International Journal of Advanced Pharmaceutical Sciences and Research (IJAPSR)
ISSN: 2582-7618 (Online), Volume-3 Issue-4, June 2023

Ethnobotanical Study of Medicinal Plant and Traditional Knowledge Used

Bekele Kindie, Solomon Mengistu

Abstract: ***As the review conducting ethnobotany deals with the link amongst people, livestock, and the environment with plants and gives details on how people of a particular culture and religious knowledge formulate the use of medicinal plants. Indigenous knowledge is the accumulation of procedural knowledge, cultural practices, and traditional knowledge that has developed over many years. The term "ethnobotany" was first used orally by John Hershberger in 1895. Medicinal Plants have been used as a vital source of prevention and healing for human and livestock ailments. Thus, traditional medicine refers to the knowledge and practices of a particular community, which utilise plants to diagnose and treat health problems in livestock and humans. Medicinal plants used in Ethiopia comprise 887 plant species, with 26 species being indigenous. The most effective plant species are identified and recorded for treating various human and animal ailments. Ethnoveterinary medicine is a traditional knowledge and practice to prevent and treat diseases encountered by livestock. In Ethiopia, medicinal plant species are not equally distributed throughout the country. In-situ conservation is a method of conserving and protecting medicinal plant species in their natural habitat. In contrast, Ex-situ conservation is a method of preserving and safeguarding medicinal plant species without their natural habitats. However, medicinal plants are declining rapidly due to ecological shifts, deforestation, urbanisation, loss of forests and woodlands, and agricultural expansion.***

Keywords: Ethnobotany, Indigenous Knowledge, Traditional Medicine, Medicinal Plant, Conservation, Ethiopia

I. INTRODUCTION

Ethnobotany is the study of plants and elucidates how people of a particular culture, with their specific procedures and religious knowledge, utilise medicinal plants [41]. Ethnobotany is a combination of two words, which means ‘ethno’, the study of people and ‘botany’, the study of plants [7]. Ethnobotany is a diversified and multidisciplinary subject that requires expertise in various fields of academic research [3].

In the world, people have been using traditional medicinal plant for medical purposes to treat various ailments [35, 8].

In Ethiopia, local communities have diverse indigenous experiences with medicinal plants, including the ability to classify plants and their parts for use in treating various ailments [24]. In Africa, traditional healers possess detailed knowledge of traditional medicinal plants [43]. The diverse beliefs, cultures, and languages of the people in Ethiopia have contributed to the high diversity in traditional knowledge of medicinal plant healing [14].

80% of the population in developing countries has used traditional medicine to treat ailments in humans and livestock. The primary means of treating diseases and fighting infections using medicinal plants is effective worldwide. Conventional treatments have been used to address various health issues and treat physical and mental illnesses in a manner different from allopathic medicine [60]. Around 70% of humans and 90% of the livestock population depend on traditional medicine [18]. Plants have efficient medicinal value for human and animal ailments throughout the country. Medicinal plants are vital for the use of medication, providing not only ecological, economic, and cultural services.

In Ethiopia, medicinal plants comprise 887 species of plants [19]. However, traditional medicinal plants and associated indigenous knowledge are declining rapidly due to ecological shifts, deforestation, loss of forests and woodlands, urbanisation, agricultural expansion, and a lack of awareness among the community [29, 16]. In situ and ex-situ conservation methods are the primary strategies for conserving medicinal plants and their associated indigenous knowledge [12]. Therefore, this study aimed to conduct an ethnobotanical survey of medicinal plants, encompassing indigenous and traditional knowledge, as well as methods of conservation.

II. DEVELOPMENT OF ETHNOBOTANICAL STUDY AND MEDICINE

Historical accounts indicate that traditional medicinal plants were utilised in Chinese medicine from approximately 5000 to 4000 BC [15]. The medicinal plant has a significant role in the development of modern drugs. The term "ethnobotany" was first introduced orally by John Hershberger in 1895 and was initiated by Christopher Columbus, who introduced useful plants with medicinal value in 1492 [11, 27, 41]. During this period, significant indigenous knowledge was associated with the use of various traditional medicines for healing [20]. The relationship between plants and human cultures is not limited to food, clothing, and shelter, but also used for religious ceremonies, ornamentation, and healthcare [34, 2]. The pharmaceutical industry and Western researchers have developed medicinal plant-based drugs [54]. Pharmaceutical companies

Manuscript received on 03 February 2023 | Revised Manuscript received on 08 March 2023 | Manuscript Accepted on 15 June 2023 | Manuscript published on 30 June 2023.
*Correspondence Author(s)
Bekele Kindie*, Ethiopian Biodiversity Institute, Harar Biodiversity Centre, Harar, Ethiopia. Email ID: kindiebekele21@gmail.com
Solomon Mengistu, Ethiopian Biodiversity Institute, Harar Biodiversity Centre, Harar, Ethiopia.

have developed strategies [45] to involve indigenous people in collecting plant samples [44, 3, 7]. China is a significant source of pharmaceutical products worldwide, while India, Chile, and Egypt also play an essential role. Botanical drugs play a crucial role in the pharmaceutical industry in Hong Kong, whereas Japan and Korea have large-scale manufacturing industries that serve as major consumer markets [18]. In Ethiopia, an insufficient number of ethnobotanical studies have been conducted on medicinal plants, with associated knowledge being inadequately documented [13]. When significance studies are undertaken on medicinal plants, detailed information can be obtained about the related knowledge. Scientific research on medicinal plants has provided sufficient evidence about their use and application from generation to generation [51,57]. World Health Organisation has developed basic and applied research programs on traditional medicine worldwide. The priorities involved in the development of conventional medicine during the first and second decades of WHO-AFRO for African countries include research promotion [59], Capacity building, Policy formulation, and Support for the local invention and cultivation of medicinal plants.

A. Indigenous Knowledge

Indigenous knowledge encompasses a diverse array of procedural knowledge, cultural practices, traditional knowledge, local knowledge, rules, standards, skills, and mental frameworks, all of which have evolved over many years of treating various human and animal ailments. This indigenous knowledge is unique to a given culture within a local society [32, 41]. Indigenous knowledge has been utilised in traditional medicine, known as Ethnomedicine. The ethnomedicinal engagement involved diagnosis, collection of plant materials, preparation of remedies, and their prescription to the patient [20].

Indigenous knowledge has been passed down from generation to generation orally, with great confidentiality, in many countries [31]. This transfer of indigenous knowledge has made them vulnerable to alteration and loss. This vital knowledge should be systematically documented and utilised through ethnobotanical research, and awareness raised within the community through newsletters, videos, and book documents [4].

B. Traditional Medicine and Practitioner

In Ethiopia, the first recorded epidemic dates back to 849, following the expulsion of Abba Yohannes. The disease and famine that ensued were perceived as God's punishment for Yohannes' misdeeds. Most Ethiopian traditional medical practices rely on an explanation of disease that combines both the "mystical" and "natural" causes of illness, using a holistic approach to healing.

Traditional medicine is the accumulation of knowledge and practices within a community, developed based on the conventional treatment of various ailments that occur within the community. This traditional knowledge is crucial for diagnosing and treating livestock and human health problems, as well as preventing social diseases [58]. This knowledge is passed down through experiences that have been transferred orally or in written documents from one generation to the next. Ethiopia has a rich history of utilising traditional medicine and combating diseases with medicinal plants. The conventional medicinal systems in Ethiopia have distinctive features, similar to those of Japanese, Chinese, and Indian Ayurvedic traditional medicine [6]. A conventional medicine practitioner is a person who has the knowledge and experience to provide traditional healthcare using plant, animal, and mineral substances, as well as crops. Some of the conventional health care practitioners are:

1) Herbalist;
2) Bonesetters;
3) Birth attendants;
4) Spiritual healers;
5) Psychiatrists;
6) Spiritual healers.

Ethiopia's ancient churches have accepted and practised the traditional medical system since the 15th century, and it developed further in the 17th century, incorporating a wide range of medicinal plant prescriptions [13, 21]. Some cultures in Ethiopia have their own written or oral traditions associated with specific individuals or groups. For instance, the Borana Oromo have their traditional healer system, known as Cirressa and Ayana [4]. The healer begins teaching their pupils about various plants at a young age. Once the pupil has acquired the knowledge, the healer conducts an oral examination with the pupil [18].

C. Medicinal Plant in Ethiopia

Traditional medicine encompasses the totality of knowledge, skills, practices, beliefs, and experiences used in maintaining health and treating health problems [60]. Medicinal plants play a crucial role in treating various human and livestock ailments. Eighty per cent of the Ethiopian population depends on traditional medicine for healthcare, and 95% of conventional drugs are derived from plant origins. Ethiopia has approximately 65,000 higher plant species; nearly 12% of these plant species are endemic, and Ethiopia is one of the six countries in Africa with the richest plant biodiversity [56, 30]. Medicinal plants are part of the higher plant kingdom and a source of both traditional and modern medicine. For 5,000 years, Ethiopia has been known as a biodiversity-rich country. In Ethiopia, around 1,000 medicinal plant species have been identified, but many others remain unidentified. However, 300 medicinal plant species are frequently mentioned in numerous sources. These plants are typically used for treating human and livestock ailments, as well as for preventing pests and vectors [18]. Collaboration between modern and traditional health professionals is essential for individuals who lack access to modern health facilities and reside in remote areas [31].

i. Distribution and Source of Medicinal Plant

Medicinal plants are not uniformly distributed in Ethiopia, nor are they distributed uniformly throughout the world. China has the highest number of medicinal plant species, with 11,146, followed by India, Colombia, South Africa, and the United States. Ethiopia has diverse ecological and climatic conditions, supporting a wide range of medicinal plant species [13].

Many plant species and vegetation types are also varied in each part of the country [1]. The variation in vegetation types occurred due to significant geographical differentiation present in the country [55].

In Ethiopia, medicinal plants are cultivated in natural ecosystems, with the majority being grown in the wild and home gardens [52]. In Ethiopia, 6% of Medicinal plant species are cultivated in home gardens for medicinal purposes, and a large number of these are collected from natural vegetation. Forests, grasslands, woodlands, wetlands, field margins, weeds, gardens and fences have contained a significant number of medicinal plant species. These are where traditional healers and local communities collect medicinal plant species [18]. The woodlands, montane vegetation, grasslands, forests, and rocky areas have been found to contain a greater variety of medicinal plants. This showed that traditional medicinal plant species are not uniformly distributed in Ethiopia [17]. However, the woodlands have more medicinal plant species, while the Afroalpine consists of the fewest medicinal plant species [17, 18]. Currently, Ethiopia has 887 medicinal plant species that are used for their medicinal value. The majority of these medicinal plants are herbs, followed by unidentified and shrub species. Most of the medicinal plant species are found in the wild, with a smaller number of unnamed and cultivated species (Tables 1 and 2).

Table 1: Growthhabits of Medicinal Plant Species

No_	Growthhabit	Numberofspecies	Frequency (%)
1	Herbs	271	30.5
2	shrubs	168	19
3	Trees	110	12.4
4	climbers	74	8.3
5	Reed	2	0.2
6	Unidentified	262	29.6

Source: Ethiopia's Conservation of Biological Diversity, Fourth National Report.

Table 2: Sources of Medicinal Plant Species

No_	Plantsource	Numberofspecies	Frequency (%)
1	Wild	357	40.2
2	Cultivated	89	10
3	Weed	52	5.9
4	Unidentified	389	43.9

Source: Ethiopia's conservation of biological diversity, the fourth national report.

Generally, medicinal plants are distributed in the south and southwestern Ethiopian regions [17]. Several studies have shown that medicinal plant species are limited in number in the central, northern, and northwestern parts of Ethiopia [18].

ii. Medicinal Plants Used in Human Healing

Medicinal plants are the most affordable and easily accessible source of treatment in the primary healthcare system of resource-poor communities, especially in developing countries where modern healthcare services are insufficient and inaccessible [25]. Approximately 80% of the Ethiopian population still relies on traditional plant medicine to prevent and treat various health problems [13]. Accessibility, the efficacy of treatment, and the use of inexpensive medicinal plants in health services are the main reasons to prefer traditional medicine over modern medication [33]. Thus, in Ethiopia, people have a high interest in using medicinal plants due to their cultural acceptability, ease of access, affordability, and the biomedical benefits of traditional medicinal plants in treating various human diseases [33].

The treatments derived from Ethiopian traditional medicinal plants possess three primary treatment features: curative, prophylactic, and preventive [14]. At times, the treatment may have both curative and preventive effects. The prophylaxis could be genetically fixed and can protect the offspring. Prevents are usually prepared as ornamental to be worn by the patients against evil spirits and psychosomatic disorders. Hagenia abyssinica and Glinus lotoides are used for the treatment of tapeworms, and Phytolacca decondra is used for the control of Schistosomiasis, which has been confirmed. Prunus africana is a tree whose bark is recognised as the source of a potent medicinal substance internationally. It is used for preventive and against snake bites, intestinal worms, and miscarriages. In Ethiopia, most effective medicinal plant species were identified and recorded, which are used to treat various human ailments based on local communities' traditional experiences reported. Among these medicinal plant species mainly used for treating various human diseases are *Ocimum lamiifolium*, *Vernonia amygdalina*, *Allium sativum*, *Rutacha lepensis*, *Lepidium sativum, Hagenia abyssinica, Calpurnia aurea, Carica papaya*, *Olea europaea* and *Croton macrostachyus*.

iii. Medicinal Plants Used in Ethno Veterinary

In Ethiopia, 90% of the livestock population relies on medicinal plant treatment for primary healthcare. Animal diseases are one of the primary causes of poor livestock performance and reduced productivity in developing countries [53]. In Ethiopia, medicinal plants are vital methods for treating livestock health problems. Ethnoveterinary medicine emphasises the use of medicinal plants in livestock treatment and management. Encouraging and understanding a farmer's traditional knowledge, attitudes, and experiences, as well as their control of various livestock ailments, is crucial for designing and implementing successful livestock production [50].

Livestock owners can prepare and use homemade remedies to address their animals' health problems. Traditional medicinal plants are often the primary choice for treating various animal ailments [40]. Traditional animal healthcare practices, which include conventional manipulative techniques, traditional immunisation, religious practices and beliefs, and the use of herbal remedies to treat diseases, are countered by livestock holders [50]. This traditional animal healthcare practice has utilised ethnoveterinary medicinal plants. In Ethiopia, farmers and pastoralists depend on conventional knowledge, religious practices, and medicinal plants to prevent and manage animal diseases [23]. Some of the livestock diseases that have occurred in Ethiopia include anthrax, blackleg, anaplasmosis, ascariasis, abscesses, leech infestations, trypanosomiasis, lymphangitis, stomatitis, and coccidiosis [47, 21]. Some of the known ethnoveterinary uses of medicinal plant species include Monopsis

Sellariodes, Solanum anguivi L., Vinigaspp, Nicotiana tabacum L., Argemone mexicana L., Platostoma rotundifolium, Caylus eabyssinica, Cissampelos mucronata, Cissampelos parviflora, Desmodium dichotomum, Ipomoea eriocarpa, Justicia diffusa, Premna schimperi, and Zornia glochidiata. They are targeted against selected ecto- and endo-parasites of livestock diseases [5].

III. APPROACHES OF MEDICINAL PLANT CONSERVATION STRATEGIES

Approximately 85% of Ethiopia's population resides in rural areas, and this population relies directly or indirectly on natural resources for their livelihood. Conservation of biodiversity is crucial to the sustainability of agriculture, forestry, fisheries, wildlife, industry, health, tourism, ecosystems, livelihoods, irrigation, and power. Ethiopia's future development will continue to depend on the foundation provided by living resources and the conservation of biodiversity. Methods of conserving medicinal plants include ex-situ, in situ, and cultivation practices.

A. In Situ Conservation

In-situ conservation is a method of conserving and protecting medicinal plant species in their natural habitat [22]. The in situ conservation method is also used to conserve genetic resources in natural populations of plant or animal species. This method of conservation is advantageous because it maintains recovering populations in the surrounding areas where they have developed their distinctive properties, ensuring the ongoing processes of evolution and adaptation within their environments [39]. Successful in situ conservation depends on rules, regulations, and the potential for compliance with medicinal plants within their growth habitats [56]. Some of the in situ conservation strategies are:

B. Natural reserves

The degradation and destruction of habitats are significant causes of the loss of medicinal plant resources [9]. Natural reserves strategies protect the areas of critical wild resources to preserve and restore biodiversity [48]. Medicinal plants are conserved by protecting key natural habitats, as well as the contributions and ecosystem functions of individual habitats [38].

C. Wild nurseries

A wild nursery strategy can provide a practical approach to conserving medicinal plants in their natural habitat [37]. The populations of many wild species are under pressure by overexploitation, habitat degradation, invasive species and agricultural expansion. A wild nursery is established by cultivating and domesticating endangered medicinal plants in a protected area, where they naturally grow [26].

D. Ex Situ Conservation

E*x-s*itu conservation is the method of conserving and protecting medicinal plant species without their natural habitats by creating new habitats for sustainable utilisation. It is the process of protecting endangered plant species from a natural habitat that is threatened by introducing them into a new habitat, either in a wild area or under human care.

Some of ex situ conservation strategies are:

E. Botanical gardens

Botanical gardens' conservation strategies play a crucial role in ex-situ conservation, as they can maintain ecosystems to improve the survival of endangered plant species [28]. Botanic gardens possess multiple unique features and play a key role in conserving medicinal plants through the development of propagation and cultivation protocols [42].

F. Seed banks

Seed bank conservation is a method of conserving medicinal plants by storing their genetic diversity in ex situ conservation rather than in a botanical garden. Seed bank conservation is also crucial for preserving the biological and genetic diversity of wild plant species [49]. However, the challenges of seed banking conservation tasks include reintroducing the plant species back into the wild and actively restoring wild populations [36].

G. Cultivation Practice

Cultivation practices are designed to provide optimal levels of water, nutrients, optional additive materials, and environmental factors to obtain improved yields of target medicinal plant products [37]. Cultivations are vital for providing the opportunity to use new techniques and solve problems encountered in the production of medicinal plants, such as toxic components, pesticide contamination, low contents of active ingredients, and the misidentification of botanical origin [46]. Moreover, the increased cultivation of medicinal plants is contributing to a decrease in the harvest volume of medicinal plants within a reasonable range [26].

H. Good agricultural practices (GAP)

Good agricultural practices are another strategy for conserving medicinal plant species, improving yields and quality of target products, and ensuring the quality of herbal drugs [10]. Organic farming has garnered increased attention to creating integrated, humane, environmentally sustainable, and economically viable production methods for medicinal plants. Organic agriculture involves maintaining the biological processes of medicinal plants and preserving the ecological balance of habitats [47].

Some of the good agricultural practices strategy and activities are:

1) The ecological and habitats of production sites.
2) Germplasm and tissue, cultivation;
3) Collection and restoration.
4) Quality aspects of pesticide detection and control;
5) Macroscopic and microscopic endorsement.
6) Chemical identification of bioactive compounds.

IV. CONCLUSION

As the historical description showed, traditionally used medicinal plants were in use from 5000 to 4000 BC. The term "ethnobotany" was first coined orally by John Hershberger in 1895. Traditional medicine is the accumulation of community knowledge and practices that utilise medicinal plants

to diagnose health problems, prevent physical and mental illnesses, and address social diseases. These traditional medicines are used to maintain health, diagnose, and treat physical and mental illnesses in a manner different from allopathic medicine. Some of the conventional health practitioners include herbalists, Bone Setters, Traditional birth attendants, Traditional psychiatrists, herb sellers, and spiritual healers.

Indigenous knowledge encompasses the accumulation of technical knowledge, cultural practices, traditional knowledge, skills, and mental set, resulting from many years of treating various human and animal ailments. The indigenous knowledge of medicinal plants is passed down from generation to generation verbally.

Ethiopia has approximately 65,000 species of higher plants and is one of the six countries in Africa with rich plant biodiversity. In Ethiopia, around 1,000 medicinal plant species have been identified, but many others remain unidentified. In Ethiopia, medicinal plant species are grown in natural ecosystems, and most of them are collected from the wild. The woodlands, montane vegetation and rocky areas contain more medicinal plants.

In-situ conservation is the method of conserving medicinal plant species and protecting them in their natural habitat. In contrast, ex-situ conservation is the method of preserving and safeguarding medicinal plant species outside their natural habitats. However, traditional medicinal plant resources are declining rapidly due to ecological shifts, deforestation, urbanisation, agricultural expansion, and a lack of awareness within the community.

RECOMMENDATIONS

A. Introduced the role of traditional medicine and practitioners to the public.
B. Medicinal plant with indigenous knowledge should be proposed as a course in the school curriculum.
C. Traditional medicine does not have a formal market system in Ethiopia. Hence, there should be a formalised marketing system for plant remedy services provided by practitioners and wholesalers through licensing.
D. Create significant integration of traditional medicine practitioners and modern medicine to approach effective health care service and drug.
E. Provide basic training to traditional medicinal practitioners with their traditional knowledge and skills, as well as ways to transition their knowledge to the local communities.
F. Identify authentically effective medicinal plant species and encourage their production and cultivation with sustainable utilisation.

DECLARATION STATEMENT

After aggregating input from all authors, I must verify the accuracy of the following information as the article's author.

- **Conflicts of Interest/ Competing Interests:** Based on my understanding, this article has no conflicts of interest.
- **Funding Support:** This article has not been funded by any organizations or agencies. This independence ensures that the research is conducted with objectivity and without any external influence.
- **Ethical Approval and Consent to Participate:** The content of this article does not necessitate ethical approval or consent to participate with supporting documentation.
- **Data Access Statement and Material Availability:** The adequate resources of this article are publicly accessible.
- **Author's Contributions:** The authorship of this article is contributed equally to all participating individuals.

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