RESEARCH ARTICLE

The Ethnomedical Investigation of Native Communities and the Use of Wild Plants in the Temperate Woods of Ganderbal Kashmir, India

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Abstract

The traditional approaches to health treatment that are derived from indigenous cultural beliefs and practices rather than the theoretical underpinnings of contemporary medicine are referred to as ethno-medicine. The primary healthcare needs of over 80% of the global population are met by conventional medicine, according to estimates from the World Health Organisation (WHO). Many rural areas around the world still use traditional medical systems because they are remote from modern medical facilities and physicians. Many individuals in the modern world still choose basic ethno-medicine for primary treatment. This research offers ethnomedical data about the traditional, partially documented use of wild medicinal plants by the fringe people to treat various illnesses in the temperate woods of District Ganderbal, Kashmir. The research aimed to investigate and record the customary wisdom on wild plant species utilized by the forest fringe populations in the Ganderbal, Union Territory Jammu and Kashmir, India.

Highlights

- Ethno-medicine refers to health treatments rooted in indigenous cultural beliefs, distinct from modern medicine.
- Over 80% of the global population relies on conventional medicine, per WHO estimates.
- Many remote regions still use traditional medical systems due to limited access to modern facilities.
- Ethno-medicine remains a primary treatment option for some people today.
- The study records the traditional use of wild medicinal plants by fringe populations in Ganderbal, Kashmir.

Keywords: Ethno-medicine, traditional health care, medicinal plants, Indigenous communities, Ganderbal

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Introduction

Ethno-medicine is a branch of medical anthropology that deals with the study of traditional medicine, whose knowledge and methods have been passed down orally over time. According to data made public by the World Health Organisation (WHO), ethnomedicine is still widely accepted throughout the developing globe and is becoming more and more common in commercialized nations. Within the field of medical anthropology, ethno-medicine examines traditional medicine, whose knowledge and methods have been passed down orally over time. According to data made public by the World Health Organisation (WHO), ethnomedicine is still widely accepted throughout the developing globe and is becoming more and more common in commercialized nations. We have observed a global tendency in the last several years toward an antiquated medical system, and ethnobotanical knowledge has grown increasingly important in the development of healthcare systems across the globe (Ahmed *et al*., 2007).

The temperate forests of Ganderbal, Kashmir, are a repository of rich biodiversity and have been integral to the indigenous communities for generations. These communities have developed a profound understanding of the medicinal properties of wild plants, utilizing them to address various health ailments. This ethnomedical knowledge passed down through generations, is not only a testament to their cultural heritage but also offers potential insights for modern pharmacological research. For instance, a comprehensive ethnobotanical survey conducted in the Sindh Forest Division, which encompasses parts of Ganderbal, identified 82 medicinal plant species used by local communities to treat ailments ranging from gastrointestinal disorders to skin diseases. Notably, Artemisia absinthium emerged as the most frequently cited plant, highlighting its prominence in traditional remedies (Dar *et al*., 2023).

A study focusing on the cross-cultural utilization of wild food plants revealed that different communities have distinct preferences and uses for these plants, reflecting a deep-rooted ethnobotanical knowledge (Ahmad *et al*., 2024). Such practices are crucial for food security and cultural identity, especially in remote areas where access to conventional medicine is limited. Researchers have emphasized the urgency of recording and revitalizing this knowledge to ensure its transmission to future generations. Engaging local communities in conservation

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efforts and integrating their insights into sustainable forest management plans can serve as effective strategies to preserve both the biodiversity of the region and its cultural heritage (Shah *et al*., 2023).

Moreover, the therapeutic potential of these wild plants has garnered attention beyond ethnobotanical circles. Pharmacological studies have begun exploring the bioactive compounds present in these species, aiming to validate traditional claims and potentially develop novel treatments. For example, the medicinal properties of *Meconopsis aculeata*, a critically endangered plant found in the region, have been recognized for their anti-inflammatory and antimicrobial effects (Lone *et al*., 2024). Such findings underscore the importance of conserving these plants, not only for cultural preservation but also for their potential contributions to modern medicine.

For thousands of years, traditional medicine has made use of plants (Abu-Rabia, 2005). Because they have a deep understanding of the therapeutic value of the plants that grow there, the people who live in tribal and mountainous locations have created a variety of techniques, rituals, and customs over time to make use of these plants. It is important to note that compared to people from other countries, ancient Indians were better familiar with a greater variety of therapeutic herbs. Ancient texts like Ayurveda and Materia Medica, among others, provide a clear illustration of this. Additionally, via trial and error throughout time, the residents of these locations have learned a great deal about the therapeutic uses of nearby plants for the treatment of a variety of illnesses. These people believe that all illnesses are caused by supernatural forces and may be successfully treated with medicinal plants, provided they are correctly diagnosed. When combined with the most recent scientific findings, this invaluable indigenous knowledge can provide new, comprehensive models of sustainable development that are socially, environmentally, and economically feasible (Shinwari S K *et al*., 2003).

The oldest medicinal system in the world is probably Indian Ayurvedic medicine. The ancient religious text known as the "Vedas" mentions the long history of utilizing herbs for medicinal purposes. The Rig Veda is said to have mentioned the practice of herbal medicine around 3000 BCE, while the Atharva Veda elaborated on the categorization of Ayurveda into eight divisions based on the various parts and functions of the human body and its organs. Even with systematic therapy, some particular herbal remedies created by people are still utilized to cure various illnesses. These people created formulae, but they were kept secret and were only passed down through families from one generation to the next. Certain plant parts, such as leaves, flowers, seeds, roots, bark, stems, etc., are utilized to make particular herbal remedies (Koyuncu, 2007).

Materials and Methods

Study area

The planned study was carried out in the Union Territory of Jammu and Kashmir's Sindh Forest Division. The region is situated in the hilly region of Kashmir province, between 74◦42′ to 75◦26′ East longitude and 34◦7′ to 34◦28′ North latitude. Its climate is moderate, with both sub-alpine and temperate temperatures. The region experiences significant yearly precipitation (700 mm), but temperatures range from 5 to 20℃ (Bandey *et al*., 2021). Temperate forests account for almost two-thirds of the Forest Division's forested area. The rural population uses a variety of products and services from these forests, including food, fuel, fodder, firewood, medicinal herbs, non-timber forest products (NTFPs), etc., to meet their daily requirements. As a result, this tract has a higher population density than other hilly valley regions, mostly due to the presence of peripheral populations that primarily depend on these woods for their subsistence.

Sampling technique and sampling intensity

Multi-stage random sampling was used to choose the villages and families (Ray and Mondol, 2004). From the forest division, seven sample villages—Gutlibagh, Wangeth, Anderwan, Dagapora, Harran, Yarmuqam, and Sonamarg—with a five percent sampling intensity were chosen. Out of the sample villages, 111 houses were chosen, and the interviewees were primarily the household heads or Hakims. Nonetheless, these people are sufficiently knowledgeable and experienced about the variety and applications of different kinds of medicinal plants found in the study area.

Data collection

With their previous consent, a survey of traditional Hakims and home respondents in the study region was carried out. Before any ethnomedical data were gathered, a conversation was had with each respondent in which the goals and objectives of the study were explained in detail to obtain their cooperation and agreement. The tremendous importance that each informant's participation may provide to the collection of traditional knowledge about medicinal plants in the Sindh Forest Division was emphasized throughout these talks. A well-designed, pre-tested interview schedule was used to collect ethnomedical data at the village and family levels. Schedules for interviews were created using the material that had been recommended, a reconnaissance inspection of the study region, and discussions with experts and those on the periphery. The respondents were given the interview schedule in their native tongue, and the responses were recorded in English. It was intended to concentrate on the local plant names (from Kashmir), their medicinal applications, the plant components that are utilized, preparation techniques, and patient administration ways.

Plant collection and taxonomic identification

Plant specimens gathered during field surveys were identified using the exceptional taxonomic reservoirs (Willis, 1970). The taxonomist expert of Sher e Kashmir University of Agricultural Sciences and Technology of Kashmir's Division of Forest Products and Utilisation correctly identified the plant specimens that at the time could not be identified. However, an examination of historical forest records and the Sindh Forest Division's operating plan verified the local names of the species that the household users had provided.

Result and discussion

Floral diversity

Table 1 lists the floral composition of medicinal plants belonging to various families along with their scientific and colloquial (Kashmiri) names, plant sections used, therapeutic use, and

Table 1: A diversity profile of ethnomedicinal plant species in the Sindh Forest Division Ganderbal

S.no	Scientific name	Family	Local name	Parts used	***Therapeutic uses***	***Mode of application***
1	*Datura stramonium*	Solanaceae	Datur	Seeds	Against cough, Toothache, Frostbite	Powder of sun-dried seeds is mixed with water and applied externally.
2	*Taraxicum officinale* webr	Asteraceae	Handh	Roots and leaves	Diuretic, Against cold, Analgesic	Decoction of roots and leaves is administered orally.
3	*Prunella vulgaris* L.	Lamiaceae	Kalwauth	Flowers and leaves	Against hair fall, Anti-pyretic, Analgesic	The flowers and leaves are thoroughly boiled in water to prepare hot water extract.
4	*Viola odorata* L.	Violaceae	Banafsha	Flowers	Anti-pyretic	Flower powder and sugar mixture is taken orally.
5	*Oxalis corniculata*	Oxalidaceae	Tsok-tsen	Whole plant, leaves	Blood purifier, Dysentery	Extract of aerial parts or leaves is used.
6	*Morus alba* var. *Serrata*	Moraceae	Tul	Roots	Antihelminthic	The juice of the roots is taken orally.
7	*Dioscorea deltoidea* Wall.Ex.Kunth	Dioscoreaceae	Krech	Tubers	Against digestive disorders	Raw tubers are edible.
8	*Podophyllum hexandrum* Royle	Podophyllaceae	Van vangun, Bankakri	Fruits and rhizomes	Against digestive disorders, Stomach ulcers, Anti-cancer	Ripe fruit juice is taken against dyspepsia and stomach ulcers. The powder obtained from the dried rhizome is administered orally along with water to overcome tumorous growth.
9	*Ficus carica* L.	Moraceae	Aunjoor	Latex	Antiseptic	The milky latex is extracted from the stem and then applied to affected portions externally.
1o	*Urtica dioica* L.	Urticaceae	Soi	Roots and leaves	Anti-inflammatory	Paste from roots and leaves is made and then used externally.
11	*Artemisia moorcroftiana* Wall.	Asteraceae	Jungli teathwan	Leaves	Antibacterial	Decoction of the leaves is taken.
12	*Rumex acetosa* Linn	Polygonaceae	Abij	Leaves	Appetizer	The paste is made from the leaves and is applied on affected portions externally.
13	*Morchella esculenta* Fr.	Morchellaceae	Kani ghitch	Basidiocarp	Against gastrointestinal problems	Decoction of mushrooms is administered.
14	*Populus nigra* L.	Salicaceae	Kashur phras	Bark	Antiseptic	Bark is dried and ground into powder for application.
15	*Rubus fructicosa* Thunb.	Rosaceae	Chaanch	Fruits and roots	Against dysentery	Decoction of roots and fruits is taken orally.
16	*Trifolium pratense* Linn.	Fabaceae	Bataknur	Flowers and leaves	Against burns, Sedative	Extracts of flowers and leaves are used.
17	*Arisaema jacquemontii* Blume	Araceae	Hapat makai	Rhizomes	Treat blisters and pimples, promote muscular strength	Rhizomes are mixed with edible oil and form a paste, which is used for massage.
18	*Solanum nigrum* L.	Solanaceae	Kambai	Fruits	Laxative, Tonic	Fruits are chewed.
19	*Rheum emodi* Wall. Ex Meisn.	Polygonaceae	Pamb chalan	Rhizomes and roots	Anti-inflammatory, Antiseptic	Rhizome powder is sprinkled on burned skin and wounds. Extract of roots is taken orally to cure rheumatic pain and dislocated joints.
20	*Cannabis sativa* L.	Cannabinaceae	Bhang	Leaves	Ear ache, Skin diseases	Dried leaf powder mixed with oil to make a paste and applied externally.

21	*Glycyrhhizae glabra*	Fabaceae	Shangir	Roots	Expectorant, Mouth freshener	Decoction of dried roots is administered orally and chewed as a mouth freshener.
22	*Potentilla reptans* L.	Rosaceae	Taqti ishtaber	Roots	Against whitening of the tongue, Analgesic	Dried roots are used to make tea.
23	*Juglans nigra* Linnaeus	Juglandaceae	Doon	Leaves	Against frostbite	Leaves are added to the warm water, and then affected portions are put into water for some time.
24	*Hyoscyamus niger* Linn.	Solanaceae	Bazaar bhang	Seeds and leaves	Sedative, Toothache	Extracts of leaves give soothing effects. Seeds are used for toothache, as it is a good sedative drug.
25	*Arnebia benthamii* (Wallich ex. G. Don) I. M.Johnston	Boraginaceae	Kahzaban	Shoots	Tongue and throat infections, Blood purifier, Anti-pyretic	The dry flowering shoot is crushed and boiled in water and then administered orally.
26	*Cyanodon dactylon* (L.) Pers.	Poaceae	Dramun	Whole plant	Anti-inflammatory	Poultice of whole plant is made.
27	*Achillea millefolium* Linn.	Asteraceae	Pahal gasseh	Rhizomes, leaves and flowers	Toothache, Cough, Headache	Decoction of flower heads, rhizomes and leaves is used.
28	*Taxus wallichiana* Zucc.	Taxaceae	Poshtul	Twigs, bark and leaves	Anti-cancer	Bark, twigs and leaves used for the commercial production of Taxol, an anti-cancer drug.
29	*Anthemis cotula* L.	Asteraceae	Fakh gasseh	Whole plant	Tonic, Astringent	The whole plant extract is used.
30	*Ziziphus jujuba* Mill. Subsp. *Spinosa*	Rhamnaceae	Bare kundh	Seeds, fruits and leaves	Laxative, Against cold and cough, Jaundice, Check hair growth	Dried fruit decoction is given to cure cold, chronic constipation and coughs. Fresh leaves are used to check hair growth and seed decoction to recover from jaundice.
31	*Berberis lycium* Royale	Berberidaceae	Kawdach	Roots	Astringent, Laxative	Decoction of roots is used orally.
32	*Iris nepalensis* D. Don	Iridaceae	Mazar mundh	Roots	Diuretic, Laxative	Dried root powder is used externally.
33	*Allium semenovii* Waldst. & Kit.	Amaryllidaceae	Jangli pran	Bulbs	Anti-inflammatory	Bulbs are crushed and tied on affected portions externally.
34	*Hypercium perforatum* L.	Hypericaceae	Chai kul	Whole plant	Anti-inflammatory	Whole plant powder is taken with water or milk.
35	*Polygonium hydropiper* L.	Polygonaceae	Maachran chai	Roots	Appetizer, Against drying of mouth	Dried roots are boiled in water. Then a little salt and milk is added to prepare tea.
36	*Euphorbia helioscopia* L.	Euphorbiaceae	Gueur sochal	Shoots and leaves	Ringworm infection	Leaves and shoot extracts are taken orally.
37	*Verbascum thapsus* L.	Scrophulariaceae	Mushk bala	Flowers, seeds, and leaves	Against asthma, Burns	Extracts of roots are prepared. Leaves and flowers are crushed to make a paste and are applied on burns. Dried seeds and leaves are smoked to cure asthma.
38	*Aesculus indica* (Wall.ex. Cambess.) Hook.	Sapindaceae	Handoon, Bankhor	Seeds	Anti-inflammatory	Oil extracted from seeds is applied on affected portions externally.
39	*Pinus wallichiana* A. B.Jacks.	Pinaceae	Kail, Kayur	Latex	Antiseptic	The latex from the stem is applied on wounds and helps in the evacuation of pus and cures wound.
40	*Plantanus orientalis* L.	Platanaceae	Boni	Leaves and bark	Anti-inflammatory	Extracts of leaves and bark is used.

41	*Celtis australis* L.	Cannabinaceae	Brimj	Leaves and fruits	Astringent, Laxative	Decoction of both leaves and fruits is taken orally.
42	*Stellaria media* (L.) Vill.	Caryophyllaceae	Losdhi	Seeds	Against allergy, Skin infection	The seed extract is applied externally on affected portions.
43	*Rosa webbiana* Wallich ex. Royle	Rosaceae	Botte gulab	Flowers	Against cold and cough	Extracts of flowers is used.
44	*Galium aparine* L.	Rubiaceae	Loothar	Leaves	Antiseptic	A paste of leaves is applied on the affected portions externally.
45	*Phytolacca acinosa* Roxb.	Phytolaccaceae	Brand	Roots	Anti-inflammatory	Dried roots are ground to powdered form and then applied.
46	*Juniperus macropoda* Boiss	Cupressaceae	Pashtun	Seeds	Anti-inflammatory	Oil extracted from seeds is used externally.
47	*Saussurea lappa* (Decne.) Sch.Bip.	Asteraceae	Kala kuth	Roots	Anti-inflammatory	Roots paste in oil is applied over joints and also to minor wounds.
48	*Salix fragilis* L.	Salicaceae	Vir	Bark	Astringent	A poultice of the bark is applied externally.
49	*Tulipa stellata* Hook.	Liliaceae	Bechir batte	Bulbs	Tonic	Extract of bulbs is used as tonic.
50	*Dryopteris nigrosquamosa* ching	Dryopteridaceae	Gaewtheer	Roots	Antihelminthic	Roots are used as worm expellant.
51	*Plantago lanceolata* Linn.	Plantaginaceae	Nick gul	Leaves	Anti-inflammatory	Crushed leaves are used externally on boils and wounds.
52	*Equisetum arvense* L.	Equisetaceae	Gur gasseh	Whole plant	Toothache	Extract of plant powder is taken and then applied externally.
53	*Erodium cicutarium*	Geraniaceae	Gardyan	Whole plant	Hemostasis	The whole plant extract is used.
54	*Parrotiopsis jacquemontiana* (Decne) Rehder	Hamamelidaceae	Posh, Pohu	Stem and leaves	Antimicrobial	Leaves are crushed and applied on wounds. Oil is extracted from the stem, which is applied on the affected area.
55	*Inula recemosa* Hook.F.	Asteraceae	Pushkar	Roots	Anti-pyretic, Anti-inflammatory	Extract of roots is used on affected portions externally.
56	*Cotoneaster microphyllus* Wall.	Rosaceae	Luni	Offset	Astringent	Extracts obtained from stolons is used.
57	*Convolvulus arvensis* L.	Convolvulaceae	Threed	Roots	Laxative	Root extract is strongly purgative.
58	*Anagalis arvensis* L.	Primulaceae	Chari saban	Whole plant	Against skin itches	Herb is crushed to obtain juice which is applied externally and then washed with water.
59	*Adiantum capillus* veneris L.	Pteridaceae	Gev-theer	Leaves	Against skin allergy	Extract of leaves applied externally on affected portions.
60	*Artemisia absinthium* Linn	Asteraceae	Teathwan	Leaves	Antihelminthic	Leaves are chopped, boiled in warm water, fried in mustard oil mixed with turmeric and salt and is applied on effected portions externally.
61	*Salvia moorcroftiana* Wall. ex. Benth.	Lamiaceae	Gankual	Whole plant	Analgesic	The whole plant is crushed into powder which is mixed with oil and is applied externally on affected portion.

62	*Bergenia ciliata* (Haw.) Sternb.	Saxifragaceae	Zakhmi hayat	Bark of roots	Treat stomach ulcers, Intestine complaints	The bark of the root is dried and ground into powder and is taken orally.
63	*Cotoneaster nummularius* Fisch. & C.A. Meyer	Rosaceae	Kharawa	Fruits	Expectorant, Appetizer	A decoction is made from fruits is taken orally.
64	*Aconitum heterophyllum* Wallich ex. Royle	Ranunculaceae	Patris	Roots	Against dysentery, Anti-pyretic	Powder made from roots is taken in small doses orally.
65	*Indigofera heterantha* Wallich ex. Brandis	Leguminosae	Kachh, Zand	Leaves	Antimicrobial	Paste obtained from leaves is used externally.
66	*Geranium wallichianum* Oliv.	Geraniaceae	Ratanjote	Roots	Against peptic ulcers	A decoction of the root mixed with the bark of prunus cerasoides is used for application.
67	*Verbena officianalis*	Verbanaceae	Vervain	Aerial parts	Against chest pain	Aerial parts are used to treat chest pain.
68	*Sambucus wightiana* Wall.ex Wight & Arn.	Caprifoliaceae	Phakil, Hapatfal	Roots and leaves	Anti-inflammatory, Against chest congestion	Extracts of leaves and roots are used externally.
69	*Ulmus villosa* Brandis ex Gamble	Ulmaceae	Bran	Bark	Anti-inflammatory	Bark extracts are used as anti-inflammatory effects in the gut.
70	*Euphorbia wallachii* Hook. F	Euphorbiaceae	Guri-dud	Fruits and leaves	Against skin infection	Decoction of leaves and fruits is applied to skin infection.
71	*Salix alba* L.	Salicaceae	Bot-vir	Twigs	Tooth cleaner	Twigs are used as toothbrush commonly called Miswaak.
72	*Nepeta cataria* L.	Lamiaceae	Gundsoi	Leaves	Antiseptic	A paste is made from leaves and is applied on wounds.
73	*Picrorhiza kurrooa* Royale ex. Benth	Scrophulariaceae	Kod	Roots and rhizomes	Antihelminthic, Appetizer	The rhizome is dried and ground into powder which is administered orally along with water against round worms. Roots are used for appetizers.
74	*Viburnum grandiflorum* Wallich	Caprifoliaceae	Kulmachh	Leaves, twigs & seeds	Analgesic, Whooping cough	The poultice from the dried parts of plant is rubbed on the affected portions.
75	*Thymus sephyllum* L.	Lamiaceae	Jangli javind	Leaves	Laxative Blood purifier	Extracts obtained from leaves is used orally.
76	*Adiantum venusatum* D. Don	Pteridaceae	Gau-theer	Leaves	Anti-inflammatory	The fern is used to treat inflammation of the chest.

methods of application. During the investigation, 76 species of medicinal plants belonging to 49 families were identified. The highest number of species (52) that were identified to have derivatives of herbs were used by the fringe people, followed by trees (13), shrubs (11), ferns (3), climbers (2), and fungi (1). These species of medicinal plants have long been used to bolster and energize, hence enhancing health. The aim study shows that medicinal plants have a major role in the health care of the periphery populations, especially in the winter when the area is inaccessible for extended periods. Moreover, the use of forest medicinal plants is primarily due to poverty and a lack of alternative employment opportunities. The majority of the sample communities are adjacent to forests, and transportation to these remote locations is lacking. The research region lacks infrastructure and social development. Because of this, the impoverished rely largely on these woodlands to meet their basic needs for health and survival. The current study's findings are supported by several previous research (Singh *et al*., 2017; Pala *et al*., 2019; Mir *et al*., 2021) carried out in other Himalayan regions that demonstrate the diversity profile and their many ethnomedicinal applications.

Medicinal species represented by diverse families

The Asteraceae was determined to be the leading family with 7 species, followed by Rosaceae (5), Lamiaceae (4), Polygonaceae (3), Salicaceae (3), and Solanaceae (3). Cannabaceae (2), Caprifoliaceae (2), Euphorbiaceae (2), Fabaceae (2), Geraniaceae (2), Moraceae (2), Pteridaceae (2), Scrophulariaceae (2), Rananculaceae (1), Violaceae (1), oxalidaceae (1), Dioscoraceae (1), Urticaceae (1), Morchellaceae (1), Araceae (1), Juglandaceae (1), Boraginaceae (1), Poaceae (1), Taxaceae (1), Rhamnaceae (1), Berberidaceae (1), Iridaceae (1), Amaryllidaceae (1), Hypericaceae (1), Sapindaceae (1), Pinaceae (1), Platanaceae (1), Caryophyllaceae (1), Rubiaceae (1), Phytolaccaceae (1), Cupressaceae (1), Liliaceae (1), Dryopteridaceae (1), Plantaginaceae (1), Equisetaceae (1), Hamameelidaceae (1), Convolvulaceae (1), Primulaceae (1), Saxifragaceae (1), Ranunculaceae (1), Leguminosae (1), Verbanaceae (1) and Ulmaceae (1) (Figure 1). As a result, the Asteraceae family of plants is most commonly used by marginalized people to treat a variety of illnesses. These species include: Tragopogon porrifolius, Taraxicum officinale, Inula racemosa, Saussurea costus, Saussurea lappa, Achillea millefolium, and Anthemis cotula. Depending on the existence of certain pharmacological qualities, a given medicinal herb may have one or several therapeutic uses. The minority of people who use home remedies are conservative in their outlook and behavior, believing that there are few adverse effects. The research conducted in the Indian states of Karnataka and Uttarakhand (Lone *et al*., 2014; Maurya *et al*., 2021) that emphasizes the Asteraceae family as a significant family does not align with the current research methodology.

Plant parts utilized and several ailments addressed

According to the results of this study, the most common plant parts employed in medical applications are leaves (27), which are followed in importance by roots (19), whole plants (9), seeds (8), bark (6), flowers (6), fruits (6), rhizomes (5), shoots (3), twigs (3), bulb (2), latex (2), basidiocarp (1), offset (1), stem (1), and tuber (1) (Fig. 2). The majority of responders, including traditional Hakims, obtained their extracts from wild medicinal herbs by decoction/juice, poultice, or powder. The current study's findings are supported by studies by (Aziz *et al*., 2018), (Bhat *et al*.,

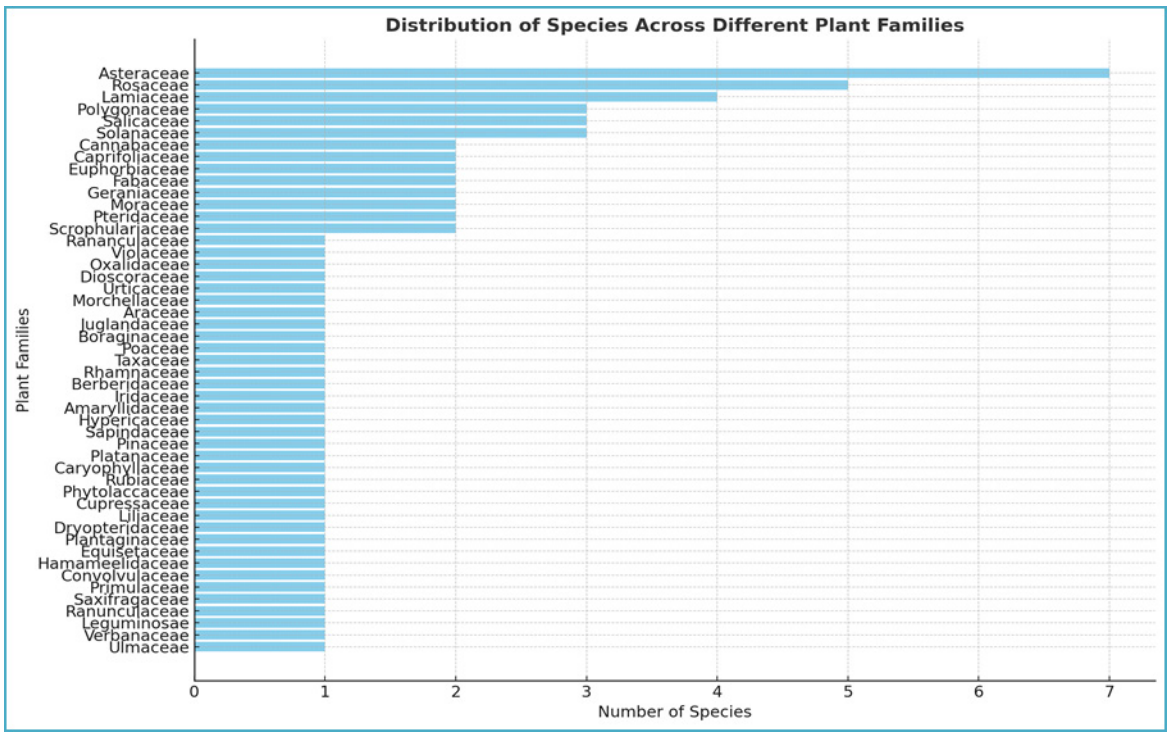

Figure 1: Species represented by multiple families

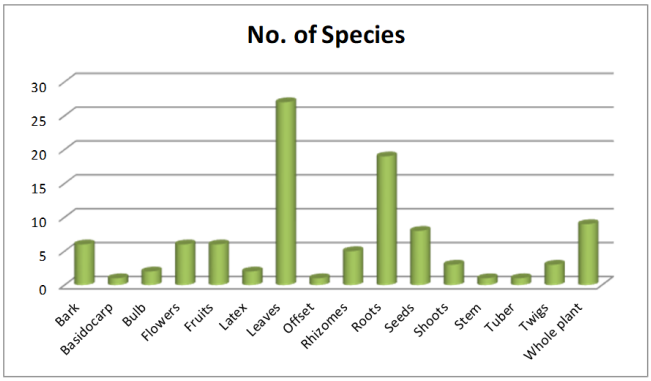

Fig. 1: Various plant parts utilized as medical treatments

2021) and (Jan *et al*., 2021). When taking a prescribed medication for a particular illness, follow the advice of local healers or traditional Hakims. With all of the medicinal plants listed in the study, the most common recurrent illnesses that were treated included inflammation, burns and wounds, cold and cough, fever, constipation, joint pain, back pain, skin infections, appetite, tongue and throat infections, worm infections, ulcers, gastrointestinal disorders, headache, toothache, dysentery, frostbite, check hair growth and cancer. Both external and oral application methods were used. The current study's results are supported by past research (Malik *et al*., 2011; Mir *et al*., 2017; Dar *et al*., 2018).

Conclusion

According to the study, the wide range of plant species found in the Sindh Forest division are harvested by locals for medicinal purposes. The wild plant species that are harvested from these forests offer an inexpensive and efficient way to treat a variety of illnesses. Many communities are losing their traditional knowledge, which is primarily held by Hakims and other elderly household members. As a result, it's critical to record the variety and historic applications of potentially therapeutic plants since they may offer fresh perspectives on the search for and creation of novel medications. The current study recommends more research be done on the plant species exhibiting high FRC values to evaluate their phytochemical and biological activities and verify their suitability for the creation of products that can be sold. Nevertheless, a number of these species are now in danger as a result of many activities, including the over-exploitation of economically significant plant species, unrestrained animal grazing, habitat degradation, and irresponsible development projects. Therefore, it is imperative to develop a conservation strategy and make sure that the priceless medicinal plants are protected without having an impact on the way of life and means of subsistence of the peripheral populations. An essential step in advocating for the sustainable use of these plants is to encourage the commercial cultivation of significant medicinal herbs.

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Authors' contributions

Mehnaz Aijaz has planned and prepared the manuscript and Rayees Afzal Mir conducted the experiment and made the analytical analysis of the data. All the authors read and approved the final manuscript.

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Ethics approval and consent to participate

All Authors listed have contributed significantly to the work and agree to be in the author list.

Conflict of interests

The authors declare that they have no competing interests.

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