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Sociological perspective on traditional knowledge, healthcare, & therapeutic practices regarding medicinal plants

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Abstract

The role of medicinal plants in human health is significant as it can be traced back to ancient times and this role is played by these plants as a key source of medications in the treatment of various human conditions in different cultures. As evidenced by historical documents, including the Ebers Papyrus and Pen Ts'ao by Emperor Shen Nung, past utilization of herbal therapies has shown that the practice remains highly relevant. Ethnobotany and ethnopharmacology can provide interdisciplinary approaches to the study of the relationship between humans and plants and clarify their chemical, nutritional, and medicinal characteristics. The study of the nature, historical applications and pharmacological possibilities of medicinal plants are necessary to save the traditional knowledge and inform drug discovery in the future. This research combines the historical importance, therapeutic, and contemporary scientific views on medicinal plants focusing on their impact within the healthcare sector, research, and sustainable use.

Keywords: ethnobotany, ethnopharmacology, medicinal plants, therapeutic applications, traditional medicine

Introduction

Medicinal plants have been part of human health care since prehistoric times, as they have been the primary sources of remedies in different civilizations (Abdalla, 1981; Chander et al., 2025; Chevallier, 2023; Joshi, 2024; Kindersley, 2023). Seemingly, herbal remedies were widely used to treat various diseases, including gastrointestinal, metabolic, and infectious illnesses, as shown in historical sources, including the Ebers Papyrus (c. 1500 BCE) and Pen Ts'ao by Emperor ShenNung (El-Saadony and Saad et al., 2025; Jundi, 1997; Micozzi, 2010; Oakeley, 2024). Modern pharmacology is based on the

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traditional knowledge of medicinal plants by using them through empirical observation and culture (Blanding, 2024; Johnstone, 1998; Siddiqui, 2008).

Ethnobotany and ethnopharmacology are the specialized branches concerned with the dynamic interdependence of plants with humans as a focus and the identification, characterization, and therapeutic (medical) possibilities of bioactive compounds (Chi et al., 2025; Kuca et al., 2025). Ecological, cultural, and socio-economic values of medicinal plants are also emphasized by these fields especially in the developing nations where herbal medications are extensively used (El-Saadony and Alkafaas et al., 2025; Farid, 2025; Uddandrao and Saravanan, 2025). In addition, historical and recent researches show that plant-derived compounds like flavonoids, tannins, saponins and alkaloids have anti-inflammatory, antioxidant and antimicrobial effects (Ajram, 1992; Khan, 2009; Saad and Said, 2011).

Knowing the properties, history of application, and pharmacological usage of medicinal plants is important in maintaining the traditional knowledge, sustainable application, and drug discovery (Kumar et al., 2025; Morrow, 2011; Latif and Nawaz, 2025; Wilkinson and Salazar, 2002). The introduction emphasizes the timeless topicality of medicinal plants in human well-being as it unites the knowledge of antiquity with the achievements of modern science.

Research Justification

Medicinal plants continue to play a significant role in the primary health care of the world, and more than two-thirds of the world population still relies on traditional medicines (Abdalla, 1981; Chevallier, 2023; El-Saadony and Saad et al., 2025). Although the use of herbal medicine is not a recent development, little information on the pharmacological potential, safety, and efficacy of herbs has ever been properly scientifically studied (Blanding, 2024; Chander et al., 2025; Jundi, 1997; Micozzi, 2010; Oakeley, 2024). The availability of medicinal plant species is also at threat by rapid modernization, deforestation and habitat degradation which means that invaluable traditional knowledge may be lost (Farid, 2025; Johnstone, 1998; Uddandrao and Saravanan, 2025).

Ethnobotanical and ethnopharmacological research are necessary to record the bioactive constituents of plants, learn about their pharmacological action, and find new drugs (Kuca et al., 2025; Kumar et al., 2025; Siddiqui, 2008). Moreover, a combination of historical and cultural knowledge and resources with current pharmacological knowledge can help shape sustainable use and conservation measures (Ajram, 1992; Morrow, 2011; Saad and Said, 2011).

It is essential to investigate medicinal plants as an alternative or complementary therapeutic agent since such chronic conditions as diabetes, cancer, and cardiovascular disorders are commonplace (Chi et al., 2025; El-Saadony and Alkafaas et al., 2025; Khan, 2009; Latif and Nawaz, 2025). This research aims to bridge traditional knowledge and modern science, ensuring the preservation, rational use, and therapeutic optimization of medicinal plants for global healthcare challenges (Wilkinson & Salazar, 2002).

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Importance of Medicinal Plants

For years, medicinal plants and herbal therapy have been widely used to treat many ailments in diverse civilizations (Abdalla, 1981; Blanding, 2024). However, herbal medicine is used for primary health care in many nations worldwide (Micozzi, 2010; Oakeley, 2024), with two-thirds of the world's population relying on it (Chander et al., 2025; Chevallier, 2023; Joshi, 2024; Kindersley, 2023). It is because of their higher cultural tolerance, compatibility, and adaptation with the human body (Kumar et al., 2025; Stapley, 2023; Wyk & Wink, 2023).

Despite a widespread perception that natural goods are harmless, few data on their toxicity have been published (Jundi, 1997). Medicine requires medicinal strategies when it comes to the prevention of illnesses as well as treatment (Chi et al., 2025). Since these plants have medical value, there has been extensive research within recent years with the goal of extracting and characterizing the active components of herbal medicine (El-Saadony and Alkafaas et al., 2025).

Studies have demonstrated that various active compounds in medicinal plants can help relieve pain (Farid, 2025). In vitro studies have also revealed that several medicinal plants contain anti-oxidant and anti-inflammatory properties (Siddiqui, 2008).

Moreover, some of the medicinal plants are widely used in different therapeutic purposes such as in the treatment of gastrointestinal and digestive disorders induced by microbial infection (Saad and Said, 2011). There are several native medicinal herbs used by different communities to treat diseases, including malaria and gastrointestinal illnesses, and also to treat infants and children, and they usually include Cassia siamea, Flueggea virosa, Terminalia bellirica, and Terminalia chebula (Kuca et al., 2025).It is believed that over 80% of people in diverse cultures employ various forms of traditional medicine to cure various diseases (Latif & Nawaz, 2025).

Even in affluent nations, natural treatments are increasingly commonly used since the world's rich and wonderful plant kingdom is well known for its medical value (Dunbar, 2025). Plant species' potential therapeutic characteristics have aided in the creation of a variety of herbal remedies for a variety of disorders across the world (Uddandrao & Saravanan, 2025). Cancer is one of the most severe health issues that has afflicted the entire world's population (Johnstone, 1998). There is an urgent need for better and more effective treatment to address this condition (Al-Hassan, 2001).

Biochemical compounds with anti-cancer effects have been found in various medicinal plants (Singh et al., 2025). Natural-source chemical metabolites with anti-cancer characteristics might be used as lead molecules in medication development (Morrow, 2011). In order to create and construct anti-cancer medications, further study and testing into the relationship between medicinal plants and cancer is required (Khan, 2009). These plants are either "wild plant species" that grow naturally in self-maintaining populations in natural or semi-natural ecosystems and can exist independently in contrast to "domesticated plant species" that have evolved through actions of humanlike breeding and selection of plants rely on management for their survival (El-Saadony & Saad et al., 2025).

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In recent years, growing study data has demonstrated the beneficial effect of traditional medicinal herbs in preventing or treating various metabolic illnesses such as diabetes, heart disease, and some types of malignancies (Chander et al., 2025). Medical plants are the starting point of a variety of pharmaceuticals, either single or in combination, and they are also the main source of raw materials of other types of medicines (Chi et al., 2025; Wyk and Wink, 2023). Other than having pharmacologically active phytochemicals, every medicinal plant species possesses its specific nutritional composition (Kumar et al., 2025).

Since time immemorial, plants have been used to cure diseases (Siddiqui, 2008). The general attitudes towards using medicinal plants and their effectiveness play a significant role in exposing the potential of medicinal plants in treating a condition, leading to widespread prescription, despite understanding their chemical components being only partially comprehended (Kuca et al., 2025; Micozzi, 2010; Oakeley, 2024). Therapeutic effect of a medicinal plant can be attributed to bioactive components (Wilkinson and Salazar, 2002). Recognition of these bioactive components is accomplished through phytochemical screening which includes phytochemical assays and TLC (Japhari et al., 2025).

Medicinal plants contain Secondary metabolites or substances such as tannins, flavonoids and terpenoids which determine the curative effect of medicinal plants especially the antibacterial effects of the plants (Abdalla, 1981). Phytochemical components such as flavonoids and tannins have also proved to be effective in combating pathogenic bacteria such as Bacillus cereus and S. aureus among others (Latif & Nawaz, 2025). Since medicinal herbs do include tannins, they can be utilized to create antiseptic soap, which is commonly used to clean the surface of the skin (Chevallier, 2023; Farid, 2025; Joshi, 2024). The wide range of the physiological activity due to antibacterial effects has been found to be caused by saponins, steroids, phenols, and tannins (Uddandrao & Saravanan, 2025). Saponins are a significant component that acts as a secondary antifungal metabolite (El-Saadony & Alkafaas et al., 2025).

Due to their physiological actions, such as being anti-oxidant, antibacterial, and anti-inflammatory, tannins have astringent properties that aid the healing of wounds and irritated mucous membranes due to their antiqueniness (Blanding, 2024; Singh et al., 2025). Therapeutic property of medicinal plants can be attributed to the existence of tannins (Jundi, 1997). Anti-inflammatory, astringent, anti-oxidant, anti-diarrheal, and antimicrobial activities have been discovered (Saad & Said, 2011). Saponins have long been employed in detergents, insecticides, and molluscicides, as well as in industrial applications, including bubble formation and surface-active agents (Morrow, 2011). Saponins aid in the prevention of heart disease and cholesterol management in humans (Norwawi, 2021).

The active ingredients of medicinal plants are metabolic products of plant cells, and various trace elements are involved in the metabolism (Khan, 2009). It is critical to screen the elemental makeup of commonly used therapeutic plants (Johnstone, 1998). Local communities employ a variety of medicinal plant species in the form of extracts or decoctions (Al-Hassan, 2001; Micozzi, 2010; Oakeley, 2024).

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There are three types of benefits that medicinal plants can provide:

1. They provide health advantages to those who use them as medications.
2. Financial rewards for those who collect, process, and distribute them for a profit.
3. Broader societal advantages include increased employment prospects, tax revenue, and a healthier workforce.

Characteristics of Medicinal Plants

When utilized as a therapy, medicinal plants have several qualities, including:

1. **Synergic Medicine:** Plant elements interact simultaneously; thus, their usage can either complement or harm others or negate their potentially harmful effects.
2. **Support of Official Medicine:** The components of plants have shown to be quite valuable for treating difficult situations like TB and malignant diseases.
3. **Preventive Medicine:** Research has confirmed that plant components can prevent the onset of specific illnesses. It can help reduce the reliance on chemical medications, typically used when the disease is already present, along with the associated synthetic therapeutic side effects.

As a result, it is critical for open-access journals to encourage researchers and physicians to diligently work in order to define the primary active compounds isolated from medicinal plants (Blanding, 2024; Chander et al., 2025). Furthermore, to define their significance in treating current ailments and how they might be employed to manufacture or synthesize more effective drugs (Chevallier, 2023; Joshi, 2024; Kindersley, 2023; Kumar et al., 2025). Medical plants are becoming popular worldwide due to their unique advantages and medicinal importance (El-Saadony & Saad et al., 2025). Herbal treatment is also getting popular, and many people are attracted to it as an alternative to traditional medicine (Dunbar, 2025; Stapley, 2023; Wyk & Wink, 2023).

These medicinal herbs are increasing global relevance due to their rising traditional use and cultural tolerance, as well as the fact that they have few adverse effects (Singh et al., 2025). Most developing nations are promoting herbal pharmaceuticals, which are often more cost-effective than synthetic drugs, and they have begun finding (Micozzi, 2010; Oakeley, 2024) and filing patents on medical plants and their derivatives (Uddandrao & Saravanan, 2025). Many medications have yet to go through the drug approval process and have not been verified for safety and effectiveness (Kuca et al., 2025).

Medicine-based enterprises can develop these medical plant-derived medications (Abdalla, 1981; Chevallier, 2023; Joshi, 2024; Kindersley, 2023). Asia is a significant exporter of medicinal plants and their derivatives, as many plants grow in this region of the world (Johnstone, 1998). These curative plants can be promoted and used to help in developing the economies of Asian countries (Al-Hassan, 2001).

Moreover, the use of medical plants must be reduced to the minimum (especially synthetic and non-important ones), the plants of high marketing value must be preserved (Ajram, 1992), and it should be ensured to grow them in the future (Farid, 2025). Also, the researcher should make sure that bioactive compounds can be obtained in a reproducible and safe way (Chi et al., 2025). Interest in herbal medicine across the world has also resulted in an integration of pharmacologists and traditional healers (Japhari et

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al., 2025). There should be policies that will inject a balance between the commercial demand and the conservation needs (Saad & Said, 2011). Excessive harvesting may pose a risk to biodiversity and reduce the sustainability of such resources in the long run (Siddiqui, 2008).

Medicinal plants are not only beneficial in terms of medication but also of economic discrimination to the local people (Khan, 2009). To achieve consistency and safety in plant-based medicines, promotion of the appropriate cultivation methods and quality control can aid (Wilkinson & Salazar, 2002). Governments and other researchers ought to collaborate to come up with the means of sustainable use without affecting the cultural and traditional relevance of medicinal herbs (Morrow, 2011). Another thing that can be done in the global healthcare system to achieve affordable healthcare is the development of herbal pharmaceuticals (Norwawi, 2021). Lastly, it is possible to monitor and document the pharmacological potential of these plants to inform future scientific research and drug discovery (El-Saadony and Alkafaas et al., 2025).

Importance of Medicinal Plants in History

When Adam and Eve used to live in paradise, there was no concept of disease; after they were expelled from paradise, the discovery of disease and misery began (Abdalla, 1981; Blanding, 2024). From prehistoric times, people have started looking for natural drugs to rescue themselves from diseases (Chevallier, 2023; Joshi, 2024; El-Saadony & Alkafaas et al., 2025). The start of using both plants and animals for curing disease was impulsive (Khan, 2009; Micozzi, 2010; Oakeley, 2024). In reality, during that period, there was limited understanding of the causes of illnesses and how certain plants could be utilized for preventive medicine (Chi et al., 2025; Stapley, 2023; Wyk & Wink, 2023). The discovery of the effectiveness of specific medicinal plants in treating particular ailments occurred gradually (Farid, 2025).

Consequently, using medicinal plants gained empirical support and transformed into facts (Uddandrao & Saravanan, 2025). Plants have been used for therapy and prevention until the 16th century when iatrochemistry was introduced (Siddiqui, 2008). Because necessity is the mother of innovation, man has been searching for cures for many ailments since ancient times (Al-Hassan, 2001). Throughout history, man has investigated nature for two primary purposes: food for survival and plants for pain and sickness relief (Japhari et al., 2025).

As a thorough cure for ailments, ancient cultures employed plants or mixes known as "corpus therapeuticum" (Ajram, 1992). Ebers papyrus was one of these components (Johnstone, 1998). The E. papyrus, written around 1550 BC, describes the therapeutic plants utilized in Egyptian society (Chander et al., 2025). Dr. George Ebers, a German Egyptologist, bought the papyrus in Thebes in 1872 and investigated its components, describing it as "exceptional value" (Kuca et al., 2025). In addressing sickness, prevention, and treatment, this approach integrates personalized nutrition and herbal medicines that cater to the needs of the body, mind, and spirit (Wilkinson & Salazar, 2002).

Consumers worldwide have good attitudes regarding herbal products, believing that they are of "natural" rather than "synthetic" origin and are thus safer than synthetic

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pharmaceuticals (Morrow, 2011). They saw themselves as part of a healthy lifestyle and rejected traditional "Western" medicine (Norwawi, 2021). Herbal medications and their ingredients have been shown to have beneficial effects on fitness and may be utilized effectively to cure human illnesses (El-Saadony & Saad et al., 2025).

Nowadays, natural pharmaceuticals account for more than half of all medications, and they are derived from plants in various ways (Latif & Nawaz, 2025). Herbal medications are recognized as mixes of different chemical compounds created in plants, and they are commonly utilized for healthcare in both developed and developing countries (Jundi, 1997). As per a World Health Organization (WHO) survey, approximately 80 percent of the global population relies on herbs and other traditional medicines for their primary healthcare needs (Kumar et al., 2025). Furthermore, three categories of herbal medications have been recognized:

1. Raw plant material
2. Processed plant material
3. Herbal products

Herbal medicines are natural materials proven safe when used to treat ailments and as dietary supplements to protect the human body against sickness (Abdalla, 1981). Depending on consumer needs, herbal remedies include capsules, pills, powder, tea extracts, and fresh or dried plants (Farid, 2025; Oakeley, 2024). People do not hesitate to ingest herbal medications without a prescription since they are historically considered safe (Khan, 2009). While some may cause health issues, others are ineffective and interfere with other medications (Saad & Said, 2011). In the current situation, assessing medicine quality and standardizing herbal goods are necessary to determine the quantity of active components (Chi et al., 2025).

The traditional knowledge and use of medicinal herbs further aid in exploring the natural resources of plants (Uddandrao & Saravanan, 2025). Preserving this valuable knowledge necessitates a comprehensive strategy and collaborative efforts to document historical data on medicinal plants (Japhari et al., 2025; Micozzi, 2010). It is crucial to harness these resources for the benefit of humanity before they are lost irretrievably (El-Saadony & Alkafaas et al., 2025). As a result, this review aimed to look into and describe the method of employing medicinal herbs throughout history (Johnstone, 1998).

Use of Medicinal Plants in Ancient Cultures

Since ancient times, medicinal herbs have been extensively practiced for treating different diseases (Chevallier, 2023; Kindersley, 2023; Kuca et al., 2025). The Sumerians in ancient Mesopotamia developed the earliest recorded record of therapeutic herbs on clay tablets around 5,000 years ago (Iraq) (Chi et al., 2025). The Ebers Papyrus, written about 1500 BCE, lists approximately 850 herbal medications (Wilkinson & Salazar, 2002). Many plants that we recognize and use today are included in this collection (Abdalla, 1981). A medicinal plant is utilized in contemporary or traditional medicine to preserve health, treat a specific illness, or both (Farid, 2025; Oakeley, 2024). In 2002, the Food and Agriculture Organization (FAO) estimated that more than 50,000 medicinal plants are used globally (Blanding, 2024; El-Saadony & Saad et al., 2025).

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Medicinal plants have been used to treat different diseases since prehistoric times (Siddiqui, 2008). The linkage between humans and their hunt for pharmaceuticals in nature extends back many years, with much evidence found from different sources like some written texts, monuments, and even original herbal remedies (Johnstone, 1998; Stapley, 2023; Wyk & Wink, 2023). Man learned to detect medications in seeds, barks, fruit bodies, and other components of the plants as a result of many years of fights against sickness (Uddandrao & Saravanan, 2025).

Since ancient times, people have turned to natural remedies to treat their illnesses (Japhari et al., 2025). Therapeutic herbs began instinctively, similar to how animals use them (Al-Hassan, 2001). Given the limited knowledge during those times regarding the causes of ailments and how specific plants could be used as remedies, the approach was primarily based on personal experiences (Khan, 2009). As the understanding of the efficacy of various medicinal plants in treating specific ailments grew, medicinal herbs transitioned from an empirical framework to one founded on explanatory facts (El-Saadony & Alkafaas et al., 2025). Plants remained a primary source of therapy and prevention until the emergence of iatrochemistry in the 16th century (Morrow, 2011). However, the diminishing effectiveness of synthetic pharmaceuticals and the increasing number of their contraindications have shifted the focus back to the use of natural remedies (Jundi, 1997).

Plants have been used as remedies since before written history (Chander et al., 2025; Micozzi, 2010; Oakeley, 2024). Archaeological evidence suggests that people used medicinal herbs around 60,000 years ago, during the Paleolithic period (Kumar et al., 2025). Human cultures have been in intimate touch with their environs from their inception and have exploited the environment's elements for various purposes (Ajram, 1992). Through trial and error, humans gradually learned to recognize and use plants to create food and medicine, and they could fulfill their requirements from their environment (Singh et al., 2025). Emperor ShenNung's book "Pen Ts'ao" described 365 medications, many of which are still used today, including Ginseng, Yellow gentian, Theae folium, Cinnamon bark, Camphor, Rheirhisoma, Jimson weed, Podophyllum, and ephedra (Latif & Nawaz, 2025). There are several additional antiquarian books from other nations (Dunbar, 2025).

In the past, knowledge of the underlying etiology of sickness was limited, and the nature of plant elements, along with a lack of understanding of their mechanistic therapeutic application, limited the utilization of herbs in medicine (Saad & Said, 2011). As a result, herbal medicine use has relied on experience and trial and error since ancient times (Farid, 2025; Oakeley, 2024). Medicinal plants have a long and illustrious history of aiding humans on nearly every continent (Chander et al., 2025; Stapley, 2023; Wyk & Wink, 2023). That great expertise has been passed down through the generations by traditional healers (Chi et al., 2025). Modernization and cultural upheavals have kept this natural medical paradigm's in-depth understanding the same (El-Saadony & Alkafaas et al., 2025). Pharmacological reasoning based on historical applications, followed by phytochemical investigations, might usher in a new era in illness treatment (Abdalla, 1981).

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Ethnobotany and Ethnopharmacology: Intra-Disciplinary Relationship

Ethnobotany, a field within ethnobiology, examines the productive interplay among humans, biota, and ecosystems (Blanding, 2024; Chi et al., 2025). The term "ethnobotany" was first introduced in 1895 by the American botanist John William Harshberger (Abdalla, 1981). However, the field of ethnobotany predates the term; for example, the Greek Pedanius Dioscorides of Anazarbus wrote in his book De Materia about the valuable plants he collected from the Mediterranea (Farid, 2025). Ethnobotany, as defined by Harshberger, is "the utilization of plants by primitive people" (Singh et al., 2025).

Ethnobotany has grown since Harshberger's time to incorporate both anthropology and botany: "studying the dynamic relationship between humans and plants" (Chevallier, 2023; Joshi, 2024; Wilkinson & Salazar, 2002). Along with the definition, ethnobotany has evolved significantly over the years, expanding from its Starting focus on the utilization and handling of plants to include social and economic factors, as well as the recognition, conceptions, perspectives, and values of the local (Kuca et al., 2025). It has made ethnobotany increasingly interdisciplinary, encompassing not just anthropology and botany but also ecology, linguistics, economics, agriculture, geography, pharmacology, and other fields (Jundi, 1997; Stapley, 2023; Wyk & Wink, 2023).

The swift advancement of globalization has led to shifts in lifestyles, potentially causing substantial erosion of traditional knowledge (Latif & Nawaz, 2025; Micozzi, 2010; Oakeley, 2024). Ethnobotany's interdisciplinary character provides the ideal instrument for collecting fast-vanishing traditional knowledge, like the indigenous people in different areas (Ajram, 1992). In addition to ensuring that traditional knowledge is preserved, ethnobotanical research aids in demonstrating the requirements and preferences of ordinary people when systems and policies for biological diversity or handling techniques are lacking (El-Saadony & Alkafaas et al., 2025). Ecosystems, such as the Gutwala forest, give products and services to local people, such as food, medicine, shelter, and energy (Siddiqui, 2008).

Drivers of change leave their imprint on ecosystems, biodiversity, natural resources, soils, and other aspects of traditional knowledge, such as languages and material culture (e.g., instruments) (Japhari et al., 2025). They also imprint on ecosystems, biodiversity, natural resources, soils, and other aspects of traditional knowledge (Khan, 2009). Natural resource losses can lead to a loss of food security, medicinal plants, and other resources, thus it will result in adversely affecting the local people (El-Saadony & Saad et al., 2025). Deforestation, harvesting, soil depletion, and other factors can all contribute to change (Norwawi, 2021).

Deforestation is the change of forest land into land which is then used for other activities, such as land of agriculture (Morrow, 2011). There is no change in land utilization with logging; the removal of wood trees causes severe environmental effects (Dunbar, 2025). These change drivers impact the natural environment and can significantly affect many parts of the ecosystem (Kumar et al., 2025). In communities that do not consist of industries, the use of medicinal plants is very high because their

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availability is high and affordable compared to contemporary medicine (Johnstone, 1998).

Conventional medicine is seldom modified in many countries, but WHO manages a network to maintain the safe and sensible utilization of medicine (Al-Hassan, 2001). General concerns, like climate changes and habitat degradation, challenge medicinal plants' existence (Chander et al., 2025). Deforestation has already occurred in large portions and continues at an ever-increasing rate (Uddandrao & Saravanan, 2025). While deforestation remains the most substantial destruction in land utilization, logging also inflicts environmental damage (Saad & Said, 2011). Additionally, deforestation and logging decrease the resilience of forests, rendering them more susceptible to fires, droughts, and other natural calamities primarily directly or indirectly triggered by human actions (Latif & Nawaz, 2025).

Plants are necessary for life to exist (Chander et al., 2025). Plants are an essential part of medicine's infrastructure (Ajram, 1992). Traditional medicinal plants are the source of several essential medications that are still used today (El-Saadony & Alkafaas et al., 2025). The search for novel medications has led to ethnobotany and ethnopharmacology, a new avenue as a valuable source of information that has led to many causes and compounds (Kuca et al., 2025). Studies on structure-activity connections and their influence on the creation of innovative medications are now considered one of the most useful and, hence, significant contributions of pharmaceutical chemistry, a branch of pharmaceutical sciences (Chi et al., 2025; Stapley, 2023; Wyk & Wink, 2023).

Some of them have active components that come from plants (Siddiqui, 2008). Plant-derived medications have been identified via recent investigations from the study of therapeutic and curative-conventional treatments and, most importantly, folk knowledge of indigenous people, and some of these faiths always remain unable to be replaced despite current developments in the field of science and technology (Morrow, 2011). Aspirin, atropine, digoxin, artemisinin, ephedrine, colchicine, morphine, pilocarpine, physostigmine, quinine, quinidine, taxol, reserpine, and tubocurarine are some of the medications considered to be derived from plants (Farid, 2025). Unfortunately, the number of taxonomists and herbaria is declining worldwide (Dunbar, 2025). Endangered endemic species can also be investigated for ethnobotanical, pharmacological, and medicinal purposes (Uddandrao & Saravanan, 2025).

Additionally, some plants are considered a vital way of nourishment, and as a result, due to their medicinal properties, they are suggested, including the extensive use of walnuts, ginger, and green tea (Japhari et al., 2025). Besides their derivatives, other plants are considered critical sources of active chemicals in aspirin and other medications (El-Saadony & Saad et al., 2025). The phrase "Alternative Medicine" has recently gained popularity in Western society; it refers to employing plants for medical purposes (Kumar et al., 2025; Micozzi, 2010; Oakeley, 2024).

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However, there is a widespread perception that the only medicines we can trust and use are those that come in capsules or tablets (Khan, 2009). Nonetheless, most pills and capsules we consume and utilize regularly are made from plants (Wilkinson & Salazar, 2002). Medicinal plants are commonly used as raw materials for extracting active components for medication production (Abdalla, 1981). Ingredients taken from plants are used in laxatives, antihypertensive, antibiotics, and anti-malarial drugs, among other things (Al-Hassan, 2001). There are millions of plants on this planet whose medicinal properties have yet to be studied (Johnstone, 1998). However, in the future, they may be a part of the research of medicine development, indicating that natural medicine one day will have a very bright future (Saad & Said, 2011).

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