

Original Article

ETHNOBOTANICAL DOCUMENTATION OF MEDICINAL PLANTS USED BY INDIGENOUS COMMUNITIES

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ABSTRACT

Ethnobotanical knowledge serves as a vital element for indigenous healthcare systems which operate in areas that lack access to contemporary medical facilities. The research demonstrates how indigenous communities utilize various medicinal plants together with their methods of plant preparation and practical applications. The research demonstrates that these plants possess therapeutic properties which can effectively address various medical conditions including respiratory illnesses and digestive disorders and inflammatory diseases and chronic medical conditions. Traditional practices were documented through fieldwork which included both interviews and participatory observation and plant identification activities. We conducted research to assess the reliability of plant species through two quantitative ethnobotanical measures which included Informant Consensus Factor ICF and Use Value UV and Relative Frequency of Citation RFC. The efficacy of specific medical interventions for digestive and respiratory ailments is widely acknowledged by specialists, a consensus bolstered by their extensive historical application. The plants *Azadirachta indica* and *Curcuma longa* hold significant importance within traditional medical practices, thereby underscoring their value in the context of ethnomedicine.

Conversely, the long-term viability of these approaches is threatened by two key elements: the decline of biodiversity and the loss of indigenous knowledge. Given these challenges, this study suggests that drug development should include thorough documentation, plant conservation efforts, and ethnobotanical research. This integrated approach is expected to promote lasting improvements in healthcare.

Keywords: Ethnobotanical Knowledge, Informant Consensus Factor ICF, And Relative Frequency of Citation, *Azadirachta Indica* ETC

INTRODUCTION

BACKGROUND

Ethnobotany serves as an essential interdisciplinary field which examines plant resource usage by different cultures within traditional medicine contexts. Indigenous people have used native plants for hundreds of years to create treatments that address various health issues [Sharma and Kumar \(2015\)](#). Their cultural practices combined with their research efforts have enabled them to establish intricate knowledge systems that exist through multiple generations. The survival practices of these groups enable people to connect with natural ecosystems while their beliefs about health encompass all physical and spiritual and environmental elements

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of existence. Forest-dwelling indigenous groups who inhabit protected tribal territories depend on medicinal plants as their primary healthcare resource. The plants safeguard community health by demonstrating their role in maintaining community well-being.

JUSTIFICATION

The growing loss of indigenous knowledge through modernization and urban development together with environmental destruction poses a critical threat to ethnobotanical heritage. The younger generation increasingly abandons traditional healing practices which leads to their complete disappearance [Singh and Arora \(2014\)](#). The simultaneous loss of biodiversity creates a barrier that prevents access to medicinal plant species. The process of documenting this information serves two purposes: it protects cultural heritage and it helps scientists find new bioactive compounds to advance modern drug development [Kumar and Pandey \(2013\)](#). Ethnobotanical research shows how traditional knowledge combines with contemporary scientific progress to create environmentally friendly medical solutions.

GOALS

The research project intends to document all medicinal plants used by indigenous communities while investigating their medicinal properties and studying their methods of plant preparation and plant medicine use. The project intends to evaluate the value of this knowledge for contemporary medical practice while promoting environmental protection methods that will enable sustainable management of botanical resources.

REVIEW OF THE LITERATURE EXISTING KNOWLEDGE

The ethnobotanical study has demonstrated through centuries of plant study that indigenous communities possess extensive knowledge about medicinal plant usage. Traditional doctors in South Asia and Africa and Latin America and other regions employ numerous plant species to treat various medical conditions which range from minor infections to chronic diseases [Giday et al. \(2010\)](#). Researchers have extensively examined the antimicrobial properties and anti-inflammatory effects and antioxidant characteristics of *Azadirachta indica* and *Curcuma longa* and *Ocimum tenuiflorum* plants. Traditional medical practices receive support from phytochemical evidence which validates their use [Kala \(2005\)](#). People use various medicinal plants because they contain bioactive compounds such as alkaloids and flavonoids and terpenoids. Global health reports indicate that traditional medicine serves as the primary healthcare system for a significant portion of the population who live in resource-poor rural areas. The ongoing proper use of ethnobotanical knowledge in modern healthcare systems shows that it's still relevant in this nature.

GAPS IN RESEARCH

Despite the increasing availability of ethnobotanical research publications, there exist substantial deficiencies in the systematic documentation and authentication process of indigenous knowledge systems. The primary issue arises because people share knowledge through spoken word which results in actual information becoming lost when different generations enter the world and individuals adopt unfamiliar traditions. The majority of research studies fail to implement standardized practices which creates difficulties in obtaining research information and determining plant species and understanding the findings. The field of ethnobotanical research exists as a separate entity from contemporary pharmaceutical research activities. The process of developing effective medical treatments from indigenous knowledge becomes more challenging because traditional knowledge exists without proper scientific validation. The presence of intellectual property concerns together with the need to share benefits especially when indigenous knowledge becomes commercialized without proper recognition creates additional research obstacles. Environmental issues such as ecosystem destruction and climate change impede the discovery of medicinal plant species. We need to develop solutions through interdisciplinary approaches which combine ethnobotany and medicine and conservation science and policy frameworks for the protection of scientific advancement and cultural heritage.

METHODOLOGY STUDY AREA

The research took place in areas which exhibit high biodiversity and which have numerous indigenous communities. The traditional healing practices of these locations maintain their significance throughout daily activities World Health Organization. (2013). The area contains forested regions and indigenous settlements and natural environments which support diverse plant species. The research site selection process identified this location because it contained multiple plant species and various cultural groups and showed traditional medicine practices among its residents. The environmental conditions of temperature and soil and plant growth patterns in these regions determine the distribution and usage of medicinal plants which grow in these areas.

METHODS OF COLLECTING DATA

The researchers used both qualitative and quantitative methods from ethnobotanical research to gather their study data. The researchers conducted semi-structured interviews with traditional healers and elders and community members who had expertise to obtain specific plant usage details which included both preparation methods and therapeutic applications [Fabricant and Farnsworth \(2001\)](#). The research team used participatory observation to document real-world practices and confirm the accuracy of the information from different sources. During field surveys, plant specimens were gathered and subsequently identified through the application of taxonomic keys and botanical literature. Furthermore, the investigators adhered to rigorous ethical protocols, securing informed consent and honoring indigenous knowledge systems throughout the duration of the research.

Figure 1

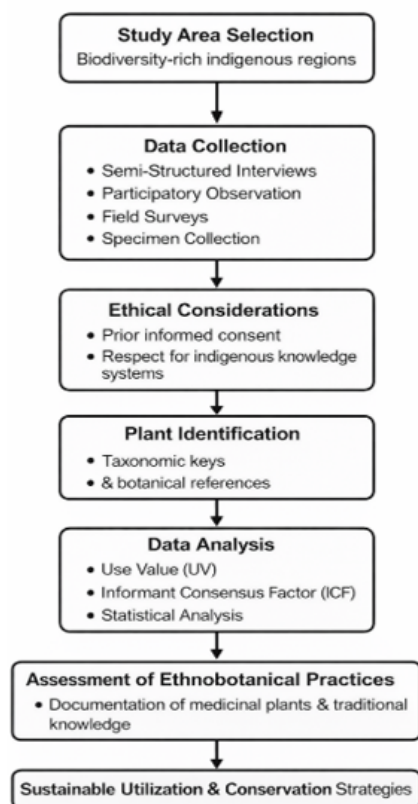


Figure 1 Methodology Chart, Source: Author Generated

STUDYING THE DATA

The researchers used ethnobotanical indices to analyze their data which provided details about the significance and trustworthiness of medicinal plant usage. The study's investigators employed Use Value (UV) and Informant Consensus Factor (ICF) metrics to assess the importance of various plant species, simultaneously gauging the level of agreement among informants regarding their applications. A statistical analysis was conducted to identify correlations and trends in the utilization of plants for the treatment of diverse ailments. Furthermore, the researchers integrated qualitative and quantitative data to formulate a comprehensive understanding of ethnobotanical practices and their incorporation into established healthcare frameworks.

FINDINGS FROM ETHNOBOTANY

VARIETY OF PLANTS

The ethnobotanical survey showed that indigenous groups use a wide range of medicinal plant species. The presence of traditional knowledge together with ecological abundance shows deep-rooted knowledge of the environment. The researchers identified medicinal plants that belonged to Fabaceae and Asteraceae and Lamiaceae and Euphorbiaceae families [Balick and Cox \(1996\)](#). The study area showed ecological variation through its tree population and soil composition and climatic conditions. Native American groups developed expertise in plant identification and classification while learning to use plants for their medicinal

properties. The local healthcare systems benefit from this variety because it helps identify potential sources of bioactive compounds which researchers can use to develop new drugs.

USES IN MEDICINE

The research showed that people used medicinal plants to treat various medical conditions which included respiratory diseases and gastrointestinal disorders and skin diseases and conditions of inflammation and diabetes and other chronic diseases [Heinrich et al. \(1998\)](#). The leaves were used the most because they were easy to get to and had the most active chemicals. The subsequent parts used the roots and bark and seeds and flowers. Multiple plant species displayed medicinal properties which enabled their application across different medical conditions. The high usage of plant-based treatments in indigenous health care demonstrates their effectiveness and low cost and cultural acceptance.

METHODS OF PREPARATION

The researchers discovered that traditional methods for creating medicines proved to be highly systematic which enabled them to treat multiple medical conditions. People typically created decoctions and infusions and powders and pastes through the use of fresh plant materials which provided maximum effectiveness. The therapeutic effects reached their highest level through the combined use of multiple plant species which produced synergistic effects. The preparation process included specific techniques, which included boiling and drying and grinding and fermentation, that demonstrated advanced knowledge about phytochemical extraction methods. The researchers used multiple administration routes which included oral consumption, topical application, and inhalation. Healthcare professionals decided on patient medication dosages based on their professional knowledge while considering patient age, disease severity, and individual health status. The healthcare system operates as a sophisticated system which maintains its ability to adapt to various needs.

Table 1

Table 1 Representative Ethnobotanical Plants and Their Uses, Source: Author Generated				
Plant Name	Family	Part Used	Preparation Method	Therapeutic Use
<i>Azadirachta indica</i> (Neem)	Meliaceae	Leaves, Bark	Decoction, Paste	Antimicrobial, Skin diseases
<i>Curcuma longa</i> (Turmeric)	Zingiberaceae	Rhizome	Powder, Paste	Anti-inflammatory, Wound healing
<i>Ocimum tenuiflorum</i> (Tulsi)	Lamiaceae	Leaves	Infusion, Decoction	Respiratory disorders, Immunity
<i>Aloe vera</i>	Asphodelaceae	Leaves	Gel extraction	Skin healing, Burns
<i>Tinospora cordifolia</i>	Menispermaceae	Stem	Decoction	Fever, Immunity booster
<i>Zingiber officinale</i> (Ginger)	Zingiberaceae	Rhizome	Infusion	Digestive disorders
<i>Phyllanthus emblica</i> (Amla)	Phyllanthaceae	Fruit	Powder, Juice	Antioxidant, Digestive health

Figure 2

Distribution of Medicinal Plant Uses by Ailment Category

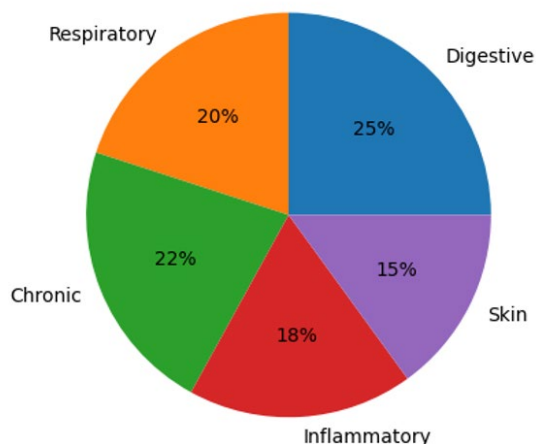


Figure 2 Medical Plant Use, Source: <https://www.mdpi.com/2223-7747/9/8/1001?>

DISCUSSION

UNDERSTAND THE FINDINGS

The study demonstrates that indigenous communities rely on ethnobotanical knowledge as their primary resource for maintaining basic healthcare services. The Informant Consensus Factor (ICF) which reached a high value for digestive disorders indicates that sources reached strong agreement regarding the plant taxa used for digestive disorder treatments [Trotter and Logan \(1986\)](#). The treatment methods have achieved proven effectiveness through continuous application which establishes them as trustworthy solutions. The Use Value (UV) and Relative Frequency of Citation (RFC) scores for *Azadirachta indica* and *Curcuma longa* highlight their importance as widely used medicinal plants in local healthcare [Phillips and Gentry \(1993\)](#). The plants contain antimicrobial and anti-inflammatory and antioxidant properties which explain their historical medicinal applications. Leaf-based preparations serve as a common practice because leaves can regenerate through multiple cycles without causing damage to the plant [Jain \(1991\)](#).

ANALYSIS OF DIFFERENCES BETWEEN NEW AND OLD STUDIES

The findings of this investigation corroborate prior ethnobotanical research, particularly within the Indian subcontinent and regions characterized by rich biodiversity. The analysis reveals a persistent correlation between ailments affecting the digestive and respiratory systems, a conclusion substantiated by numerous investigations into these specific health concerns. Studies in the Himalayas and central India have shown that people often use medicinal plants to treat digestive issues [Cotton \(1996\)](#), [Albuquerque, and Hanazaki \(2009\)](#).

The sequence of diseases begins with digestive disorders which are followed by respiratory and inflammatory diseases. The research supports previous findings which identified *Tinospora cordifolia* and *Ocimum tenuiflorum* as essential components of traditional medicinal systems because they show high Use Value (UV) and RFC values in commonly used plant species.

The environmental changes and cultural practices and species availability across different regions lead to different plant selection and usage patterns among people [Martin \(2004\)](#). The differences demonstrate that ethnobotanical knowledge remains tied to specific geographic locations while people worldwide use plant-based treatments. The research shows that indigenous medical practices provide valuable benefits which scientists and cultural experts should study [Prance et al. \(1987\)](#). The research provides a foundation for future pharmacology research and for developing methods that protect native indigenous practices.

PROBLEMS AND CHALLENGES

THREATS TO KNOWLEDGE AND RESOURCES IN ETHNOBOTANY

Ecological and social-cultural forces are increasing their impact on ethnobotanical systems. Many types of medicinal plants face extinction because of climate change and habitat destruction and rapid deforestation. Native people find less value in these resources. The unsustainable methods of gathering which include root and bark extraction lead to accelerated species extinction. Urbanization and modernization together with generational changes create a major problem that destroys traditional knowledge because young people in indigenous communities show no interest in practicing ancestral traditions. The absence of appropriate documentation creates more serious problems because information systems become vulnerable to permanent loss. Biopiracy concerns together with the absence of formal protection for indigenous intellectual property rights create barriers to benefit sharing among all parties involved.

STRATEGIES FOR CONSERVATION AND SUSTAINABILITY

The solution to these problems requires the development of integrated conservation methods which combine two strategies. The first strategy protects natural resources in their native habitats while the second strategy enables sustainable resource management that benefits local communities. Environmental conservation research requires us to create sustainable methods which will protect ecosystems during the collection of medicinal plants and their cultivation and outreach activities. Indigenous rights need protection through policy frameworks which also promote collaborative conservation research between different ethnic groups.

CONCLUSION

SUMMARY

The current study demonstrates the vital role of ethnobotanical knowledge in helping indigenous communities deliver their essential health care services. The documentation of medicinal plants includes their preparation methods and medicinal applications which demonstrate an intricate system of traditional medicine that has been validated through scientific research. High ethnobotanical indices which include Informant Consensus Factor (ICF) and Use Value (UV) and Relative Frequency of Citation (RFC) demonstrate that specific plant species possess both dependable characteristics and cultural significance.

WHAT THE FUTURE HOLDS AND WHAT IT MEANS

Future investigations should integrate ethnobotanical insights with contemporary pharmacological and biotechnological techniques to validate and optimize therapeutic applications. Collaborative efforts among ethnobotanists, pharmacologists, and policymakers from various disciplines are crucial for the sustainable utilization and preservation of medicinal plant resources. Furthermore, protecting this vital knowledge for future generations demands enhancements in documentation protocols, the reinforcement of legal protections, and the promotion of increased community participation.

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