

Ethnobotanical Study of Medicinal Plant and Traditional Knowledge Used

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Abstract

As the review conducting ethnobotany deals with the link amongst people, livestock, and the environment with plants and gives details how people of a particular culture and religious knowledge formulate use of medicinal plants. Indigenous knowledge is the accumulation of procedural knowledge, cultural practice and traditional knowledge as a result of many years. The term Ethnobotany was declared orally by John Hershberger in 1895. Medicinal Plants have been used as a vital source of preventive and healing to human and livestock ailment. Thus traditional medicine is the knowledge and practices of a particular community which used plants to diagnose and heal health problems of livestock and humans. Medicinal plants used in Ethiopia constituted 887 of plant species and 26 species are indigenous. The most effective plant species are identified and recorded to treat different humans and animal ailments. In Ethiopia 90% of the livestock population depends on medicinal plants for primary health care. Ethnoveterinary medicine is a traditional knowledge and practice to prevent and treat diseases encountered by livestock. In Ethiopia medicinal plant species are not equivalently distributed in each part of the country. In-situ conservation is a method of conserving and protecting medicinal plant species in their natural habitat. Whereas Ex-situ conservation is a method of conserving and protecting medicinal plant species without their natural habitats. However medicinal plants and traditional knowledge are declining at an alarming rate due to ecological shifts, deforestation, urbanization, loss of forests and woodlands, urbanization and agricultural expansion.

Keywords: Ethnobotany; Indigenous knowledge; Traditional medicine; Medicinal plant; Conservation; Ethiopia

Introduction

Ethnobotany is the study of plants and elucidates how people of a particular culture, procedure and religious knowledge make use of medicinal plants [1]. Ethnobotany is a combination of two words, which means 'ethno' the study of people and 'botany' study of plants. Ethnobotany has a more diversified and multidisciplinary subject that requires expertise in various fields of academic study such as Agriculture, Botany, ethnicity, Anthropology, and linguistics.

In the world people have been using traditional medicinal plants for medical purposes and preparing drugs to cure ailments. Different local communities in Ethiopia have various indigenous experiences on medicinal plants where they use their perceptions and experience to classify plants and plant parts to be used when dealing with different ailments. In Africa traditional healers or medicinal plant herbalists have a detailed knowledge on traditional medicine plants. People in Ethiopia having different beliefs, cultures and language to contribute to the presence of high diversity traditional knowledge of medicinal plant healing.

80% of developing country's populations have used traditional medicine to treat human beings and livestock ailments. Primary means of treating diseases and fighting infections by using medicinal plants are effective were in use for traditional medicine from 5000 to 4000 BC in China. Medicinal plant has a significant role in the development of modern drugs. The term Ethnobotany was declared orally by John Hershberger for the first time in 1895 and started by Christopher Columbus by introducing useful plants for medicinal value in 1492. Others from the new world documented food, medicines and other useful plants of the Aztec, Maya and Inca people's immigrants [2]. During time significant indigenous knowledge linked to the use of various traditional medicines healing. The relationship of plants and human cultures is not limited for food, clothing and shelter but also used for religious ceremonies, ornamentation and health care. Pharmaceuticals industries and western researchers have developed medicinal plant based drugs and discovery of new,

effective healing agents. Pharmaceutical companies have developed the strategies to involve indigenous people for collecting plant samples; this advancement has been reported to be more successful than random collections of medicinal plants. China is a major source of pharmaceutical products in the World while India, Chile and Egypt are playing a great role. Botanical drugs are processed and have a large pharmaceutical industry in Hong Kong whereas Japan and Korea have large manufacturing industries with major consumer countries. The USA and Germany are importers and exporters consumer's countries with large processing pharmaceutical industries.

In Ethiopia insufficient number of ethnobotanical studies has been conducted on medicinal plants and a little effort has been carried out to record and document the medicinal plants with associated knowledge inadequately. When significance studies are undertaken on medicinal plants and associated knowledge could be obtained detailed information [3]. Scientific research done on medicinal plants could afford sufficient evidence about medicinal plants and their use from generation to generation. World Health organizations have developed basic and applied research programs about traditional medicine worldwide. The priority involved in the development of traditional medicine during the first and second decades of WHO-AFRO for African countries are Research promotion, Capacity building, Policy formulation, Support for the local invention and cultivation of medicinal plants.

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Development of Ethnobotanical Study and Medicine

As historical accounts showed traditional medicinal plants were in use for traditional medicine from 5000 to 4000 BC in China [4]. Medicinal plant has a significant role in the development of modern drugs. The term Ethnobotany was declared orally by John Hershberger for the first time in 1895 and started by Christopher Columbus by introducing useful plants for medicinal value in 1492. Others from the new world documented food, medicines and other useful plants of the Aztec, Maya and Inca people's immigrants. During time significant indigenous knowledge linked to the use of various traditional medicines healing. The relationship of plants and human cultures is not limited for food, clothing and shelter but also used for religious ceremonies, ornamentation and health care. Pharmaceuticals industries and western researchers have developed medicinal plant based drugs and discovery of new, effective healing agents. Pharmaceutical companies have developed the strategies to involve indigenous people for collecting plant samples; this advancement has been reported to be more successful than random collections of medicinal plants [5]. China is a major source of pharmaceutical products in the World while India, Chile and Egypt are playing a great role. Botanical drugs are processed and have a large pharmaceutical industry in Hong Kong whereas Japan and Korea have large manufacturing industries with major consumer countries. The USA and Germany are importers and exporters consumer's countries with large processing pharmaceutical industries.

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Indigenous knowledge

Indigenous knowledge is an accumulation of procedural knowledge, cultural practice, traditional environmental knowledge, local knowledge, rule, standards, skills, and mental set result of many years to treat different human and animal ailments [7]. That indigenous knowledge is unique to a given culture of local society. The indigenous knowledge has been used in traditional medicine known as Ethnomedicinal. Ethnomedicinal engage diagnosis, collection of plant materials, preparation of remedies and its prescriptions to the patient applied.

Indigenous knowledge has passed from generation to generation orally with great confidentiality in many countries. This transfer indigenous knowledge has made them vulnerable to alteration and loss. This vital knowledge should be systematically documented and utilized by Ethnobotanical research, and raise awareness of the community, providing newsletters, videos and book documents.

Traditional medicine and practitioner

In Ethiopia the first recorded epidemic that occurred dates back to 849 following Abba Yohannes expulsion. The disease and famine that ensued was perceived as God's punishment for Yohannes' misdeeds. The Ethiopian emperor wrote a terrified letter to Abba Yohannes that

"great tribulations have come up on our land, and all our men are dying of the epidemic and our entire animal and livestock have perished". Most Ethiopian traditional medical practices rely on an explanation of disease that sketch on both the "mystical" and "natural" causes of illness and use a holistic approach to healing.

Traditional medicine is the accumulation of knowledge and practices of community accomplished based on traditional treatment of various ailments occurred in the communities. This traditional knowledge is very important and used to diagnose and heal livestock and human health problems, elimination of physical and mental health problems, and prevention of social diseases [8]. This knowledge or practice might depend on the past experience and advancement which has been transferred by orally or in writing documents from generation to generation. Most of the time traditional medicine practices are applied in primary health care. Ethiopia has a long history of using traditional medicine and combating diseases using medicinal plants. The traditional medicinal systems in Ethiopia have distinctive features like that of Japanese, Chinese and Indian Ayurvedic traditional medicine. Traditional medicine practitioner is a person who has the knowledge and experience to provide traditional health care using plant, animal and animal products, crops, and mineral substances. Some of traditional 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 practiced the traditional medical system usually described as medico religious since the 15th century. Ancient written sources and the book of remedy were developed in the 17th century which contains a wide range of medicinal plant prescription. And some cultures have their own written or oral traditions that are associated with individuals or groups in Ethiopia. For instance, Borana Oromo have their own culture of traditional healers system namely Cirressa and Ayana. The healers are descended from two clan; the Ali Rees family of the Karayoo clan and the Oborsa family of the Dambitoo clan. These families believe that they received their knowledge from God and passed it on to generations.

The healer begins to teach his/ her pupils about the various plants when the pupils are at a young age. Once the pupil has picked up the knowledge the healer gives an oral examination to the pupil.

Medicinal plant in Ethiopia

Traditional medicine is the sum total of the knowledge, skill, practices, beliefs and experiences which has a long history that is indigenous to different cultures and used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness. Medicinal plants are very important to offer traditional medicines to treat different humans and livestock ailments. Generally 80% of Ethiopian people depend on traditional medicine for different health care and more than 95% of traditional medicines are made from plant origin. Ethiopia has constituted around 65,000 higher plant species, nearly 12% of this plant species were endemism and Ethiopia is one of the six plant biodiversity rich countries in Africa [9]. Medicinal plants are part of higher plant species and source of traditional and modern medicine. Since 5000 years ago Ethiopia has

been known as a biodiversity rich country. When ancient Egyptians, Greeks and Romans used it as a source of unique commodities like Frankincense, Myrrh and medicine preparation. French, British and Italian travellers, naturalists, pharmacologists and herbalists visited Ethiopia between 1830 and 1930 and gave lists of plants used for medicinally and their conception by the local traditional medicine. In Ethiopia around 1000 medicinal plant species are identified but many others medicinal plant species are not yet identified. However 300 medicinal plant species are frequently mentioned in numerous sources. These plants are usually used for treating human and livestock ailments as well as for prevention of pests and vectors in lowlands and highlands communities. The collaboration of modern health and traditional health professionals are very important for people who have no adequate access to modern health facilities and live in the remote areas.

Distribution and source of medicinal plant: Medicinal plants are not uniformly distributed in Ethiopia as well as throughout the world. China has the highest numbers of medicinal plant distribution with 11,146 species, followed by India, Colombia, South Africa and the United States. Ethiopia has various ecological and climatic conditions with different medicinal plant species [10]. Many plant species and vegetation species type is also varied in each part of the country. The variation in vegetation types occurred due to significant geographical differentiation presence in the country.

In Ethiopia medicinal plants are grown in the natural ecosystem and the majority of the more grown in the wild and cultivated and grown in home gardens. In Ethiopia 6% of Medicinal plant species are cultivated from home gardens for the purpose of medicine and a large number of the more collected from the natural vegetation. Forests, grasslands, woodlands, wetlands, field margins, weeds, garden and fences have contained a significant number of medicinal plant species. These are where traditional healers and local communities collect medicinal plant species. The woodlands, montane vegetation, grassland, forests and rocky areas have been found with more medicinal plants. This showed that traditional medicinal plant species are not uniformly distributed in Ethiopia. However the woodlands have more medicinal plant species while the Afroalpine consists of the least medicinal plant species. Currently Ethiopia has 887 of medicinal plant species that are used for medicinal value. The majority of these medicinal plants are herbs, followed by unidentified and shrub species and most of the medicinal plant species are found in the wild followed by unidentified and cultivated species (Tables 1 and 2).

Generally medicinal plants are distributed in the south and south western Ethiopian. The different studies showed that medicinal plant species have limited numbers from the central, north and north western part of Ethiopia.

Medicinal plants used in human healing: Medicinal plants are the most affordable and easily accessible source of treatment in the primary health care system of resource poor communities especially for developing countries where modern health care services are insufficient and inaccessible. In fact 80% of Ethiopia people still

Table 1: Growth habits of medicinal plant species.

No	Growth habit	Number of species	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

Table 2: Sources of medicinal plant species.

No	Plant source	Number of species	Frequency (%)
1	Wild	357	40.2
2	Cultivated	89	10
3	Weed	52	5.9
4	Unidentified	389	43.9

rely on plant medicine to prevent and heal various health problems. Without difficulty accessibility, efficacy on treatment and inexpensive medicinal plants getting in health services are the main reasons to prefer traditional medicine over modern medication. Thus in Ethiopia people have the highest interests of medicinal plant use due to cultural acceptability, ease of access, affordability and biomedical benefits of the traditional medicinal plants to healing different human being disease.

The treatments of Ethiopian traditional medicinal plants possess three treatment features that are curative, prophylactic and preventive. From time to time; the treatment could have a curative as well as apophylactic effect. The prophylaxis could be genetically fixed and can protect the offspring. Preventives are usually prepared as ornamental to be borne by the patients against evil spirits and psychosomatic disorders. *Hagenia abyssinica* and *Glinus lotoides* are used for the treatment of tapeworm and *Phytolacado decondra* used for the control of Schistosomiasis has been confirmed. *Prunus africana* is a tree whose bark is known to be the source of potent medicine 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 used to treat different human ailments based on local communities' traditional experience reported. Among these medicinal plant species mostly used for treating various human diseases are *Ocimum lamiifolium*, *Vernonia amygdalina*, *Allium sativum*, *Rutacha lepensis*, *Lepidium sativum*, *Hagenia abyssinica*, *Calpurnia aurea*, *Caricapapaya*, *Olea europaea* and *Croton macrostachyus*.

Medicinal plants used in Ethno Veterinary: In Ethiopia 90% of the livestock population depends on medicinal plant treatment for primary health care. Animal diseases are one of the most principal causes of poor livestock performance and products for developing countries. In Ethiopia medicinal plants are the vital methods to treat livestock health problems. Ethnoveterinary medicine emphasizes medicinal plants that have been used for livestock treatment and management. Encouraging and understanding of a farmer's traditional knowledge, attitude and experiences and control of various livestock ailments is very important to designing and implementing successful livestock production.

Livestock holders can prepare and use homemade remedies to heal their animal health problems. Traditional medicinal plants are the only choice to treat many animal ailments. Traditional animal health care practices consisting traditional manipulative techniques, traditional immunization, religious practices and beliefs, and the use of herbal remedies to treat diseases countered by livestock holders. This traditional animal health care practice has constituted Ethnoveterinary medicinal plant. In Ethiopian farmers and pastoralists are depending on traditional knowledge, religious practices and medicinal plants to prevent and manage animal diseases. Some of livestock diseases occurred in Ethiopia are anthrax, blackleg, anaplasmosis, ascariasis, abscess, leeches, trypanosomiasis, lymphangitis, stomatitis and coccidiosis. Some of livestock diseases occurred in Ethiopia are anthrax, blackleg, anaplasmosis, ascariasis, abscess, leeches, trypanosomiasis, lymphangitis, stomatitis and coccidiosis. Some of known ethnoveterinary uses medicinal plant species were *Monopsis Sellariodes*, *Solaniumanguivi Lam*, *Viginaspp*, *NicotianatabacumL*, *Argemone Mexicana L*, *Platostoma*

Rotundifolium, *Cayluseabyssinica*, *Cissampelos mucronata*, *Cissampelo spariera*, *Desmodium dichotomum*, *Ipomoeaeriocarpa*, *Justiciadiffusa*, *Premnaschimperi*, and *Zorniaaglochidiata* are they are against selected ecto-and endo-parasites of livestock diseases [5].

Approaches of Medicinal Plant Conservation Strategies

85% of Ethiopia populations live in rural areas and this population depends directly or indirectly on natural resources. Conservation of biodiversity is crucial to the sustainability of agriculture, forestry, fisheries, wildlife, industry, health, tourism, ecosystem, livelihood, irrigation and power. Ethiopia's development in the future will continue to depend on the foundation provided by living resources and conserving biodiversity. Methods of conservation of medicinal plants are ex-situ, in-situ and cultivation practice. Home gardens are crucial conservation methods of traditional medicinal plants.

In situ conservation

In-situ conservation is a method of conserving and protecting medicinal plant species in their natural habitat. In situ conservation method also used to conserve genetic resources in natural populations of plant or animal species. Wildlife and livestock conservation is mostly based on in-situ conservation. This method of conservation is advantageous by maintaining recovering populations in the surrounding where they have developed their distinctive properties and helps to ensure the ongoing processes of evolution and adaptation within their environments. In situ conservation has focused on establishing protected areas and taking an ecosystem-oriented approach in the world. Successful in situ conservation depends on rules, regulations, and potential of compliance with medicinal plants within growth habitats. Some of in situ conservation strategies are:

Natural reserves: The degradation and destruction of habitats is a major cause of the loss of medicinal plant resources [9]. Natural reserves strategies protect the areas of important wild resources to preserve and restore biodiversity. Medicinal plants are conserved by protecting key natural habitats contributions and ecosystem functions of individual habitats.

Wild nurseries: Wild nurseries strategy can provide an effective approach of medicinal plants conservation in their natural habitat. The populations of many wild species are under pressure by overexploitation, habitat degradation, invasive species and agricultural expansion. A wild nursery is established by species-oriented cultivating and domesticating of endangered medicinal plants in a protected area and plants where they naturally grow.

Ex situ conservation

Ex-situ conservation is the method of conserving and protecting medicinal plant species without their natural habitats by introducing new habitat for sustainable utilization. It is the process of protecting endangered plant species from a natural threatened habitat by introducing them into a new habitat either wild area or within the care of humans.

Ex situ conservation is important to cultivate and naturalize threatened species to ensure their sustained survival and produce large quantities of planting material. Some of ex situ conservation strategies are:

Botanical gardens: Botanical gardens conservation strategy plays an important role in ex-situ conservation. It can maintain the ecosystems to improve the survival of endangered plant species. Botanic gardens have multiple unique features and play a key conservation

role of medicinal plants through development of propagation and cultivation protocols.

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 very important to preserve the biological and genetic diversity of wild plant species. Ex situ conservation could be providing rapid access to plant samples for the evaluation of their properties, providing helpful information for conserving the remaining natural populations. However, the challenges of seed banking conservation tasks are how to reintroduce the plant species back into the wild and how to actively assist in the restoration of wild populations.

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. Cultivation under controlled growth conditions can improve the yields of active compounds with consistently secondary metabolites and ensures production stability. Cultivations are very 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. Moreover, increased cultivation of medicinal plants is contributing to decreases in the harvest volume of medicinal plants, benefits the recovery of their wild resources, and decreases their prices to a more reasonable range.

Good agricultural practices (GAP)

Good agricultural practices are another strategy to conserve plant species for improved yields and quality of target products. These practices provide the appropriate levels of water, nutrients, optional additive materials, and environmental factors. Good agricultural practices for medicinal plants have been formulated to regulate production, ensure quality, and facilitate the standardization of herbal drugs [10]. Organic farming has increased the attention to create integrated, humane, environmentally and economically sustainable production of medicinal plants. The aims of organic farming of medicinal plants are producing material with better quality, high productivity and ensuring the conservation and sustainable utilization of plants. Organic farming is depending upon farm-derived renewable resources for maintaining biological processes of medicinal plants and ecological balance of habitats.

Some of the good agricultural practices (GAP) 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.

Conclusion

As the historical description showed, traditionally used medicinal plants were in use from 5000 to 4000 BC. The term Ethnobotany was declared orally for the first time by John Hershberger since 1895. Ethnobotany is the study between people, plants and the environment

and explains how people of a particular culture and religious knowledge make use of medicinal plants. Those Traditional medicines are used to maintain health, diagnose, and treat physical and mental illnesses differently from allopathic medicine.

Indigenous knowledge is the accumulation of technical knowledge, cultural practice, traditional knowledge, rule, standards, skills, and mental set result of many years to treat different human and animal ailments. In many countries Indigenous knowledge of medicinal plants is passed from one generation to generation verbally. Traditional medicine is the accumulation of community knowledge and practices by using medicinal plants to diagnose health problems, prevention of physical and mental problems and social diseases. Some of the traditional health practitioners are Herbalists, Bonesetters, Traditional birth attendants, Traditional psychiatrists and Herb sellers and spiritual healers.

Ethiopia has constituted around 65,000 species of higher plants and is one of the six plant biodiversity rich countries in Africa. In Ethiopia around 1000 medicinal plant species are identified but many others medicinal plant species are not yet identified. 90% of livestock populations in Ethiopia are dependent on medicinal plant treatments for primary health care. Ethnoveterinary medicine provides traditional medicines. In Ethiopia medicinal plant species are grown in the natural ecosystem and most of them are collected from the wild. The woodlands, montane vegetation and rocky areas contain more medicinal plants. The different studies showed that medicinal plants have small numbers from the central, north and north western part of the country.

In-situ conservation is the method of conserving medicinal plant species and protecting them in their natural habitat. In situ conservation efforts are focused on establishing protected areas and ecosystem-oriented, rather than species-oriented. Ex-situ conservation is the methods of conserved and protected medicinal plant species without their natural habitats. Some ex situ conservation strategies are Gene bank, botanic gardens, seed bank, field gene bank and tissue culture technique. However traditional medicinal plant resources and indigenous knowledge are declining at an alarming rate, due to ecological shifts; deforestation, urbanization, agricultural expansion and lack of awareness of the community.

Recommendations

1. Introduced the role of traditional medicine and practitioners to the public.
2. Medicinal plant with indigenous knowledge should be proposed as a course in the school curriculum.
3. Traditional medicinal have not a formal market system in Ethiopia. Hence, there should be a formalized marketing system of plant remedies services provided by practitioners and whole sellers through licensing.
4. Create significance integration of traditional medicine practitioners and modern medicine to approach effective health care service and drug.
5. Provide basic training to traditional medicinal practitioners with their traditional knowledge and skill as well as ways of transition their knowledge for the local communities.

6. Identify authentically effective medicinal plant species and encourage their production and cultivation with sustainable utilizing.

7. To conserve medicinal plants and indigenous knowledge local people should be aware of cultivating medicinal plants in their home gardens, around farming lands and within botanical gardens and transfer their knowledge on the correct time without losing for new generation.

8. Training and seminar should be given to the practitioners on the use of plants, ways of administration, methods of preparation, parts of plants used, storage and conservation of medicinal plants.

Declarations

Authors' Contributions

All authors were involved equally in the data collection, the review and writing of the manuscript as well as read and approved the final submission of manuscript publication.

Competing Interest

All authors declare that there are no competing interests.

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