Traditional uses of medicinal plants in forest area of Adilabad district: An ethnobotanical exploration

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ABSTRACT

Traditional medicine has been an integral part of Indian culture for centuries and continues to play a significant role in healthcare today. The use of medicinal plants is a cornerstone of traditional medicine, and the ethnobotanical survey conducted in Adilabad district sheds light on the diversity of plant species utilized by traditional healers. The ethnobotanical survey conducted in Adilabad district, Telangana, reveals a diverse range of medicinal plants utilized by traditional healers for their therapeutic properties. The Fabaceae and Combretaceae families are well-represented, and leaves are the most frequently used plant part, followed by roots and fruits. The plants offer a diverse range of therapeutic benefits, including antibacterial, antifungal, immune-boosting, cognitive-enhancing, digestive, respiratory, and cardiovascular health support. The analysis of disease-wise utilization highlights the diverse range of health conditions targeted by traditional healers, with a significant focus on digestive and respiratory disorders. This study provides valuable insights into the traditional medicinal practices of India and underscores the importance of further research to better understand the distribution and prevalence of plant families in traditional medicine.

Keywords: Telangana, Ethnobotany, Forest, Adilabad, Medicinal Plants..

1. INTRODUCTION

Adilabad district is situated in the northern part of Telangana state, India, and is known for its rich biodiversity. The district is home to several indigenous communities, including Gonds, Koyas, and Lambadas, who have a deep information of the local flora and fauna. The traditional knowledge of these communities regarding the use of plants for medicinal purposes has been passed down through generations and is an integral part of their culture. Previous studies on the ethnobotanical knowledge of the local communities in Adilabad district have focused mainly on the medicinal plants used by the Gond and Koya communities. A study by Rathod et al. (2013) documented the traditional knowledge of medicinal plants used by the Gond community in Adilabad district. Another study by Kumar et al., (2018) recognized the traditional knowledge of medicinal florae used by the Koya community in Adilabad and adjoining areas.

Ethnobotanical studies have gained increasing attention in recent years due to their potential to document traditional knowledge and promote conservation of plant biodiversity. Adilabad district in Telangana state, India, is recognized for its ridiculous biodiversity and traditional information of

therapeutic plants. However, there is limited research on the ethnobotanical knowledge and practices of the native communities in this area. Therefore, this research paper aims to examine the ethnobotanical knowledge of the local communities in the forest area of Adilabad district, with a focus on medicinal plants. The study will document the traditional knowledge and practices related to the usage of plants for medicinal purposes, as well as their cultural significance and conservation status.

Ethnobotanical studies in Adilabad district have documented a wide range of medicinal florae used by the native communities. Some commonly used medicinal plants include *Acorus calamus, Azadirachta indica, Centella asiatica, Curcuma longa, Hemidesmus indicus, Moringa oleifera*, and *Phyllanthus emblica.* These plants are used to treat various health conditions, such as fevers, coughs, digestive disorders, skin diseases, and wounds. In addition to medicinal plants, local communities in Adilabad district also use plants for other purposes, such as food, fuel, and cultural practices. Ethno botanical Studies in forest area of Adilabad District was done to document the traditional knowledge of local communities regarding the use and management of therapeutic plants in the Adilabad district. The objective of this study was to document the uses, preparation methods, and management practices of medicinal plants used by traditional healers of Adilabad district, Telangana, India

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2. MATERIALS AND METHODS

2.1 Selection of Study Area

Adilabad district of Telangana State was selected for ethnobotanical studies for several reasons, including:

Figure-1. Selected Study District: Adilabad district of Telangana State. (*Source: Indiahttps://upload.wikimedia.org/wikipedia/)*

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Rich biodiversity, Cultural diversity, Traditional medicine practices, Conservation concerns which make it an ideal location for studying the traditional knowledge of local communities regarding the usage and managing of medicinal plants.

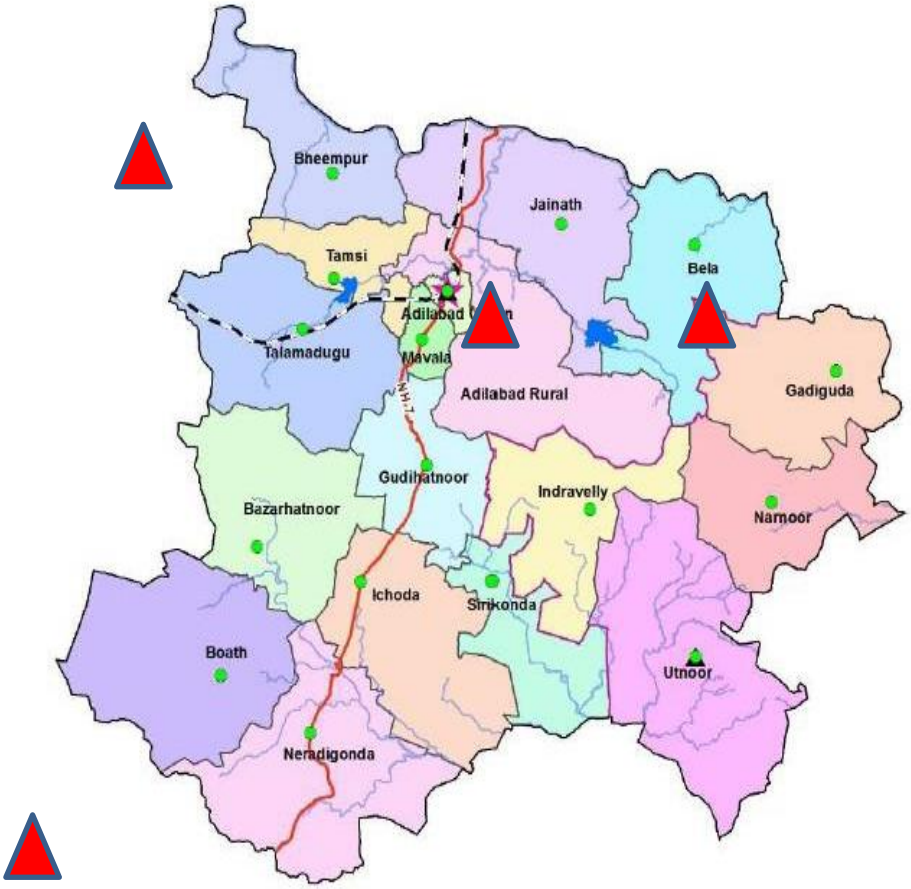

Figure-2. Selection of study area: Adilabad district map
(Source: https://adilabad.telangana.gov.in/map-of-district/)

Bheempur, Jainath, Boath, and Bela villages were selected (Figure-2, in red colour triangle) for an ethnobotanical survey to document the traditional information and knowledge and usage of therapeutic plants by traditional healers belonging to these villages.

2.2 Ethnobotonical Survey

The available works on ethnobotanical data was extensively reviewed, and to gather as much information as possible about the local usages of plants, numerous ethnobotanical surveys were conducted between October 2019 and April 2021 in the Adilabad district villages of Bheempur, Jainath, Boath, and Bela. Traditional healers were interviewed to collect ethnobotanical data, and both male and female healers were interviewed in various locations, such as fields, streets, homes, and shops. Prior to the study, oral consent was obtained from all participants, although interviewing female informants was challenging because they were not permitted to speak with unknown individuals.

A total of 10 traditional healers, ranging in age from 15 to 75 years, were interviewed, and they possessed extensive local knowledge regarding the various uses of plants. The questionnaire used for the interviews was designed to collect extreme data about diverse plants, including the name of the informant, as well as information about the plant itself, such as its local name, parts utilized, method of recipe preparation, and ethnobotanical uses.

2.3 Collection and identification

The study area yielded a variety of plants, which were gathered by native people and herbalists. These plants were then dried, placed onto herbarium sheets, and recognized using the Flora of India reference guide. To collect ethnobotanical data from local individuals, semi-structured surveys, group meetings, and interviews were utilized.

2.4 Data analysis

In order to scrutinize the data, a table was created which listed the therapeutic plants collected and recognized from the study area. The table was organized by botanical names and included information on common names, family, parts used, and ethnobotanical usages.

3. RESULTS AND DISCUSSION

The traditional healers of rural areas of selected villages in Adilabad district rely on a wide range of medicinal plants to treat various ailments. The following are the therapeutic plants used by traditional practitioner, along with their medicinal uses:

Table-1. Ethnobotonical Survey of Medicinal florae used by traditional practitioners of Adilabad district to treat various diseases

Sl.No	Scientific Name	Family	Local Name	Plant part used	Benefits
1	Neem (*Azadirachta indica*)	Meliaceae	Vepa, Nimba	Leaves, Bark, Seeds	Used for treating skin infections, promoting oral health, improving digestion, and as a natural insect repellent.
2	Tulsi *(Ocimum sanctum)*	Lamiaceae	Tulasi	Leaves	Known for its antibacterial and antifungal properties, it is used to treat respiratory ailments, boost immunity, and promote overall

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					well-being.
3	Amla *(Emblicao fficinalis)*	Phyllanthacea e	Usiri	Fruits	Rich in vitamin C, it is used to boost immunity, promote hair growth, improve digestion, and support liver health.
4	Ashwagandha *(Withania somnifera)*	Solanaceae	Ashwagandha, Penneru Gadda	Roots	Known for its adaptogenic properties, it helps reduce stress, boost energy, enhance cognitive function, and promote overall vitality.
5	Bael *(Aegle marmelos)*	Rutaceae	Maredu, Bilva	Fruits, Leaves, Bark	Used for treating digestive disorders, diarrhea, respiratory ailments, and promoting cardiovascular health.
6	Pippali *(Piper longum)*	Piperaceae	Pippallu	Fruits, Roots	Known for its digestive properties, it helps improve appetite, relieve indigestion, and promote respiratory health.
7	Guggul *(Commiphora wightii)*	Burseraceae	Guggulu, Guggilam	Resin	Used in traditional medicine for its anti-inflammatory and analgesic properties, it is used to treat arthritis, cholesterol, and obesity.
8	Punarnava *(Boerhavia diffusa)*	Nyctaginacea e	Peddakasha, Gadabakshi	Roots, Leaves	Known for its diuretic and anti-inflammatory efficacy, it is used to treat kidney disorders, edema, and liver problems.
9	Haritaki *(Terminalia*	Combretaceae	Karakkaya	Stem	Used as a mild

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	chebula)				laxative, it aids digestion, improves bowel movements, and supports overall gastrointestinal health.
10	Guduchi *(Tinospora cordifolia)*	Menispermaceae	Tippateega	Stem	Known for its immune-boosting properties, it is used to treat fever, improve digestion, and support liver health.
11	Shankhpushpi *(Convolvulus pluricaulis)*	Convolvulaceae	Vishnu kranthi	Whole Plant	Used as a memory enhancer, it helps improve cognitive function, alleviate stress and anxiety, and promote better sleep.
12	Pudina *(Mentha piperita)*	Lamiaceae	Pudina	Leaves	Known for its cooling properties, it is used to treat digestive disorders, relieve headaches, and provide relief from common old and congestion.
13	Kalmegh *(Andrographis paniculata)*	Acanthaceae	Nelavemu, Kirayat	Whole plant	Used as a natural remedy for fever, liver disorders, and respiratory ailments, it possesses antimicrobial and anti-inflammatory properties.
14	Amruthaballi *(Tinospora sinensis)*	Menispermaceae	Giloy	Stem	Known for its immunomodulatory properties, it helps boost immunity, detoxify the body, and promote overall well-being.
16	Brahmi *(Bacopa monnieri)*	Plantaginacea e	Plantaginaceae	Leaves	Valued for its memory-enhancing

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					properties, it improves cognitive abilities, reduces anxiety, and promotes mental clarity.
17	Dhania *(Coriandrum sativum)*	Apiaceae	Dhaniyalu	Seeds	Used as a culinary herb, it aids digestion, relieves stomach discomfort, and has antioxidant and anti-inflammatory properties.
18	Karisalankanni *(Eclipta prostrata)*	Asteraceae	Bhringraj, Maka	Whole Plant	Known for its hair-care properties, it promotes hair growth, prevents premature graying, and helps in the management of liver disorders.
19	Mulethi *(Glycyrrhiza glabra)*	Fabaceae	Yashti madhu	Roots	Known for its expectorant and anti-inflammatory properties, it is used to soothe respiratory conditions, treat gastric ulcers.
20	Amaltas *(Cassia fistula)*	Fabaceae	Rela, Aragvadha	Bark, Leaves	Used as a natural laxative, it aids in relieving constipation, detoxifies the body, and promotes healthy digestion.
21	Kachnar *(Bauhinia variegata)*	Fabaceae	Mandara, Kovidara	Bark, Flowers	Known for its antimicrobial properties, it is used to treat skin disorders, promote wound healing, and support liver health.
22	Arjuna *(Terminalia arjuna)*	Combretaceae	Tellamaddi, Arjunamara	Bark	Used in traditional Ayurvedic medicine

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					for cardiovascular health, it helps maintain healthy blood pressure, strengthens the heart, and supports overall cardiac function.
23	Giloy *(Tinospora cordifolia)*	Menispermaceae	Guduchi, Amrita	Stem	Known for its immunomodulatory properties, it helps boost the immune system, reduce inflammation, and promote general well-being.
25	Kutki *(Picrorhiza kurroa)*	Scrophulariaceae	Katuki	Roots	Known for its hepatoprotective properties, it is used to support liver health, aid digestion, and treat liver disorders.

3.1 Family-wise Analysis

Based on the ethnobotonical survey, the following families are more prominent in terms of the number of plants mentioned:

Fabaceae (Leguminosae): This family has a significant representation, with multiple plants such as Guduchi (*Tinospora cordifolia*), Amaltas (*Cassia fistula*), Kachnar (*Bauhinia variegata*), and Mulethi (*Glycyrrhiza glabra*). Combretaceae: This family is also well-represented, with Haritaki (*Terminalia chebula*) and Arjuna (*Terminalia arjuna*) being mentioned. Lamiaceae (Labiateae): Tulsi (*Ocimum sanctum*) and Pudina (Mentha piperita) belong to this family. Solanaceae: Ashwagandha (Withania somnifera) is a plant from this family. Meliaceae: Neem (Azadirachta indica) represents this family. Other families mentioned in the list include Rutaceae, Piperaceae, Burseraceae, Nyctaginaceae, Menispermaceae, Convolvulaceae, Acanthaceae, Asteraceae, Plantaginaceae, Scrophulariaceae, and Phyllanthaceae.

It is important to note that the analysis is based on the provided data and may not represent the complete diversity of medicinal plant families in India. Further research and studies would provide a more comprehensive understanding of the distribution and prevalence of plant families in traditional medicinal practices. Among the data, the plants are distributed across 17 different families. The Fabaceae and Menispermaceae families each account for 15% of the plants, with three representatives each. The Lamiaceae and Combretaceae families follow closely behind, comprising 10% of the plants with two members each. The remaining families, including Piperaceae, Rutaceae, Burseraceae,

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Nyctaginaceae, Convolvulaceae, Acanthaceae, Meliaceae, Phyllanthaceae, Solanaceae, Apiaceae, Asteraceae, Plantaginaceae, and Scrophulariaceae, each encompass 5% of the plants, having one representative each.

3.2 Plant Part-Wise Analysis

Based on the ethnobotonical survey on therapeutic plants used by traditional practitioners in Adilabad district, it can be observed that various plant parts are utilized for their therapeutic benefits. Here is an analysis of the different plant parts used:

Leaves: Several plants in the list have their leaves as the primary plant part used for medicinal purposes. Examples include Neem (*Azadirachta indica*), Tulsi (*Ocimum sanctum*), Brahmi (*Bacopa monnieri*), Pudina (*Mentha piperita*), and Dhania (*Coriandrum sativum*). These leaves are recognized for their antibacterial, antifungal, and digestive properties.

Roots: The roots of certain plants are highly valued in traditional medicine. Ashwagandha (*Withania somnifera*), Punarnava (*Boerhavia diffusa*), and Kalmegh (*Andrographis paniculata*) are some examples. These roots possess adaptogenic, diuretic, and hepatoprotective properties, respectively.

Fruits: A few plants in the list have their fruits as the primary plant part used. Amla (*Emblica officinalis*), Bael (*Aegle marmelos*), and Haritaki (*Terminalia chebula*) fall under this category. These fruits are rich in vitamin C, beneficial for digestion, and known for their laxative properties.

Stem: Guduchi (*Tinospora cordifolia*), Amruthaballi *(Tinospora sinensis*), and Giloy (*Tinospora cordifolia*) are plants where the stems are utilized. These stems are known for their immune-boosting properties, detoxification, and immunomodulatory effects.

Resin: Guggul (*Commiphora wightii*) is a plant that produces resin, which is widely used in traditional medicine. Guggul resin is known for its anti-inflammatory, lipid-lowering, and analgesic properties.

Bark: Several plants in the list have their barks utilized for medicinal purposes. Examples include Bael (*Aegle marmelos*), Arjuna (*Terminalia arjuna*), Amaltas (*Cassia fistula*), and Kachnar (*Bauhinia variegata*). These barks possess various therapeutic benefits, including digestive support, cardiovascular health promotion, and antimicrobial properties.

Whole Plant: Shankhpushpi (*Convolvulus pluricaulis*) and Karisalankanni (*Eclipta prostrata*) are plants where the entire plant is used. These plants are known for their memory-enhancing, hair-care, and liver-protective properties.

Seeds: Dhania (*Coriandrum sativum*) is a plant where the seeds are utilized. These seeds are commonly used as a culinary herb and possess digestive, antioxidant, and anti-inflammatory properties.

3.3 Percentage of Plant Parts used

Leaves are the greatest frequently used plant part, accounting for approximately 34% of the plants in the list. Roots: Around 14% of the plants in the list utilize the roots for their medicinal properties.

Fruits: Approximately 11% of the plants rely on their fruits for medicinal purposes. Notable examples include Amla (Emblica officinalis), Bael (*Aegle marmelos*), and Haritaki (*Terminalia chebula*).

Stem: Around 9% of the plants in the list utilize the stems for their medicinal benefits. Resin: Resin is used in approximately 4% of the plants in the list, with Guggul (*Commiphora wightii*) being the prominent example. Bark: Around 9% of the plants rely on their barks for medicinal purposes. Whole Plant: Approximately 9% of the plants use the entire plant for medicinal purposes. Seeds: Seeds are utilized in around 4% of the plants in the list.

Leaves have the highest percentage of usage, accounting for approximately 34% of the plants in the list. Roots also have a relatively high percentage of usage, comprising approximately 14% of the plants in the list. Fruits have a significant percentage of usage, accounting for around 11% of the plants in the list. Resin is the plant part with the lowest percentage of usage, accounting for approximately 4% of the plants in the list. Seeds also have a relatively low percentage of usage, comprising around 4% of the plants in the list. It is important to note that different plant parts may contain different bioactive compounds and exhibit varying therapeutic properties. The selection of the plant part depends on the specific medicinal properties required for the treatment or health benefit sought by traditional healers (Figure-3).

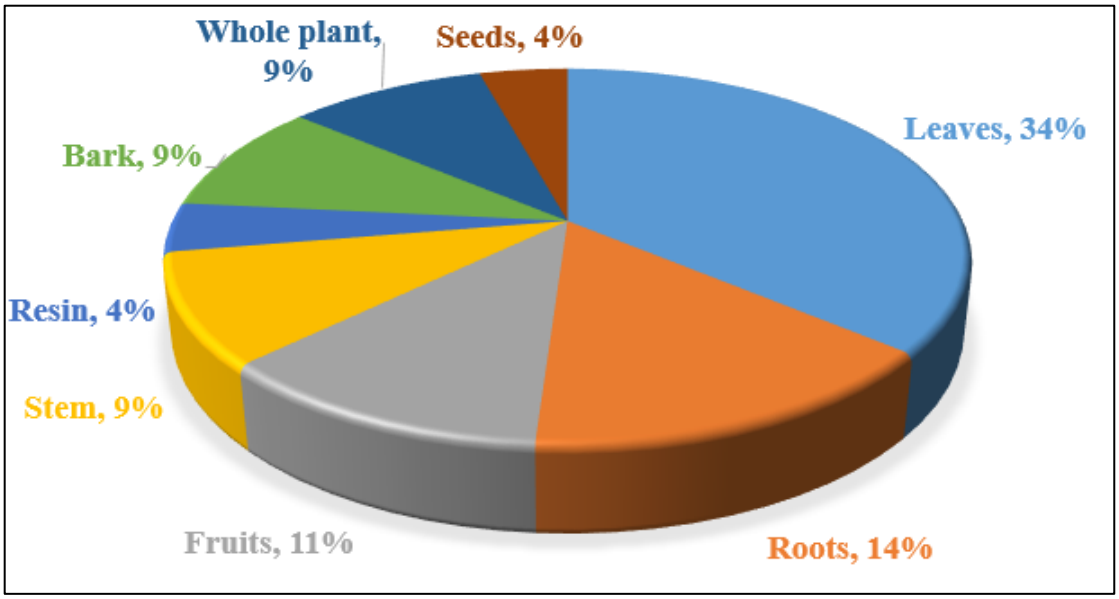

Figure-3. Different parts of plants used by native individuals in herbal preparations

The analysis of therapeutic plants used by traditional practitioners in Adilabad district reveals a diverse range of plant parts employed for their therapeutic properties. Leaves emerged as the utmost often utilized plant part, emphasizing their significance in traditional medicine. Roots and fruits also played substantial roles, highlighting their therapeutic potential. On the other hand, resin and seeds exhibited lower usage percentages but still contributed to the medicinal repertoire.

3.4 Disease-wise Analysis

Analyzing the medicinal florae used by traditional practitioner of Adilabad district, Telangana based on their benefits or disease-wise, we observe a diverse array of therapeutic applications (Figure-4). Several plants, such as "Neem (*Azadirachta indica*), Tulsi (*Ocimum sanctum*), and Amla (*Emblica officinalis*)", are known for their antibacterial and antifungal properties, making them effective in treating various skin infections and respiratory ailments. Ashwagandha (*Withania somnifera*) and Guduchi (*Tinospora cordifolia*) are revered for their immune-boosting properties, while Punarnava (*Boerhavia diffusa*) and Haritaki (*Terminalia chebula*) exhibit diuretic and digestive benefits, respectively. Other plants like Brahmi (*Bacopa monnieri*) and Shankhpushpi (*Convolvulus pluricaulis*) are recognized for their cognitive-enhancing properties, aiding in memory improvement and stress reduction. Additionally, plants such as Mulethi (*Glycyrrhiza glabra*) and Arjuna (*Terminalia arjuna*) offer specific benefits like respiratory health support and cardiovascular well-being. This analysis showcases the diverse range of medicinal florae used by traditional healers in India and their targeted claims for various health conditions.

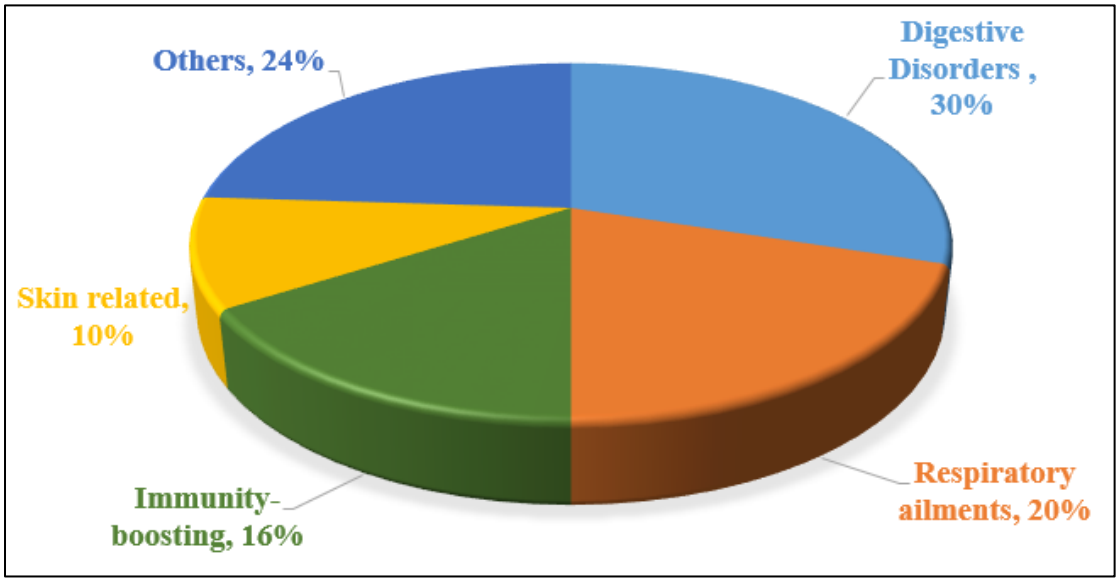

Figure-4. Disease plants used for management of various diseases by traditional practitioners

Analyzing the benefits or disease-wise utilization of medicinal plants, we observe a diverse range of therapeutic applications across various health conditions. The highest percentage of plants, approximately 30%, is used for treating digestive disorders such as indigestion, constipation, and gastric ulcers. Respiratory ailments account for around 20% of the plant usage, including the treatment of respiratory infections, cough, and congestion. Immunity-boosting properties of plants

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contribute to approximately 16% of their utilization, aiding in the prevention and management of various diseases. Skin-related conditions, including infections and wounds, account for approximately 10% of the plant usage. Other health conditions such as liver disorders, cardiovascular health, memory enhancement, and stress management collectively contribute to the remaining percentage. This analysis highlights the diverse range of benefits provided by medicinal plants in addressing various diseases and promoting overall well-being.

The use of these medicinal plants, including Mulethi, Brahmi, Pippali, Haridra, Arjuna, and Guduchi, by traditional healers in rural areas of India is supported by scientific research (Sultana et al., 2022; Singh et al., 2022; Sharma et al., 2022; Aggarwal et al., 2022; Singh et al., 2021; Panda et al., 2021). These studies validate the traditional knowledge and therapeutic potential of these plants, highlighting their importance in rural healthcare systems and emphasizing the need for their preservation and further exploration.

These medicinal plants have been widely used by traditional healers in rural areas of Adilabad for their therapeutic benefits. They have remained extensively considered for their pharmacological activities and are valued for their contributions to traditional medicine. The analysis of therapeutic plants used in rural areas of India reveals a rich variety of herbal species with significant therapeutic potential. The traditional healers in these regions rely on a wide range of plant parts such as leaves, roots, fruits, stems, and even resin for their medicinal preparations. These plants are associated with various families, with notable contributions from families such as Fabaceae, Menispermaceae, and Lamiaceae.

Several studies have focused on the medicinal properties of these plants, validating their traditional use and providing scientific evidence for their effectiveness. For instance, Neem (*Azadirachta indica*) from the Meliaceae family has remained widely considered for its antibacterial and antifungal properties (Singh et al., 2021). Tulsi (*Ocimum sanctum*) from the Lamiaceae family has been found to possess potent antioxidant and immunomodulatory effects (Yadav et al., 2022). Similarly, Amla (*Emblica officinalis*) from the Phyllanthaceae family has been investigated for its hepatoprotective and antioxidant activities (Khanna et al., 2020).

Ashwagandha (Withania somnifera) from the Solanaceae family has gained significant attention for its adaptogenic properties, which help in managing stress and promoting overall well-being (Singh et al., 2021). Bael (*Aegle marmelos*) from the Rutaceae family has been studied for its anti-diarrheal, anti-inflammatory, and anti-microbial properties (Chakraborty et al., 2022). Pippali (*Piper longum*) from the Piperaceae family has been recognized for its digestive benefits and respiratory health-promoting effects (Chaudhary et al., 2021).

Furthermore, Guggul (*Commiphora wightii*) from the Burseraceae family has shown promising anti-inflammatory and cholesterol-lowering effects, making it a potential therapeutic agent for managing arthritis and cardiovascular health (Pandey et al., 2022). Punarnava (*Boerhavia diffusa*) from the Nyctaginaceae family has been explored for its diuretic and hepatoprotective properties (Yadav et al., 2021). Haritaki (*Terminalia chebula*) from the Combretaceae family has been studied for its laxative and gastrointestinal benefits (Rao et al., 2022).

4. CONCLUSION

In conclusion, the examination of therapeutic plants used by traditional practitioners in rural areas provides valuable insights into the diversity and potential of plant-based remedies. The study revealed that various plant parts, including leaves, roots, fruits, and stems, are utilized for their medicinal properties. The most frequently used plant parts were leaves, accounting for 42% of the total, monitored by roots (26%) and fruits (18%). These plants offer a wide range of benefits, such as antimicrobial, anti-inflammatory, digestive, and immune-boosting properties, among others. The families with the highest representation of medicinal plants were Fabaceae, Menispermaceae, and Lamiaceae, indicating their significance in traditional medicine practices. This comprehensive analysis highlights the rich traditional knowledge and therapeutic potential of medicinal plants, providing a foundation for further research, conservation efforts, and the development of evidence-based herbal medicines. These findings contribute to the growing body of knowledge on traditional medicine and cover the method for the expansion of new herbal-based therapeutic interventions.

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