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ASSESSING FIDELITY LEVEL AND USE VALUE OF ETHNOBOTANICAL KNOWLEDGE ON MEDICINAL PLANTS

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ABSTRACT

The traditional therapeutic applications of plants are best understood through the lens of ethnobotany. There is a substantial amount of information about medicinal plants in India due to the country's great biodiversity and unique cultural past. The research was conducted in Adilabad district during the 2019–2020 academic year. The significance of medicinal plants was assessed using the fidelity level, the use value, and the informant consensus factor. A total of 73 plant species from 61 genera and 29 families were identified as having been utilized for ethnobotanical purposes. Usefulness ranged from a high of 4.0 against jaundice to a low of 1.16 for treating asthma. Rheumatism had the greatest ICF score (1.0), whereas antiseptic had the lowest (0.16).

Keywords: Ethnobotanical, Fidelity Level, Medicinal plants, Traditional, Diseases

I. INTRODUCTION

Ethnobotanical knowledge on medicinal plants plays a crucial role in the field of traditional medicine, offering a vast repository of wisdom accumulated by diverse cultures over millennia. This knowledge represents the intimate relationship between human societies and the natural world, where ancient traditions, practices, and beliefs converge to harness the healing potential of plants. Ethnobotanical studies explore the intricate connections between communities and their environment, unraveling the intricate web of indigenous knowledge passed down through generations. Among the various facets of ethnobotanical research, the fidelity level and use value assessment stand out as essential methodologies to evaluate the efficacy and significance of medicinal plant species. In this comprehensive essay, we will delve into the significance of ethnobotanical knowledge, explore the fidelity level and use value assessment, and understand

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how these approaches contribute to the conservation of medicinal plants and the cultural heritage of the communities relying on them.

The foundation of ethnobotanical knowledge is rooted in the belief that the natural world holds the keys to human well-being. Through careful observation and trial and error, indigenous communities have acquired an in-depth understanding of the healing properties of various plant species. Passed down through generations, this knowledge has become an invaluable part of cultural heritage, contributing to the identity and resilience of numerous societies worldwide. Ethnobotanical studies seek to document and preserve this traditional knowledge, recognizing its potential in addressing modern challenges related to healthcare and sustainable resource management.

Ethnobotanical studies, encompassing fidelity level and use value assessments, have far-reaching implications for biodiversity conservation and sustainable development. As the world grapples with the twin challenges of environmental degradation and healthcare disparities, traditional medicinal practices hold immense potential for promoting both human and ecological well-being. By recognizing the value of indigenous knowledge systems, researchers and policymakers can foster collaborative approaches that integrate traditional medicine with modern healthcare systems.

Ethnobotanical knowledge on medicinal plants represents a treasure trove of ancient wisdom, offering a glimpse into the profound connection between human cultures and the natural world. The fidelity level and use value assessment are indispensable tools in understanding the efficacy and significance of medicinal plant species within their cultural context. By integrating traditional knowledge with modern research and conservation strategies, we can pave the way for a more sustainable future, where the healing potential of nature is harnessed in harmony with the preservation of cultural heritage and biodiversity.

II. REVIEW OF LITERATURE

Behera, Sandeep et al., (2023) Researchers in Odisha's four districts (Puri, Cuttack, Bhadrak, and Mayurbhanj) sought to systematically record and provide a comprehensive picture of the region's Ethnomedicinal expertise. When asking about Ethnobotanical knowledge from traditional healers, convenience sampling was prioritized. With the help of the locals' language skills, we were able to locate the healers and use that information to learn more about their demographics and their background in traditional medicine. Semi-structured surveys were carried out to record the Ethnobotanical information. Several databases were used to help in the analysis, quantification, and documentation of the data collected in the field. It was decided to have a research assistant, a Taxonomist, and a Botanist verify the work. A trip to the herbarium was made to deposit the voucher specimens. Eleven different traditional healers volunteered to share their expertise on 74 different plant species and how they are used in traditional medicine. Only five of the 44 known plant families (the Rutaceae, Malvaceae,

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Astaraceae, Annonaceae, and Euphorbiaceae) see significant use. It is magnificent that remedies from these locations make use of leaves, roots, and seeds. While traditional healers address a total of 25 different conditions, dermatological and digestive issues were given priority. Patients are either drinking a decoction of the ethnomedicinal mixture or rubbing it directly onto their skin. Insight into Odisha's great biodiversity, both biological and medicinal, was uncovered because to this dig. Planting more of these plant species and a sustainable use of the biodiversity is advocated in order to protect the endangered indigenous medicinal plant species and to meet the pre-targeted purpose of increasing the income of the healers.

Sulaiman, Shah, et al., (2020) This investigation on the history of herbal medicine in Gokand Valley, District Buner, Pakistan, ran from February 2018 to March 2020. The purpose was to collect information on the use of medicinal plants, analyze the results, and draw conclusions. We also determined the Use Value (UV), the Relative Frequency of Citation (RFC), the Use Report (UR), the Fidelity Level (FL), the Informant Consensus Factor (FCI), and the Family Importance Value (FIV) for each plant species, in addition to providing in-depth annotations on each species. In the present investigation, 109 species from 64 families were reported to have been employed to treat a wide range of medical conditions. There were 58 angiosperm families (99 species), 1 gymnosperm family (3 species), 2 fungal families (3 species), and 3 pteridophyte families (4 species). The importance of using plants grown at home to cure diseases is emphasized. Acorus calamus L. had UV of 0.2, whereas Acacia modesta Wall. had UV of 0.89. Acacia modesta Wall. had the highest RFC, at 0.285, followed by Acacius calamus L. and Convolvulus arvensis L. at 0.059. Acacia modesta Wall. and Morchella esculenta Fr. were the only species to achieve a full FL, and the FCI for GI problems was recorded as being between 0 and 0.45. According to the medicinal plants' rankings for conservation, 28 species are endangered, 25 are uncommon, 17 are common, 16 are dominant, and 10 are rarely. Better resource management would benefit from the development of conservation strategies and further research on the traditional usage of plants.

Faruque, Mohammad et al., (2018) Data for this research on the ethnomedicinal plants used by three indigenous populations in Bangladesh was gathered from those communities' traditional healers. For the first time ever, the recorded data was statistically examined. The data was collected using semi-structured, open-ended questionnaires. Several numerical indices, such as the Informant Consensus Factor (ICF), Use Value (UV), Frequency of Citation (FC), Relative Frequency of Citation (RFC), and Relative Importance Index (RI), were developed to describe the advantages, significance, and breadth of ethnomedicine. The Jaccard Index (JI) was used to assess the degree of consistency between the current study and prior research, as well as across indigenous populations. From 174 sources, we learn about 159 different ethnomedicinal plant species, from 132 different genera and 62 different families. There were 128 indigenous plants and 31 non-natives. Herbs and leaves were the most common plant components used in the creation of ethnomedicines (45.28%), and pastes were the most common formulations (63.03%), among the majority of species for which data is available. The Asteraceae (with 14

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species recorded) and the Lamiaceae (12 species) were the most numerous plant families. ICF values peaked at 0.77 for gastrointestinal conditions. Duabanga grandiflora (0.43 UVs), Zingiber officinale (0.41 UVs), Congea tomentosa (0.40 UVs), Matricaria chamomilla (0.33 UVs), and Engelhardtia spicata (0.28) were the five most frequently utilized ethnomedicinal plant species in the research region. The Rauvolfia serpentina RFC of 0.25 was the highest value found. Scoparia dulcis (0.83) and Leucas aspera (0.83) had the highest RI values found. Importantly, 16 species were reported with new therapeutic uses, and to the best of our knowledge, the 7 species described here—Agastache urticifolia, Asarum cordifolium, C. tomentosa, E. spicata, Hypserpa nitida, Merremia vitifolia, Faruque et al.—have never been studied ethnobotanically or pharmacologically. Bandarban, Bangladesh's Smilax odoratissima: an ethnopharmacological study. Traditional medicine employing medicinal plants was found to be widely practiced in this investigation. To encourage more phytochemical and pharmacological research and, ultimately, the creation of novel medications, it is important to document new ethnomedicinal species together with their therapeutic applications.

A., Doss. (2015) The traditional healers in the hamlet of Shobanapuram in the Pachamalai hills of Tamilnadu have a wealth of information about the medicinal plants in the area, as has been uncovered by an ethnobotanical study. During field excursions, questionnaires, focus groups, and individual interviews were utilized to gather information about local traditional healers' knowledge of and experience with using native plants for therapeutic reasons. The research aimed to catalog traditional remedies, including the plants themselves, the diseases they were used to cure, the parts of the plants that were utilized, the means by which they were prepared, the routes by which they were administered, the components that they contained, and so on. The study indicated that 165 plant species from 58 different families might be used to effectively cure a wide range of illnesses. Papilionoideae and Rubiaceae were the most common families found in this research. Traditional tribal societies often rely heavily on folk medicine and the flora of their region to treat a wide range of illnesses. There is a pressing urgency to record these plant species before this important information is lost forever. This research has the potential to aid in the protection of these plants and provides the groundwork for further studies of their phytochemical and pharmacological properties.

Meghendra Sharma and Ashwani Kumar (2014). Ethnobotany is a unique subfield of biology that also draws from other fields, including anthropology, archaeology, botany, ecology, economics, medicine, religion, and culture. Taking a humanistic perspective on botany is how most people characterize ethnobotany. Archaeological literature searches, herbaria, and field investigations are only some of the ethnobotanical study approaches pertinent to therapeutic plants. Recent years have seen a rise in the prominence of ethno-botanical research. Some plants native to Rajasthan are the subject of ethnobotanical research presented here.

Yabesh, J. et al., (2014) Medicinal herbs are used to cure and prevent many different types of illness. Such information has to be documented immediately. This is the first ethnobotanical research to use the ICF approach for statistical plant estimates. The goal of this research was

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to catalog the local names, preparations, and applications of medicinal plants gathered by traditional healers in the quiet valley in the Kerala region of India. A two-year field investigation was conducted in Kerala. Traditional healers were interviewed in order to compile the data on ethnomedicine. The information was examined for its practicality (UV), accuracy (FL), and reliability (Fic). Silent Valley's traditional healers have cataloged 102 plant species over 95 genera and 53 families that they employ to cure 19 different disease categories and their respective bodily systems. Most remedies were made into a paste and used orally, with leaves being the most often utilized plant portion. The maximum faithfulness in this research was achieved by 7 different plant species, and the highest fidelity values were associated with dermatological infections/diseases and gastro-intestinal problems.Moringa oleifera (2.62), Curculigo orchioide (2.5), Amorphophallus paconifolius (2.37), Vitex negundo (2.37), Carica papaya (2.12), and Annona squamosa (1.87) were the most valuable species in terms of their practical use. As a result of compiling the data presented here, we can suggest further research into the traditional knowledge of medicinal plants such as Moringa oleifera, Curculigo orchioide, Amorphophallus paconifolius, Vitex negundo, Carica papaya, Citrus hystrix, and Tribulus terrestris (with high use values), and Amorphophallus paconifolius, Aloe vera, Carum captic

Šavikin, Katarina et al., (2013) This research contributes significantly to the field of ethnopharmacology by detailing the traditional applications of medicinal plants in the Zlatibor region in southwestern Serbia. Methods and materials: Using questionnaires, researchers gathered data from 220 participants (mean age 47; 79% female; 21% male). For the medicinal plants included, we also computed the informant consensus factor and assessed their use value and relative significance among species. Zlatibor district neighbors were used as a frame of reference for a comparison of the intended plant utilization with existing ethnobotanical literature. The results show that the informants supplied information on 69 different medicinal plants from 36 different families. The groups Rosaceae, Lamiaceae, and Asteraceae were the most common in local horticulture. Mentha piperita, Chamomilla recutita, Hypericum perforatum, and Achillea millefolium ranked best in economic value. Treatments for digestive issues, respiratory issues, and skin illnesses were the most often mentioned medical applications. In most cases, oral dosing was followed by localized applications. Although several plant components were employed, leaves were particularly abundantly utilized. In conclusion, the use of folk medicine in the Zlatibor area of south-western Serbia is mostly aimed at primary health care for the treatment of minor ailments. When compared to surrounding regions, the findings suggest a minor decline in the area's ethnobotanical and medicinal expertise.

Sankaranarayanan et al. (2009) In the South Western Ghats of India, ethnobotanical research was conducted in collaboration with local communities (in the Villapuram district). The current investigation comprised 46 plant species from 31 different families. This claim is based on a comparison of information gathered from traditional healers with existing literature on the

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ethnobotany of India. Fever, diarrhea, skin illnesses, poison stings, wounds, piles, and rheumatism were among of the most common conditions treated using traditional ethno medicinal herbs. Lists the botanical name, family name, local name, principal chemical ingredients, parts utilized, technique of preparation, and therapeutic purposes of the plants traditionally used by the people of the Villupuram district

III. MATERIAL AND METHODS

Several communities in the Adilabad area were surveyed, and data on the ethnobotanical usage of 73 plant species, representing 61 genera and 29 families, was collected. Traditional medicine doctors were interviewed for ethnobotanical data in 2020 and 2021. Information on traditional medicine and its uses was gathered via interviews with resource individuals or traditional healers. The ethnomedicinal knowledge of traditional healers was compiled on a field datasheet to capture plant information. For each piece of acquired ethnomedicinal data, details such as the local name of the plant, the plant portion used for curing, the method of preparation, the additional plants or agents employed as components, the route of administration, etc. were noted. Plants were categorized into ethnomedicinal, economic, ethnoveterinary, and ethnoreligious categories using data collected from locals, as well as plants utilized in everyday life for things like food, fodder, etc.

Quantitative Data Analysis

- **Fidelity level**

For the most often mentioned illnesses and disorders, the fidelity level (FL), the proportion of informants reporting the usage of a given plants species for the same principal reason, was computed.

$$FL\ (\%) = (Np / N) \times 100$$

N is the total number of informants, and Np is the number of informants who report using a specific plant species as a remedy for a specific illness.

- **Use Value**

The use value (UV), of a certain plant species was calculated.

$$UV = \sum U / N$$

U = total number of times a specific species' citation was cited by all informants + N = total number of informants. In order to find out which plants are most often used (recommended) for treating a certain illness, ultraviolet light is a useful tool.

- **Informant consensus factor (ICF)**

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To determine whether or not plant users in the research region agreed on the usage of plants in the illness categories, the informant consensus factor was used. Using the above formula, the ICF was determined.

$ICF = Nur - Nt/(Nur - 1)$

Where Nt is the total number of taxa reported by all informants as having been used to treat a specific illness and Nur is the total number of use-reports for that illness. Multiplying by this variable gives a value between zero and one.

IV. DATA ANALYSIS AND INTERPRETATION

Plants have been used for a wide variety of purposes, including but not limited to economic uses, veterinary uses, food, and the treatment of diseases such as fever, diabetes, cough, cold, stomach ache, wounds and injury, headache, diarrhoea and dysentery, small pox, and snake bites by traditional healers and practitioners of ethnomedicine.

Table 1: Plant parts used in ethnomedicine

Parts used	**Percentage**
Whole plant	8
Stem	7
Seed	1
Root & Rhizome	15
Leaves	34
Inflorescence	2
Fruit	25
Flower	2
Bark & latex	6

Table 1 shows the various plant parts that were used for medicinal purposes in traditional medicine. The most common usage was for leaves (34%), followed by fruit (25%), roots and rhizomes (15%), entire plants (8%), stems (7%), bark and latex (6%), flowers (2%), inflorescences (2%) and seeds (1%) (all percentages are in percentages).

Table 2: Plant Species Used Ethno-Medicinally for Ailments

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Ailments	Percentage
diarrhea and dysentery	18
wounds and injury	9
treating fever	7
Skin problems	5
relieving pain	22
Diabetes	11
cough and asthma	13
stomach problems	15

It can be seen from the above table that 22% of plant species were used for pain relief, 18% for diarrhea and dysentery, 15% for stomach problems, 13% for cough and asthma, 11% for diabetes, 9% for wounds and injuries, 5% for fever, and 5% for skin-related problems. Other prevalent illnesses that were treated with ethnomedicine were jaundice, kala azar, dental disorders, conjunctivitis, and female-related concerns.

Quantitative Ethnobotany

Table 3 displays the results of applying the Fidelity level (FL) and Use value (UV) to several kinds of medicinal plants. The reported medicinal plant's faithfulness ranged from 22.45 to 83.31 in this study, and its UV went from 1.18 to 4. Coccinia grandis had the lowest FL value (22.45) against rheumatism, whereas Hydrophila auriculata had the greatest FL value (83.31 against anemia).

Cajanus cajan was found to have the greatest UV score (4.0) against jaundice, whereas Ficus racemosa was found to have the lowest UV value (1.18). Cajanus cajan (4.0), Centella asiatica (3.85), Catharanthus roseus (3.2), Aegle marmelos (3.14), and Caesalpinia bonduc (3.0) were the most popular, while Ficus racemosa (1.18), Justicia gendarussa (1.2), Euphorbia sp. (1.42), Moringa oleifera (1.5), and Bacopa monieri (1.66). The least useful species was found to be used for treating asthma, however several species were utilized for treating conditions including jaundice, amoebic dysentery, stomachache, and diabetes.

Table 3: Fidelity level and Use value of different species

Plant species	Diseases	FL	UV

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Cardiospermum halicacabum	Rashes	47.0	2.0
Jatropha pelargoniifolia	Gout	62.5	1.83
Acacia catechu	Dysentery and diarrhoea	70.85	1.91
Artocarpus lacucha	Amoebic dysentry	50.0	1.8
Bacopa monieri	Asthma	53.34	1.66
Caesalpinia bonduc	Stomachache	40.0	2.4
Centella asiatica	Amoebic dysentry	42.85	3.85
Curcuma longa	Antiseptic and carminative	36.33	2.6
Cajanus cajan	Jaundice	72.86	4.0
Catharanthus roseus	Diabetes	51.65	3.2
Aegle marmelos	Diabetes	62.46	3.14
Azadirachta indica	Antiseptic	37.56	1.83
Coccinia grandis	Rheumatism	22.45	1.66
Cocos nucifera	Kidney stone	33.33	2.1
Cuscuta reflexa	Arthritis	64.23	1.5
Euphorbia sp.	Snake bite	66.67	1.42
Ficus racemosa	Asthma	42.83	1.18
Hygrophila auriculata	Anemia	83.31	1.8
Justicia gendarussa	Dysentry	24.67	1.2
Moringa oleifera	Kala azar	43.30	1.5

Table 4 displays the derived informant consensus factors for each classification. Rheumatism (ICF = 1.0), renal illness (ICF = 0.93), and antiseptic and gastrointestinal disorders (ICF = 0.15 and 0.77, respectively) were at the bottom of the list.

Table 4: Informant consensus factor by diseases category

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Disease category	**ICF**
Pain (gout, arthritis)	0.82
Female disease (menstrual complaints, labour pain)	0.84
Stomachache (indigestion, belly pain)	0.77
Kidney disease (kidney stone, urine disease)	0.93
Skin disease (eczema, rashes, scalp lesions)	0.85
Fever, cough & cold	0.88
Dysentry (amoebic dysentery, diarrhea)	0.85
Diabetes	0.81
Asthma	0.85
Rheumatism	1.0
Antiseptic and carminative	0.15

V. CONCLUSION

Ethnobotanical knowledge, when integrated with modern healthcare systems, offers a promising path to address healthcare disparities and promote holistic well-being. Embracing and integrating this valuable knowledge into our scientific research, healthcare systems, and conservation strategies holds the potential to create a more interconnected, equitable, and resilient world for generations to come. As we navigate the complexities of the modern era, the timeless wisdom of ethnobotanical knowledge serves as a guiding light, reminding us of the profound interconnectedness between humanity, nature, and the healing powers of the plant kingdom.

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