi society, especially in the face of current challenges, providing a unique blend of ancient wisdom and contemporary healthcare practices (Ahmed, 2016).

CONCLUSION

Culture plays a significant role in use of medicinal plants across different regions and countries of the world. The use of plants for healing has its root in ancient traditions, religious practices, and local knowledge passed down through generations.

In many cultures, particularly in Indigenous communities, the use of medicinal plants is deeply interrelated with spiritual beliefs, rituals, and ancestral knowledge. The communities view plants as part of a holistic approach to health, integrating them with lifestyle, customs, and practices. In regions like China and India ancient systems of medicine such as traditional Chinese medicine and Ayurveda have been central to health practices for thousands of years. In Africa, the use of medicinal plants is mostly connected to traditional healing practices, with herbalists or spiritual healers serving as trusted authorities, using plant-based remedies for both physical and spiritual disease conditions. In Latin America, in indigenous cultures of the Amazon, the use of medicinal plants is often combined with rituals.

Cultural perceptions of medicinal plants can influence whether they are embraced, stigmatised, or used for commercial purpose. However, in some cultures, modern medicine has overshadowed traditional plant-based healing, while in others, there is a renewed interest in natural and holistic remedies as part of a larger cultural movement toward sustainability and organic living. The use of medicinal plants is significantly connected to cultural beliefs and practices. The plants are used instruments of physical healing and are linked to spiritual, philosophical and cultural worldviews that vary greatly across regions.

Future studies on culture and use of medicinal plants

Future studies on culture and its influence on the use of medicinal plants can provide a fascinating interdisciplinary platform where ethnobotany, anthropology, sociology, and pharmacology merge.

Research should investigate how modern advancements in medicine are influencing or challenging traditional uses of medicinal plants. For example, younger generations in various cultures may move away from traditional plant-based remedies in favour of orthodox medicine. Understanding the balance between these two could provide insight into cultural shifts.

Cultural factors, such as spirituality, religion, and customs or beliefs play a significant role in how different societies approach the use of medicinal plants. Future studies should explore how cultural beliefs shape the efficacy of medicinal plants in local traditions and whether the symbolic or spiritual aspects are as important as the physical benefits.

In many indigenous cultures, knowledge of medicinal plants is passed down orally from one generation to the next. Future research should examine how indigenous knowledge is being preserved or lost, and how it could be documented, shared, or digitised for future generations without disrupting the community's traditions.

The increasing influence of global markets, the internet, and social media may alter or blend traditional uses of medicinal plants. A study should investigate how cultural globalisation impacts the traditional knowledge surrounding medicinal plants.

How different cultures access medicinal plants s should be studied. Future research should explore how socioeconomic factors influence the use of medicinal plants in different cultures.

Studies should examine how different healthcare systems such as traditional, complementary, or alternative medicine systems integrate medicinal plants into their treatment regimens. This could provide valuable insight into the interaction between culture and healthcare.

Future studies should focus on scientifically validating medicinal uses of plants traditionally used in various cultures. This could bridge the gap between traditional knowledge and modern pharmacological understanding, providing both cultural insights and medical advancements.

Studying the similarities and differences in medicinal plant use across cultures could yield novel pharmacological discoveries. Research should explore how different societies use the same plant species for various purposes or how different plants serve similar therapeutic functions across cultures.

As demand for medicinal plants increases globally, the sustainability of plant harvesting becomes crucial. Future studies should focus on how different cultures approach the sustainable harvesting of medicinal plants, the balance between conservation and medicinal use, and the effects of environmental degradation on the availability of medicinal plants.

Climate change may significantly alter the availability of medicinal plants in different regions. Research should examine how cultures are adapting the use of plants in response to changes in climate and how traditional knowledge can contribute to climate resilience.

With increasing migration and intercultural exchanges, hybrid approaches to medicinal plant use may emerge. Future studies should explore hybrid practices and how cultures blend traditional knowledge with new influences.

The use of medicinal plants for commercial purposes often leads to ethical challenges around intellectual property and bioprospecting. Future studies should examine how cultural perspectives influence the regulation of plant-based medicines and the protection of indigenous knowledge from exploitation.

Studies should explore how different cultures assert ownership over medicinal plants and the ethical challenges that arise from the commercialisation of such knowledge.

Finally, future studies on culture and its influence on the use of medicinal plants should be multidisciplinary, involving collaboration between anthropologists, botanists, healthcare professionals, and environmental scientists. These studies have the potential to uncover new ways of preserving cultural heritage while promoting sustainable and evidence-based practices in the use of medicinal plants.

REFERENCES

Abarikwu SO (2014). Kolaviron, a natural flavonoid from the seeds of Garcinia kola, reduces LPS-induced inflammation in macrophages by combined inhibition of IL-6 secretion, and inflammatory transcription factors, ERK1/2, NF-κB, p38, Akt, p-c-JUN and JNK. BiochimBiophys Acta. 1840(7):2373-2381.

Abdallah L&Chaieb M (2007). Water status and growing phonology of a Saharan Shrub in North Africa. Afr J Ecol 1(45):80–85.

Abdel-Kader MS (2003) New ester and furanocoumarins from the roots of *Pituranthostortuosus*. J Braz Chem Soc 14:48–51

Abdelwahed MSA, Amin AA, El-Rashad SM (2006) Physiological effect of some bioregulators on vegetative growth, yield and chemical constituents of yellow maize plants. World J Agric Sci 2:149–155

Abdollahi M, Fooladian F, Emami B, Zafari K, Bahreini-Moghadam A (2003). Protection by sildenafil and theophylline of lead acetate-induced oxidative stress in rat submandibular gland and saliva. Hum Exp Toxicol 22:587–592.

Abu-Rabia A (2015). Key plants in fighting cancer in the Middle East. Chinese Medicine 6: 124. 2.

Adeniyi PO. (2019). Bitter Foods are Sometimes Better. World Journal of Preventive Medicine, vol. 7, no. 1: 1-8. DOI: 10.12691/jpm-7-1-1.

Adhvaryu MR, Reddy N, Parabia MH (2007) Effects of four Indian medicinal herbs on Isoniazid-, Rifampicin- and Pyrazinamide-induced hepatic injury and immunosuppression in *guinea pigs*. World J Gastroenterol 13:3199–3205.

Adnan N & Othman N (2012). The relationship between plants and the Malay Culture. Procedia - Social and Behavioral Sciences 42: 231 – 241.

Ahmed HM (2016). Ethnopharmacobotanical study on the medicinal plants used by herbalists in Sulaymaniyah Province, Kurdistan, Iraq. Journal of Ethnobiology and Ethnomedicine 12: 1-17. 3.

Ahmed MS, Galal AM, Ross SA, Ferreira D, El Sohly MA, Ibrahim ARS, Mossa JS, El-Ferly FS (2001) A weakly antimalarial biflavonone from *Rhus retinorrhoea*. Phtochemistry 58:599–602.

Akbay P, Gertsch J, Çalis I, Heilmann J, Zerbe O, Sticher O (2002) Novel antileukemic sterol glycosides from *Ajuga salicifolia*. Helv Chim Acta 85:1930–1942.

Akbulut S&Bayramoglu MM (2013). The trade and use of some medical and aromatic herbs in Turkey. Studies Ethno Medicines 7: 67-77.

Akinjogbin IA (2002). *Milestones and concepts in Yoruba history and culture: a key to understanding Yoruba history*. Ibadan: Olu Akin.

Akrout A (2004) The study of chemical compositions of essential oils of three pastoral plants from Matmata (south Tunisia) (in French). Cah Options Méditerr 62:289–292

Akrout A, Chemli R, Chrief I, Hammami M (2001) Analysis of the essential oil of *Artemisia campestris* L. J Flavour Fragr 16:337–339.

Akrout A, Chemli R, Simmonds M, Kite G, Hammami M, Cherif I (2003) Seasonal variation of the essential oil of Artemisia campestris L. J Essent Oil Res 15(5):333–336.

Akrout A, El-Jani H, Amouri A, Neffati M (2010a) Screening of antiradical and antibacterial activities of essential oils of *Artemisia campestris* L., *Artemisia herba-alb* Asso. & *Thymus capitatus* Off. et Link. Growing wild in the southern of Tunisia. Recent Res Sci Technol 2(1):29–39.

Albuquerque UP, Lucena, FP, Monteiro, JM., Florentino, ATN., Almeida CF (2006). Evaluating two quantitative ethnobotanical techniques. Ethnobotany Research and Applications 4, 51–60.

Albuquerque UP, Monteiroa, JM, Ramosa, MA, Cavalcanti de Amorim, EL (2007). Medicinal and magic plants from a public market in northeastern Brazil. Journal of Ethnopharmacology 110, 76–91.

Alçiçek Z (2011) The effects of thyme (*Thymus vulgaris* L.) oil concentration on liquidsmoked vacuum-packed rainbow trout (Oncorhynchus mykiss Walbaum, 1792) fillets during chilled storage. Food Chem 128:683–688.

Alemayehu G, Asfaw Z, Kelbessa E (2015). Ethnobotanical study of medicinal plants used by local communities of Minjar-Shenkora District, North Shewa Zone of Amhara Region, Ethiopia. J Med Plants Stud.3(6):01–11.

Ali, NAA, Jülich WD, Kusnick C, Lindequist U (2001). Screening of Yemeni medicinal plants for antibacterial and cytotoxic activities. Journal of Ethnopharmacology 74, 173–179.

Al-Mustafa AH&Al-Thunibat OY (2008) Antioxidant activity of some Jordanian Medicinal plants used traditionally for treatment of diabetes, Pakistan. Aust J Biol Sci 1(3):351–358.

Al-Quran S (2008) Taxonomical and pharmacological survey of therapeutic plants in Jordan. J Nat Prod 1:10–26.

Amanze PO (2007). A contextual analysis of the practice and use of African traditional medicine among Seventh Day Adventist in Remoland of Ogun State" (Ph.D. Thesis, Department of Religious Studies, Obafemi Awolowo University, Ile-Ife, Nigeria.

Amaral FMM, Ribeiro MNS, Barbosa-Filho JM, Reis AS, Nascimento FRF, Macedo RO (2006). Plants and chemical constituents with giardicidal activity. Rev Bras Farmacogn 16(Supl.):696–720.

Amer A& Mehlhorn H (2006). Larvicidal effects of various essential oils against *Aedes anopheles* and *Culex larvae* (Diptera, Culicidae). Parasitol Res 99:466–472.

Amirti F&Aberchane M (2008) Activitéantifongique des huilesessentielles de *Thymus bleicherianus* Pomel et *Thymus capitatus* (L.) Hoff. & Link contre les champignons de pourriture du boisd'eouvre. BASE 12(4):345–351.

Aniya Y, Shimabukuro M, Shimoji M, Kohatsu M, Gyamfi MA, Miyagi C, Kunii D, Takayama F, Egashira T (2000) Antioxidant and hepatoprotective actions of the medicinal herb Artemisia campestris from the Okinawa Islands. J Biol Pharm Bull 23(3):309–312.

Aremu DA (2008). African medical healing system. In A. I. Irinoye (Ed.), *The dynamics of healthcare organization*. Ibadan: College Press and Publishers.

Babalola A (2003). British civilizing mission and the truncation of a civilization. In A. Oyebade (Ed.), *The foundations of Nigeria: essays in honour of Toyin Falola*. Trenton: Africa World Press.

Badger-Emeka LI, Khalil HE, Emeka PM (2018). Evaluation of Different Fractions of Garcinia kola Extracts against Multidrug Resistant Clinical Bacterial and Fungal Isolates. Pharmacogn J.10(5):1055-60.

Bank, L (2002). Beyond red and school: Gender, tradition and identity in the rural Eastern Cape. Journal of South African Studies 28:631–649.

Barnes J, Anderson L.A., Phillipson J.D. Herbal medicines: A Guide for Health-Care Professionals. 3rd ed. Pharmaceutical Press; London, UK: 2007.

Bessong, PO, Obi CL., Andréola ML, Rojas LB, Pouységu, L, Igumbor, E., Meyer, JM., Quideau S, Litvak S (2005). Evaluation of selected South African medicinal plants for inhibitory properties against human immunodeficiency virus type 1 reverse transcriptase and integrase. Journal of Ethnopharmacology 99, 83–91.

Bhaskaran K., Douglas I., Forbes H., dos-Santos-Silva I., Leon D.A., Smeeth L (2014). Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5·24 million UK adults. Lancet. 384(9945):755–765.

Bill R (2003). Back to the future: using traditional Knowledge to strengthen biodiversity conservation in Pohnpei, Federated States of Micronesia. Ethnobotany Research and Applications, 1: 55-63.

Bourdy SJ, DeWalt LR, Cha´vez de Michel A, Roca E, Deharo V, Mun˜oz L, Balderrama C, Gimenez GA (2000). Medicinal plants uses of the Tacana, an Amazonian Bolivian ethnic group. Journal of Ethnopharmacology 70 (2000) 87–109.

Bourdy, G (1998). Tacana: Ecuanasha Aqui, EcuanashaId'rene Cuana, me Schanapaque. (Tacana; conozcannuestrosarboles, nuestrashiebras). Ird, Fonama, Umsa, Cipta, La Paz, Bolivia.

Brink PJ (1995). Fertility and fat: the Annang fattening. Soc Aspects Obes. 1:71.

Bussmann RW (2013). The globalization of traditional medicine in northern Peru – from shamanism to molecules. Ev. Based Compl. Alt. Med., 291903. http://dx. doi.org/10.1155/2013/291903.

Bussmann RW&Paniagua-Zambrana NY (2014). Traditional knowledge of biodiversity – plant use of the Chácobo in Bolivia. Gaia Scientia, Volume Especial PopolaçõesTradicionais, pp. 93–10.

Carrasquillo O, Orav EJ, Brennan TA&Burstin HR (1999). Impact of language barriers on patient satisfaction in an emergency department. Journal of General Internal Medicine, 14, 82-87.

Carter L (2008). Globalization and Science Education: The Implications of Science in the New Economy. Journal of Research in Science Teaching 45,5: 617 - 633.

Cheng Z, Hu X, Lu X, Fang Q, Meng Y & Long C (2022). Medicinal Plants and Fungi Traditionally Used by Dulong People in Northwest Yunnan, China. Front Pharmacol 13: 895129.

Cheung S& Tai J (2007). Anti-proliferative and antioxidant properties of rosemary Rosmarinus officinalis. Oncol Rep. 17(6):1525–1531.

Cocks ML & Dold AP (2006). Cultural significance of biodiversity: the role of medicinal plants in urban African cultural practices in the Eastern Cape, South Africa. J Ethnobiology 26(1): 60-81.

Cocks ML& AP Dold (2004). A new broom sweeps clean: The economic and cultural value of grass brooms in the Eastern Cape province, South Africa. Forests, Trees and Livelihoods 13: 33–42.

Cocks M.L& Wiersum KF (2003). The significance of biodiversity to rural households in Eastern Cape province of South Africa. Forests, Trees and Livelihoods 13:39–58.

De Luca V, Salim V, Atsumi SM, Yu F (2012). Mining the biodiversity of plants: A revolution in the making. Science. 336:1658–1661.

Deribe K, Amberbir A, Getachew B, Mussema Y (2006). A historical overview of traditional medicine practices and policy in Ethiopia. Ethiop J Health Dev. 20:127–34.

Dibong SD, Mpondo EM, Ngoye A, Priso RJ (2011). Inventory and biodiversity of species edible wild fruits sold in the markets of Douala, Cameroon. Int J App Biol Pharm Tech 2 (3): 303-311.

Donga JJ, Surani VS, Sailor GU, Chauhan SP, Seth AK. A systematic review on natural medicine used for therapy of diabetes mellitus of some Indian medicinal plants. Int. J. Ph. Sci. 2011;2:36

Dopamu, PA. (2003). Scientific basis of African magic and medicine: the Yoruba experience". In P. A. Dopamu (Ed.), African culture, modern science and religious thought. Ilorin: Decency Printers.

Dopamu PA. (2004). Traditional medicine in health care delivery. In N. S. Lawal, N. O. Sadiku, A. A. Mathew, & P. A. Dopamu (Eds.), *Understanding Yoruba life and culture*. Trenton: Africa World Press.

Efange SMN (2002). Natural products: a continuing source of inspiration for the medicinal chemist. Advances in Phytomedicine. Edited by: Iwu MM, Wootton JC. Amsterdam: Elsevier Science, 61-69.

Ekor M (2013). The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. Front. Pharmacol. 4:177.

Elujoba AA (2000). *Pharmacognosy for health and culture: the PHC jungle connection. Inaugural Lecture Series 134*. Ile-Ife, Nigeria: Obafemi Awolowo University.

Engel HD. (2007). A field guide to Tropical Plants of Asia. Marshall Cavendish International (Asia) Private Limited: Singapore.p 263.

Erickson PI (2016). The healing lessons of ethnomedicine. Understanding Applying Med Anthropol. 6:188.

Eshete MA & Molla EL (2021). Cultural significance of medicinal plants in healing human ailments among Guji semi-pastoralist people, Suro Barguda District, Ethiopia. J Ethnobiology Ethnomedicine17:61.

Etim II, Etukudoh NS, Olumide OB, Uchejeso MO, Lucy NL. and Bwotle, FY (2020).Hypoglycemic and hypolipidemic Eefect of Bitter Kola (Garcinia kola) seed extract on alloxan-induced diabetic Albino rats. J Biosciences and Medicines, 8, 127-134.

Etukudoh NS, Ejinaka RO, Olowu FA, Obeta MU, Adebowale OM, Udoudoh M P. (2020). Coronavirus (COVID-19); Review from A Nigerian Perspective. American Journal of Biomed Science & Research. - 9(1): 1-17.

Ezekwesili-Ofili JO &Okaka ANC (2019). Herbal Medicines in African Traditional Medicine In Herbal Medicine Chapter 10, IntechOpen. http://dx.doi.org/10.5772.

Farooquee NA, Majila BS, Kala CP (2004). Indigenous knowledge systems and sustainable management of natural resources in a high altitude society in Kumaun Himalaya, India. Journal of Human Ecology. 16:33–42.

Focho DA, Newuh MC, Anjah MG, Nwana FA, Ambo FB (2009). Ethnobotanical survey of trees in Fundong, Northwest Region, Cameroon. J EthnobiolEthnomed. 2009, 5: 17-10.1186/1746-4269-5-17.

Garba AM, Ajibadee GA & Appah J (2016). Backgrounds to the Understanding of Ethnobotanical Practice among the Hausa People of Northern Nigeria. International Journal of Indigenous Medicinal Plants 47(1): 1539-1541.

George M. Springer Singapore; Singapore (2017). Interpreting illness, disease, medicine, and medical care. In: Institutionalizing Illness Narratives; pp. 1–28.

Gonzalez-Tejero RMR, Casares-Porcel M, Sanchez-Rojas CP, Ramiro-Gutierrez JM, Molero-Mesa J, PieroniJA& Giusti ME et al (2008). Medicinal plants in the Mediterranean area: Synthesis of the results of the project. J Ethnopharmacology 116 (2008) 341–357.

Grierson DS & Afolayan AJ (1999). Antibacterial activity of some indigenous plants used for the treatment of wounds in the Eastern Cape, South Africa. J Ethnopharmacol 66: 103-106.

Hanlidou E, Karousou R, Kleftoyanni V, KokkiniS (2004). The herbal market of Thessaloniki (N Greece) and its relation to the ethnobotanical tradition. Journal of Ethnopharmacology 91, 281–299.

Hammond-Tooke WD. (1989). Bhaca Society. Oxford University Press, Cape Town, 325 pp: 22-34.

Hedberg I, Kelbessa E, Edwards S, Demissew S, Persson E (2006), editors. Flora of Ethiopia and Eritrea: gentianaceae to cyclocheilaceae;, vol. 5. Uppsala, Addis Ababa: Department of Systematic Botany.

Hofstede G (2001) Culture's Consequences. Comparing Values, Behaviors, Institutions, and Organizations across Nations. 2nd ed. London: Sage.

Hsieh CL, Peng CH, Chyau CC, Lin YC, Wang, HE & Peng, RY (2007). Low-density lipoprotein, collagen, and thrombin models reveal that Rosemarinus officinalis L. exhibits potent antiglycative effects. J Agric Food Chem. 2007;55(8), 2884–2891.

Hutchings A (1989). A survey and analysis of traditional medicinal plants as used by the Zulu; Xhosa and Sotho. Bothalia - African Biodiversity and Conservation19(1): 1-12.

Ibeneme S, Eni G, Ezuma A &Forwengel G (2017). Roads to Health in Developing Countries: Understanding the Intersection of Culture and Healing. Current Therapeutic Research 86: 13-18.

Igoli JO, Ogaji OG, Tor-Anyiin TA, Igoli NP (2005). Traditional medicine practice amongst the Igede people of Nigeria. African. J. Trad. Compl. Alterna. Med. 2(2):134-152.

Ikeagwulonu RC, Etukudoh NS, Ejinaka OR, Ibanga IE, Obeta MU, Uro-Chukwu HC and Odeh EC. (2020). Profile of Some Trace Elements in Selected Traditional Medicines used for Various Aliments in Ebonyi State, Nigeria. American Journal of Biomed Science & Research. - 9(3): 10-20.

IsmailSA (2004). History of the Plains of Erbil. vol. 1. SaadollaShaikhani Publications No. 67. Dara Press, Erbil, Kurdish Autonomous Region, Iraq.

Iwu MM, Igboko OA, Onwuchekwa U&Okunji CO (2005) Evaluation of the Bioflavonoid of Garcinia kola Seeds. Journal of Ethno Pharmacology, 21: 127-138.

Jablonski D (2004). Extinction: past and present. Nature. 427:589.

Jegede, A.S. (2002). "The Yoruba cultural conception of health and illness" *Nordic Journal of African Studies*, *11*(3).

Jiofack T, Fokunang C, Guedge N, Kemeuze V, Fongnzossie E, Nkongmeneck BA, Mapongmetsem PM, Tsabang N (2009). Ethnobotanical uses of some plants of two ethnoecological regions of Cameroon. Afr J Pharm Pharmacol. 3: 664-684.

Jiofack T, Fokunang C, Kemeuze V, Fongnzossie E, Nkongmeneck BA, Mapongmetsem PM, Tsabang N (2010): Ethnobotanical uses of medicinal plants of two ethnoecological regions of Cameroon. Int J Med Sci. 2: 60-79.

Jiofack T, Fokunang C, Kemeuze V, Fongnzossie E, Tsabang N, Nkuinkeu R, Mapongmetsem PM, Nkongmeneck BA (2008). Ethnobotany and phytopharmacopoea of the South- West ethnoecological region of Cameroon. J Med Plant Res.2: 197-206.

Kala CP&Mathur VB (2002). Patterns of plant species distribution in the trans-Himalayan region of Ladakh, India. Journal of Vegetation Science. 13:751–754.

Kala CP (2004). Studies on the indigenous knowledge, practices and traditional uses of forest products by human societies in Uttaranchal State of India. Almora: GB Pant Institute of Himalayan Environment and Development.

Kamdem STR, Wafo P, Ali Z, Oluyemisi OO, Marasini BP, Khan IA, Ngadjui BT, Choudhary MI, Rahman AU (2012). Chemical constituents of *Stereospermumacuminatissimum* and their urease and α-chymotrypsin inhibitions. Fitoterapia. 83: 204-208.

Koné MW&Atindehou, KK (2008). Ethnobotanical inventory of medicinal plants used in traditional veterinary medicine in Northern Côte d'Ivoire (West Africa). South African Journal of Botany 74, 76–84.

Kuete V, Efferth T: Cameroonian medicinal plants: pharmacology and derived natural products. Front Pharmacol. 2010, 1: 123-

Kuete V (2010). Potential of Cameroonian plants and derived products against microbial infections: a review. Planta Med. 76: 1479-1491.

Kuschik I (2016). Spanish folk medicine in discussion: the body concept. Arxiud'Etnografia de Catalunya. 7:152–169.

Laland KN, Atton N & Webster MM (2011) From fish to fashion: experimental and theoretical insights into the evolution of culture. Phil. Trans. R. Soc. B 366, 958–968.

Last M (1999). Strategies against time Sociology of Health and illness. 1:306 – 17.

Lee LJ, Batal HA, Maselli JH, Kutner JS (2002). Effect of Spanish interpretation method on patient satisfaction in an urban walk-in clinic. Journal of General Internal Medicine, 17, 641-646.

LeontiM&VerpoorteR (2017). Traditional Mediterranean and European herbal medicines. J. Ethnopharmacol. 199: 161–167.

Lewu FB& Afolayan AJ (2009). Ethnomedicine in South Africa: the role of weedy species. African Journal of Biotechnology 8 (6), 929–934.

Li X, Xu X, Wang J, et al (2012). A system-level investigation into the mechanisms of Chinese traditional medicine: compound Danshen formula for cardiovascular disease treatment. PLoS One7(9): 43-49.

Mahwasane ST, Middleton L &Boaduo N (2013). An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondo area, Limpopo province, South Africa. South African Journal of Botany 88: 69-75.

Maiti R, Jana D, Das UK, Ghosh D (2004). Antidiabetic effect of aqueous extract of seed of Tamarindus indica in streptozotocin induced diabetic rats. J Ethnopharmaco. 92:85-91.

Masoga M (2005). South African Research in Indigenous Knowledge Systems and Challenges of Change. Indilinga - African Journal of Indigenous Knowledge Systems 4(1): 15 - 30.

Mati E& de Boer H (2010). Contemporary knowledge of dye plant species and natural dye use in Kurdish Autonomous Region Iraq. Economic Botany 64: 137-148.

Mati E& de Boer H (2011). Ethnobotany and trade of medicinal plants in the Qaysari Market, Kurdish Autonomous Region, Iraq. Journal of Ethnopharmacology 133: 490-510. 33.

Menendez-Baceta G, Aceituno-Mata L, Reyes-García V, Tardío J, Salpeteur M & Pardo-de-Santayana M (2015). The importance of cultural factors in the distribution of medicinal plant knowledge: A case study in four Basque regions. J Ethnopharmacol 161: 116-127.

Mesfin F, Seta T, Assefa A. (2014) An ethnobotanical study of medicinal plants in Amaro Woreda, Ethiopia. Ethnobot Res Appl. 12:341–54.

Mesoudi, A., Whiten, A. & Laland, K. N. 2004 Is human cultural evolution Darwinian? Evolution 58, 1 –11.

Metuno R, Ngandeu F, Tchinda AT, Ngameni B, Kapche GDWF, Djemgou PC, Ngadjui BT, Bezabih M, Abegaz BM (2008). Chemical constituents of *Treculia acuminata* and *Treculiaafricana* (Moraceae). BiochemSyst Ecol. 36: 148-152.

Mi XC., Feng G., Hu YB, Zhang J, Chen L, Corlett RT et al. (2021). The Global Significance of Biodiversity Science in China: an Overview. Natl. Sci. Rev. 8: 32-27.

Mikaeili A, Karimi I, Modaresi M, Bagherinasab Z (2013). Assessment of antidermatophytic activities of Urtica dioica L. against Microsporumcanis in a guinea pig model. Tropical Journal of Pharmaceutical Research 12: 997-1002. 34.

Mitchell S., Burke A., McKenzie C., Stirling S., Ryan J., Simpson W., McGlashan D (2008). JAMAICA: Country Report to the FAO International Conference on Plant Genetic Resources for Food and Agriculture. Kingston; Frontenac, ON, Canada: pp. 2–59.

Mohammed A &Kawart AMA (2020). An ethnobotanical sur An ethnobotanical survey of medicinal plants in Ballaka y of medicinal plants in Ballakayati (Erbil, ati (Erbil, North Iraq). Turkish J Botany 44(3): 1-10.

Molina AI (2016). The evil eye as a folk disease and its Argentine and Ibero-American historical explanatory frame. West Folklore.75:1.

Mosaddegh M, Naghibi F, Moazzeni H, Pirani A,Esmaeili S (2012). Ethnobotanical survey of herbal remedies traditionally used in Kohghiluyehva Boyer Ahmad province of Iran. Journal of Ethnopharmacology 141: 80-95.

Mosaddegh M, Naghibi F, Moazzeni H, Pirani A,Esmaeili S (2012). Ethnobotanical survey of herbal remedies traditionally used in Kohghiluyehva Boyer Ahmad province of Iran. Journal of Ethnopharmacology 141: 80-95.

Moss M, Cook J, Wesnes K, Duckett P (2003). Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults. Int J Neurosci. 113(1):15–38.

Mpondo EM&Dibong SD (2012). Traditional knowledge on medicinal plants use by ethnic communities in Douala, Cameroon. Eur J Med Plant. 2012, 2 (2): 159-176.

Mukhtar, M.; Arshad, M.; Ahmad, M.; Pomerantz, R.J.; Wigdahl, B.; Parveen, Z. Antiviral potentials of medicinal plants. Virus Res. 131:111–120.

Nautiyal S, Rao KS, Maikhuri RK, Negi KS, Kala CP (2002). Status of medicinal plants on way to Vashuki Tal in Mandakini Valley, Garhwal, Uttaranchal. Journal of Non-Timber Forest Products. 9:124–131.

Nawrot J, Gornowicz-Porowska, J, Budzianowski J, Nowak G, Schroeder G, Kurczewska J (2022). Medicinal Herbs in the Relief of Neurological, Cardiovascular, and Respiratory Symptoms after COVID-19 Infection A Literature Review. Cells 11: 1897.

Negbenebor HE, Shehu K, Mairami FM, Adeiza ZO, Nura N &Fagwalawa LD (2017). Ethnobotanical survey of medicinal plants used by Hausa people in the management of diabetes mellitus in Kano Metropolis, Northern Nigeria. European J Medicinal Plants 18(2): 1-10.

Nestler G (2002). Traditional Chinese medicine. *Med Clin North Am*. 86(1):63-73.

Newman DJ& Cragg GM (2016). Natural Products as Sources of New Drugs from 1981 to 2014. J. Nat. Prod. 79:629–661.

Ngono Ngane RA, Koanga Mogtomo ML, Tchinda Tiabou A, Magnifouet Nana H, Motso Chieffo PR, Mballa Bounou Z, Ebelle Etame RM, Ndifor F, Biyiti L, Amvam Zollo PH (2001). Ethnobotanical survey of some Cameroonian plants used for treatment of viral diseases. Afr J Plant Sci. 5 (1): 15-21.

Nkongmeneck BA, Mapongmetsem PM, Pinta YV, Nkuinkeu R, Tsabang N, Fongnzossie E, Kemeuze V, Jiofack T, Johnson M, Asaha S, Sakwe C, Mboufack C (2007). Etat des lieux des plantes médicinalesimportantes à conserver et des jardins des plantes médicinales à promouvoir. Geneva: Rapport CEN/OMS/MEM.

Noumi E&Ebwelle ES (2011). Potentiality of medicinal plants in treating urinary lithiasis in Littoral Region, Cameroon. Eur J Med Plant. 1 (3): 74-87.

Ntie-Kang F, Mbah JA, Mbaze LM, Lifongo LL, Scharfe M, Ngo Hanna J, Cho-Ngwa F, Amoa Onguéné P, Owono Owono LC, Megnassan E, Sippl W, Efange SMN (2013). Building the Cameroonian 3D Structural Natural Products Database for Virtual Screening. BMC Complement Altern Med. 13: 88-810.

Nworu SC, Akah P, Esimone CO, Okoli CO& Okoye F (2008). Immunomodulatory Activities of Kolaviron, a Mixture of Three Related Biflavonoids of Garcinia kola Heckel Immunopharmacology and Immunotoxicology 30(2):317-32.

Obeta MU, Ejinaka OR, Ofor IB, Ikeagwulonu R, Agbo EC, and Abara US. (2020). Nigerian COVID-19 (Coronavirus) Patients Update, the Realities with medical laboratory diagnostic sites. American Journal of Epidemiology and Infectious Disease, 8(1): 13-15.

Okunade AA (2004). Traditional medicine and health care in transition. In N. S. Lawal, N. O. Sadiku, A. A. Mathew, & P. A. Dopamu (Eds.), Understanding Yoruba life and culture. Trenton: Africa World Press.

Olaniyan R (2003). *The amalgamation and its enemies: an interpretive history of modern Nigeria*. Ile-Ife: Obafemi Awolowo University Press.

Omeh YN, Onoja SO, Ezeja MI, Uchendu WC, Okorie E, and Raymond M. (2014). Quantitative phytochemical, proximate analysis and Hypolipidemic Effect of Garcinia kola. British Journal of Medicine & Medical Research 4(36): 5770-5778

Omotoye, R. (2010). The challenges of western health care system on African traditional medicine in Yorubaland. In O. Ogen (Ed.), Culture and education in Nigeria: perspectives on historical and pedagogical issues. Ile-Ife: Nigerian Cultural Studies Network.

Ozukum A, Changkija S, Tripathi SK (2019). Ethnobotanical Studies on the Khiamniungan Tribe in Tuensang District of Nagaland, Northeast India: Ethnomedicinal Plants. Pleione 13 (1): 70-78.

Pei SJ., Huai HY (2007). Ethnobotany. Shanghai Science and Technology Press.

Picking D, Delgoda R, Younger N, Germosén-Robineau L, Boulogne I, Mitchell S (2015). TRAMIL ethnomedicinal survey in Jamaica. J. Ethnopharmacol. 169:314–327.

Posey DA (1999). Cultural and spiritual values of biodiversity. A complementary contribution to the global biodiversity assessment. In Cultural and spiritual values of biodiversity, ed. D.A. Posey, pp. 1–19. UNEP and Intermediate Technology Publications, London. Pujol, J.

Prajapati ND, Purohit SS, Sharma AK, Kumar T (2003) A Handbook of Medicinal Plants. Jodhpur: Agrobios; 2003.

Premilla, M. (2002). Green Malaysia: Rainforest Encounters. Editions Didier Millet SdnBhd: Kuala Lumpur, Malaysia.

Quave CL, Pardo-de-Santayana M, Pieroni, A (2012). Medical ethnobotany in Europe: from field ethnography to a more culturally sensitive evidence-based CAM. Evidence-Based Complementary and Alternative Medicine 2012: 1-17.

Quinlan, M (2005). Considerations for collecting freelists in the field: examples from ethobotany. Field Methods 17: 219–234.

Quiroga R, Meneses L, Bussmann RW (2012). Medicinal ethnobotany in Huacareta (Chuquisaca, Bolivia). Journal of Ethnobiology and Ethnomedicine 8, 29. R Development Core Team, 2011. R: A Language And Environment For Statistical Computing. Vienna, Austria.

Ramirez CR (2007). Ethnobotany and the Loss of Traditional Knowledge in the 21st Century. Journal of Ethnobotany, 5: 245- 247.

Rao MR, Palada MC& Becker BN (2004). Medicinal and aromatic plants in agro-forestry systems. Agroforestry Systems. 61:107–122.

Reyes-García, V., Luz, A.C., Guèze, M., Cristobal, J., Macía, M.J., Orta-Martínez, M., Paneque-Gálvez, J., Pino, J., 2013. TAPS Bolivian Study Team (2013). Secular trends on traditional ecological knowledge: an analysis of different domains of knowledge among Tsimane' indigenous people. Learning and Individual Differences 27, 206–212.

Ried K, Frank OR& Stocks NP (2010). Aged garlic extract lowers blood pressure in patients with treated but uncontrolled hypertension: A randomised controlled trial. Maturitas. 2010; 67:144–150.

Robinson M.M& Zhang X (2011). The World Medicines Situation 2011: Traditional Medicines: Global Situation, Issues and Challenges. 3rd ed. World Health Organization (WHO); Geneva, Switzerland.

Runciman, G. 2010 The theory of cultural and social selection. Cambridge, UK: Cambridge University Press.

Sagbo IJ & Hussein AA (2022). Antidiabetic Medicinal Plants Used in the Eastern Cape Province of South Africa: An Updated Review. Processes 10: 1-26.

Saleh Yarali, J.B., 2003. Erbil Citadel between Past and Present. Iraqi Turkmen Front. Turkmen Culture Directorate, Erbil, Kurdish Autonomous Region, Iraq.

Samal PK, Shah A, Tiwari SC, Agrawal DK (2004). Indigenous health care practices and their linkages with bio-resource conservation and socio-economic development in central Himalayan region of India. Indian Journal of Traditional Knowledge.3:12–26

Saman AA& Ali AA (2015). Ethnobotany of the Hawraman Region of Kurdistan Iraq. Harvard Papers in Botany 20: 85-89.

Shu H, Zhang S, Lei Q, Zhou J, Ji Y, Luo B et al. (2018). Ethnobotany of *Acorus* in China. Acta Soc. Bot. Pol. 87 (2), 3585.

Sillitoe P, Dixon P & J Barr (2005). Indigenous Knowledge Inquiries. Warwickshire: Practical Action Publishing.

Simbo DJ (2010). An ethnobotanical survey of medicinal plants in Babungo, Northwest Region, Cameroon. J. EthnobiolEthnomed. 6: 8-10.

Sob SVT, Wabo HK, Tang CT, Tane P, Ngadjui BT, Ye Y (2011). Phenol esters and other constituents from the stem barks of *Stereospermumacuminatissimum*. J Asian Nat Prod Res. 13: 1128-1134.

Tala MF, Krohn K, Hussain H, Kouam SF, Wabo HK, Tane P, Schulz B, Hu Q (2007).Laurentixanthone C: A new antifungal and algicidal xanthone from stem bark of *Vismialaurentii*. *Z*. Naturforsch. 62b: 565-568.

Teklehaymanot T&Giday M (2007). Ethnobotanical study of medicinal plants used by people in Zegie peninsula, northwestern Ethiopia. J EthnobiolEthnomed. 3:12.

Thomas BE, Vandebroek I, Sanca S & Damme PV (2009). Cultural significance of medicinal plant families and species among Quechua farmers in Apillapampa, Bolivia. J Ethnopharmacol 122: 60-67.

Titanji VPK, Zofou D, Ngemenya M (2008). The antimalarial potential of medicinal plants used for the treatment of malaria in Cameroonian folk medicine. Afr J Trad CAM. 5 (3): 302-321.

Tomasello M, Carpenter C, Behne T & Moll H (2005) Understanding and sharing intentions: the origins of cultural cognition. Behav. Brain Sci. 28, 675–691.

Ukaoma AA, Ukaoma VO, Okechukwu RI, Iwuagwu M. (2013). Phytochemical screening and antibacterial properties of Garcinia kola. The Journal of Phytopharmacology. 2(3): 34-38.

Vouffo B, Hussain H, Eyong KO, Dongo E, Folefoc GN, Nkengfack AE, Krohn K (2008). Chemical constituents of *Dorstenia picta* and *Newbouldia laevis*. BiochemSyst Ecol. 36: 730-732.

Wanda GJMK, Njamen D, Yankep E, Fotso MT, Fomum ZT, Wober J, Starcke S, Zierau O, Vollmer G (2006). Estrogenic properties of isoflavones derived from *Millettia griffoniana*. Phytomedicine. 13: 139-145.

WHO (2024). Traditional, complementary and integrative medicine. www.who.int.org (accessed on 19 February 2025).

WHO (WHO). (2000). *General guidelines for methodologies on research and evaluation of the traditional medicine*. Geneva: World Health Organization.

WHO (2000). *General guidelines for methodologies on research and evaluation of the traditional medicine*. Geneva: World Health Organization.

WHO (2011). *General guidelines for methodologies on research and evaluation of the traditional medicine*. Geneva: World Health Organization.

Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC (2020). Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. JAMA 324, 782–793.

Xu L, Wang Y, Ji Y, Li P, Cao W, Wu S, et al. (2021). Nutraceutical Study on *Maianthemum Atropurpureum*, a Wild Medicinal Food Plant in Northwest Yunnan, China. Front. Pharmacol. 12, 710487.

Zegada MT & Marcelo G (2018). La Vida Política Del Meme. InteraccionesDigitales En Facebook En Una CoyunturaCrítica. Cochabamba: Plural Editores.

Zhang HF& Yang XH (2012). Asian Medicine: Protect Rare Plants. Nature 482, 35.

Zobolo AM &Mkabela QN (2006). Traditional knowledge transfer of activities practised by Zulu women to manage medicinal and food plant gardens. African Journal of Range & Forage Science 23(1): 77–80.

Zulu IM (2006). Critical Indigenous Education and Knowledge. Journal of Pan African Studies 1,3: 32-49.