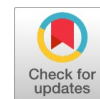


Analysis of Medicinal Plants and Traditional Knowledge Development in Ethiopia

Bekele Kindie



Abstract: As the review conducted Ethiopia has richened by medicinal plant species and traditional knowledge that have a significant role in the management of various human and livestock diseases. Medicinal plants are vastly used by the communities particularly rural communities to treat various human and livestock ailments. Medicinal plants also important for the development of modern medicine. Traditional knowledge is the accumulation of communities' knowledge according to their cultures, beliefs, and experiences. Different parts of medicinal plants are used for traditional remedies in order to cure human beings and livestock. Traditional knowledge and medicinal plants are critically threatened and extinct due to overgrazing, charcoal production, deforestation, urbanization, agricultural expansion, and fire wood collection. Traditional medicinal plants and associated knowledge can be conserved using either in-situ or ex-situ conservation methods. Therefore, create awareness among the local people about the use of medicinal plants and the associated knowledge to ensure sustainable harvesting of medicinal plants. Conducting ethnobotanical research and documented medicinal plants and indigenous knowledges is very important for conserve.

Key words: Ethnobotany, Indigenous Knowledge, Threats, Plants, Ethiopia

I. INTRODUCTION

Traditional medicine is an indigenous medicine that is used to maintain health problems inversely from allopathic medicine regarding the theories, beliefs, and experiences [9], [51]. Plant resources have remained an integral part of human culture throughout their history. Subsequently people fulfilling their primary needs like food and shelter has pursued a suitable remedy among plants for curing various diseases [50]. Around 80% of the developing countries population depend on traditional medicine and plant remedies for primary health care, especially poor resource communities [37], [27]. People have long histories on the uses of traditional medicinal plants for medical purposes and at the present time have vigorously promoted it throughout the world [35], [40]. Local communities in countries and across the world have indigenous knowledge experience on medicinal plants when different health problems are occurring [24].

In Ethiopia plants have played important roles in combating human and livestock ailments [13]. The plant-based human and livestock health care is the main alternative treatment of ailments in Ethiopia, largely due to shortage of pharmaceutical products and access of health service, high-priced for small holder farmers and pastoralists [7]. In Africa particularly in Ethiopia, traditional healers and herbalists have a detailed knowledge of traditional medicine, which is transferred through orally from one generation to the next generation [24], [44]. Thus, the knowledges of medicinal plants and their uses provides vital contribution to human and livestock health problem care needs and development of important remedies [10]. In Ethiopia, traditional medicinal plants are vastly used by the communities particularly rural communities to treat various human and livestock ailments. 80% to 90 % of Ethiopia population relies on traditional medicine to meet their; primary health care needs [11], [20]. Medicinal plants also play an important role for the development of pharmacopoeia and non-pharmacopoeia drugs to modern healthcare. In recent times in Ethiopia a primary health care system has more access than modern medicine [41].

However, the majority of populations still relies on the use of traditional medicine. This is because traditional medicine is the most inexpensive and easily accessible source of treatment to the poor community regarding modern medicine [22]. Ethiopia has been enriched by various biodiversity, with 6,500 are higher plant species nearly 10% are medicinal plants [2], [43]. However, medicinal plants are threatened by natural and anthropogenic factors like deforestation, urbanization, agricultural expansion and lack of awareness among the community [31],[17]. This review was to analyze the development of indigenous and traditional knowledge, ethnomedicine of plants, factors threatened to medicinal plants and conservation methods of medicinal plants.

II. REVIEW METHODS

A. Development of Ethnobotanical Knowledge

Plants have used traditional medicine preparations for human and livestock health problems, both preventive and curative since the earliest times. As early as 5000 to 4000 BC in China and 1600 BC in Syria, the Babylonians, Hebrews, and Egyptians traditionally used medicinal plants [44], [8]. In the earliest times, substantial indigenous knowledge was connected to the use of traditional medicine, and suggestions were attained from annotations' confirmation that even chimpanzees practiced a number of plant species for their medicinal worth [8].

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The ethnobotanical work of plants was started by Christopher Columbus and declared verbally by John Hershberger in the first time [30], [8]. Ethnobotany has developed numerous multi-disciplinary subjects that require professional fields of academic study, and nowadays it has tended to develop more logical, quantifiable, cross disciplinary, and multi-institutional [30]. Ethnobotany focuses on just how plants are used for food, medicine, religious ceremonies, ornamentation, social life, clothing, and shelter [33]. Ethnobotanical study has documented the knowledge and culture of people linked with plants and traditionally used plants for numerous purposes that were integrated into their culture and religion [14], [8]. Furthermore, the development of medicinal plants in primary health care has saved foreign exchange and helped safeguard our national heritage [3]. Medicinal plants have played a significant role in the development and improvement of novel plant remedies [52].

B. Ethnobotanical Research on Medicinal Plants

Many thousands of years ago, traditional medicine was practiced and accepted by the World Health Organization (WHO) program about 35 years ago [48]. Nowadays, plant-based drugs have been developed and rediscovered to contribute to the discovery of new, effective, safe, and profitable healing agents [8], [21][54][55][56]. Most pharmaceutical companies have developed the practice of involving indigenous people to collect plant samples at the recommendation of traditional practitioners. This has been more successful than random collections of medicinal plant samples [8].

Among the research conducted on the ethnobotanical study of medicinal plants in Ethiopia, the highest number was collected [18]. The ethnomedicinal uses of 230 plant species were documented in Mana Angetu District in the Bale Zone of Oromia Region. Among these, 181 (78.70%) were used for human ailments, 27 (11.74%) were used for livestock ailments, and the remaining 22 (9.7%) were used for both human and livestock ailments. A similar study conducted on Zay people indicated that herbs are (55%) followed by trees and shrubs (33%) [23]. Whereas, in the study conducted in Boos around the Welenchiti area, shrubs were (59%), followed by herbs (14%), and livestock remedies [15].

Different parts of plants are used in traditional medicine for the treatment of human and livestock diseases in Ethiopia. However, roots and leaves are the most commonly used plant parts, with roots accounting for 35.7%, followed by leaves (32.9%). Moreover, the study explained that 68.6% of herbal remedies were applied orally and 31.4% were applied externally. Swelling, rheumatism, spasm, snakebite, tooth pain, and eye pain were among the human ailments, and anthrax, wounds, lymphatic swelling, and bloody urine in cattle were among the livestock ailments treated by medicinal plants in Boosat, Welenchiti [15]. reported fifty-one traditional medicinal plant species that are serving the eastern Hararghe Oromo community as treatments for 54 human ailments [5]. Among ethnobotanical studies conducted on medicinal plants in Ethiopia, 49 medicinal plants were reported by Afar people of Ada"ar District for the treatment of various livestock ailments (67.3%), including shrubs [25]. As the study revealed, some medicinal preparations were

used fresh or in a dried state. As these plants are used in both forms, the chance of using the medicinal plants under different seasons of the year is increased, and traditional healers preserve the plants that they could not find in dry season in different ways, like hanging the plant material [26]. Nowadays, researchers have given consideration to medicinal plants. The documented knowledge of indigenous people on medicinal plants from different parts of Ethiopia was reported in [32], [27],[46].

C. Indigenous Knowledge

The term "indigenous knowledge" describes the accumulation of knowledge, norms, standards, abilities, and mindsets that local people possess in a particular area [21]. It is the outcome of many observations, trial-and-error experimentation, and the long years experiences of many generations. Traditional people all around the world have a unique knowledge of medicinal plants that they rely on for food, medicine, and other necessities. They also have a great deal of botanical knowledge [44]. Indigenous people have been using, managing, and conserving plant resources for generations, and they have accumulated unique knowledge over centuries [14]. Sustainable development researchers have discovered indigenous knowledge that has a particular interest in resource management, techniques, practices, and rules, as well as inanimate resources and their practical uses and the way the local group perceives their relationship to the natural world [21]. Indigenous knowledge of a people, as defined by the Convention on Biological Diversity (CBD), is knowledge held by a people based on a "combination of cultural distinctiveness and prior territorial occupancy relative to a more recently arrived population with its own distinct and subsequently dominant culture." Therefore, it shall be regarded as being within the meaning of traditional knowledge, but not vice versa [12]. Indigenous knowledge of a community is usually unwritten and preserved only through oral tradition passed from generation to generation [34]. Indigenous knowledge is knowledge that is unique to the given culture of a particular community. It is an organized body of knowledge that has been accumulated and developed over time by a group of people who have lived in close proximity to nature for many generations [42]. Traditional knowledge also includes belief systems that are essential to a people to support their livelihood, keep their health, and preserve and replenish the environment [42], [38]. The intricate knowledge, beliefs, and practices collectively referred to as indigenous knowledge evolve over time and within time. The practice of traditional medicine is one of the extensively utilized indigenous knowledge systems in many countries [44].

D. Traditional Medicines

Traditional medicine refers to the accumulation of all knowledge and practices, whether explicable or not, used in the diagnosis, prevention, and treatment of physical, mental, or social imbalances, relying exclusively on practical experience and observation passed down verbally or in writing from generation to generation.



This traditional health care system is also known as folk medicine, ethnomedicine, and indigenous medicine [48]. As the World Health Organization (WHO) reported, more than 3.5 billion people in developing countries rely on medicinal plants for their healthcare [51], [9].

However, in every country in the developing world, about 60–85% of the population is dependent on traditional medicine [14]. Traditional medicine is widely practiced in Thailand, Sri Lanka, China, India, Pakistan, and Japan. Traditional medicine is a part of the people's culture in Africa, but it is not organized as well as in India and China. Herbalists, bonesetters, traditional birth attendants, traditional psychiatrists, herb traders, and other professionals are examples of traditional medicine practitioners [8], [51]. Many people rely on traditional medicinal herbs for their livelihood security, financial stability, and maintenance of their health [30]. As some scholars have noted, traditional medicine has drawbacks as well [44]. The drawback of the traditional medicine health care system's recognition is its lack of accuracy and its imprecise dosage, which can cause toxicity [44],[21]. The age and physical characteristics of the patient, the sociocultural explanation of the sickness, the diagnosis, and the experience of the particular herbalist are all taken into consideration when determining the dosages; these measurements are not standardized [21].

III. IMPORTANCE OF MEDICINAL PLANTS

A. Plants Used in Human Health

In the primary health care system of resource-poor communities, traditional medicinal plants continue to be the most accessible and reasonably priced source of treatment for populations, and local healing is the sole access to medical care. Ethiopia's contemporary health care services are, like those in other developing and less developed countries, not only substandard but also unavailable and out of reach for the majority of the population [29]. This problem, along with the rapidly increasing human population and cultural resistance towards the use of modern medicines, means that the majority of people in developing countries are dependent on traditional medicines to manage various human and animal ailments. This is true in Ethiopia, where approximately 80% of the population still depends on traditional medicinal plants to prevent various health problems [44]. In developing countries, people depend on traditional medicinal plants due to the inaccessibility of modern health services and cultural factors [14]. Reasons for preferring traditional medicine to modern medication are accessibility, effectiveness of treatment, and inexpensive cost [36]. Plants have been crucial and important sources of preventive and curative medicine preparation for humans and livestock. About 80% of humans and over 90% of livestock in Ethiopia depend on traditional medicine [45]. Thus, in Ethiopia, there is a largely developed practice and interest in medicinal plants due to the socio-cultural acceptability, availability and biomedical profits of traditional medicinal plants. In all regions of the country, traditional medicine has the highest acceptability for alternative health care [36], [49].

B. Plants used in Ethnoveterinary

In Ethiopia and other developing countries, animal disease remains one of the principal causes of poor livestock

performance [47]. Ethiopia has diverse ecology, socio-cultural and linguistic groups that have rich knowledge in managing and using different medicinal plants against human and livestock ailments [6]. In the absence of modern medicine to treat livestock in smallholder settings, the use of traditional medicinal plants will remain a vital component of Ethiopian livestock health problem management. Ethnoveterinary uses of the plant species in Ethiopia are *Caylusea abyssinica*, *Cissampelos mucronata*, *Cissampelos pariera*, *Desmodium dichotomum*, *Ipomoea eriocarpa*, *Justiciadiffusa*, *Premnaschimperi*, and *Zornia glochidiatae*. Ethno veterinary medicine refers to traditional animal health problem care knowledge and practices encompassing traditional surgical techniques, traditional immunization, magic religious practices and beliefs, and the use of herbal remedies to treat diseases encountered by livestock [23]. Ethiopia is one of the leading countries by livestock population in Africa [23]. However, ethnoveterinary practices for livestock health problem management using traditional medicinal plants remained undocumented in Africa and Ethiopia [21]. Thus, raising awareness about ethnoveterinary medicine emphasizes useful plant species used for the treatment of livestock. In addition, appropriate documentation and understanding of farmer's knowledge and practices on the occurrence and control of various livestock ailments are important.

IV. THREATS TO MEDICINAL PLANTS AND THEIR CONSERVATION EFFORTS

A. Threats to Medicinal Plants

Plants have played a vital role in treating numerous human and livestock ailments. Indigenous knowledge and medicinal plants are critically threatened and lost through different factors. According to [46], habitats and species are being lost rapidly due to environmental degradation, agricultural expansion, deforestation, and urban expansion. Medicinal plant conservation is at risk due to overuse and negative harvesting [53]. The roots and bark of medicinal plant collections may kill the plant [21]. In a study on factors that threatened medicinal plants in the Fentalle area, it was found that firewood, charcoal, drought, agriculture, house use, and trade [32]. Around 15,000 medicinal plant species have been threatened due to habitat loss and overharvesting every two years worldwide [19]. In Gozam Woreda, East Gojjam, people have depended on medicinal plants for various purposes, but overgrazing is the major threat to medicinal plants [4]. The development of modern education has a negative impact on medicinal plant and traditional knowledge [16]. Elders who are 41-50 years old have handled most of the knowledge on herbal remedies, and ethnomedicinal knowledge is concentrated among the elderly members of the community and their relatives [46]. Ethnomedicinal knowledge has been threatened due to the deaths of elderly members of society, and a few young people are willing to acquire the knowledge. The invasion of alien weeds has had an adverse impact on medicinal plants and the climate [39], [46].

B. Conservation of Traditional Medicinal Plants

Conservation of medicinal plants and knowledge is referred to as the sustainable use conservation of medicinal plant species and associated knowledge for present and future uses. Although various threats have substantial consequences for medicinal plants, The effort of traditional healers in conserving ethnomedicinal plant species in Bale Mountain National Park was so minimal [28]. Home gardens are a central target for in-situ and ex-situ conservation of traditional medicinal plants [53]. Some traditional medicinal plants may have to be conserved in-situ in their natural habitats due to the difficulty of domestication and management [53]. Traditional medicinal plants can be conserved by ex-situ conservation methods such as gene banks, tissue culture, botanic gardens, and field gene banks [53] [1].

V. CONCLUSION

Based on the review, it can be concluded that Ethiopia is rich in a diversity of medicinal plant species and indigenous knowledge. In Ethiopia, medicinal plants are widely used by communities, particularly rural communities, to treat various human and livestock ailments. People are highly dependent on traditional medicinal plant resources for health care. The plant-based human and livestock health care is the main alternative treatment for ailments in Ethiopia, largely due to the shortage of pharmaceutical products and access to health services, as well as the high-priced of modern medicine. Traditional medicine is an indigenous medicine that is used to maintain health problems inversely from allopathic medicine regarding theories, beliefs, and experiences. 80%–90% of the Ethiopian population relies on traditional medicine to meet their primary health care needs. The main factors that threatened medicinal plants and associated knowledge in Ethiopia were human and natural factors such as charcoal manufacturing, overgrazing, deforestation, agricultural expansion, firewood collection, and overexploitation. Therefore, it is principally important to conserve medicinal plants and indigenous knowledge through in situ and ex-situ conservation approaches. Community- and research-based conservation mechanisms could be an appropriate approach for mitigating the problems pertinent to the loss of medicinal plants.

RECOMMENDATIONS

Based on the review conducted, the following recommendations are forwarded.

- documenting medicinal plants and the knowledge of traditional healers on how to prepare remedies and provide traditional medication to their patients.
- Training should be given to the practitioners on the best way to collect, document, use, store, and conserve medicinal plants.
- Traditional healers and local communities should conserve and multiply medicinal plants through botanical gardens, home gardens, proper handling practices, and scientific development.
- Encourage traditional medicine practitioners to improve their skills by licensing and incentive approaches.

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Availability of Data and Material	Not relevant.
Authors Contributions	I am only the sole author of the article.

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