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Economic and Ethnobotanical Analysis of Ethnomedicinal Plant Diversity in the Lower Jhelum Valley, Kashmir Himalaya

Zafar S Khan[1], Shabeer Ahmad Dar[2]* and Sumira Tyub[2]

[1]*Govt. Degree College Khan sahib, Budgam, Kashmir, India*

[2]*Centre of Research for Development, University of Kashmir, India*

***Corresponding Author:** Shabeer Ahmad Dar, Centre of Research for Development, University of Kashmir, India.

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Abstract

This research paper delves into the rich tapestry of ethnomedicinal plant diversity prevalent in the Lower Jhelum Valley of the Kashmir Himalaya. Through a comprehensive analysis encompassing economic and ethnobotanical perspectives, the study aims to shed light on the invaluable contributions of indigenous flora to traditional medicine practices and local economies. A total of 130 plant species have been cataloged for their ethnomedicinal applications, encompassing treatments for a diverse array of ailments including asthma, boils, constipation, diarrhea, dysentery, rheumatism, cardiac and respiratory disorders, colds, coughs, fevers, toothaches, cholera, ulcers, skin afflictions, wounds, injuries, worm infestations, chest infections, and hysteria. Furthermore, numerous plant species with various economic utilities have been identified. Specifically, 10 species are utilized for timber production, 5 species for furniture manufacturing, 19 species as fuel sources, 45 species as fodder for livestock, and 18 species as wild vegetables and fruits. Additionally, several plant species serve multiple purposes such as agricultural implements production, honey production, spices, condiments, flavorings, coloring agents, cosmetics, perfumery, toiletries, dyes, tanning agents, and artistic materials. Moreover, these plants also contribute to the human diet by providing cereals, pulses, vegetables, fruits, and oilseeds.

Keywords: Exploration; Enumeration; Asthma; Rheumatism; Infections; Cosmetic

Introduction

Plants have been the vital component of human civilization from the time man learned to survive on this planet. Man has used plants to fulfill all the primary requirements for his sustenance from prehistoric times. Not only this, plants enact as first tropic level (primary producers) in the ecosystem. Human existence (and that of most other organisms) is heavily dependent on what biologists call primary producers, mainly plants. About five thousand plant species have been used as food by humans, but less than twenty now feed the majority of the world's population and just three or four energy crops are staple food for a vast majority. Recent repetition of herbal medicine along with the ever-intensifying threats to biodiversity and the growing bio- piracy controversies have demanded for an urgent certification of the traditional use of medicinal plants. (Dar et al., 2020) Thus, a survey was carried out in the far-flung area of Kashmir Himalaya to record the out dated health care medicines practiced by tribal community. In recent times, serious threats of bio-piracy and intellectual property rights (IPR's), with huge economy at stake, have necessitated the early bio-prospecting of the potential medicinal plants used in the folklore. In this process, the first and foremost step would be the documentation of the ethno-medicinal uses of plants, as attempted in the present study, throughout the country. Simultaneously, this indigenous knowledge could be translated into commercial products on industrial scale, with benefit-sharing to all stake-holders. Such a strategy would ensure that our bio-resources are not pirated. Majority of the population in the lower Jhelum Valley reside in the hilly terrains along the flanks of

the river Jhelum. Areas being hilly in character, inhabitants are mostly deprived from the basic health care and packed foods; hence relying mostly on the plants and plant derived products for their daily basic needs; including their daily health care. Most of the human ailments and veterinary disease are taken care by local Hakeem's and elderly people with the help of herbal products.

Keeping in view the importance of biodiversity conservation and for the formulation of effective conservation strategies it is important to document the existing information of the plants of a floristic region. And this can be achieved in a phase wise exploration of the selected areas, in order to get a true picture of the plant wealth of the Kashmir Himalaya, which was once a treasure grove of the medicinal plants. In this backdrop the present study was under taken to explore the economic potential of the plants inhibiting the lower Jhelum valley.

Materials and methods

Study Area

The lower Jhelum valley is geographically located between 34.8˚ north latitudes and 74.2˚ east longitudes and is bounded in the north by district Kupwara, in the east by Baramulla and Gulmarg Tehsil and in the southwest by Line of Actual Control (LoC). Most of the habituated villages are situated on either side of the Jhelum Valley Road. The Valley is spread over an area of 255.6 sq km (Rural =250.7 sq. km. and Urban = 4.9 sq. km.) (District Sensus Hand Book, J & K, Census of India 1981) comprising of two tehsils (Boniyar and Uri). The valley is situated on the western tail end of the Pir Panjal range (Jhelum Valley Forest Division) on the southern side and the northern hills of varied altitudes of Kathai forest ranges with river Jhelum piercing through from east to west. The two famous majestic mountains 'Kazinag' (height 4399m asl) and 'Hajipeer' guard the area on the northern side and the southwestern side respectively (Lone, 2005). The average height of the area is 1200-1500m asl. The study area is situated at an altitude of 1400m-3500m asl. Most of the area is hilly with undulating topography. The area has 4-well defined seasons with winters comparatively milder and summers comparatively hotter. The average mean minimum and mean maximum temperatures being -2.5° C for January and 33° C for August, respectively.

The typical mountainous vegetation ranges from subtropical to temperate, alpine to alpine-meadows, with unique shrub and herb species interspersed. The primary tree components of the western belts of the Himalaya are *Cedrus deodara*, *Pinus roxburghii*, *Abies pindrow*, *Morus alba*, *Platanus orientalis*, *Picea pungens*, *Populus alba*, *Salix disperma*, *Atropa acuminata*, *Berberis aristata* and *Berberis lyceum*, *Hyoscyamus niger*, *Indigofera heterantha*, *Malva cashemiriana*, *Parrotiopsis jacquemontiana*, *Rosa webbiana*, *Sambucus wightiana* are the most common found plant species.

To conduct the study, 20 villages in Jhelum valley were selected. Thorough surveys were conducted in the area to collect the information regarding plant species. Using a purposive random sampling method, 20 participants from each village were selected, totaling to 200 participants. The informants were selected based on their experience, knowledge and dealing with medicinal plants with special focus on Hakeem's, the traditional doctors. Among the informants, 150 were male and 50 females with the age >40 years. The information regarding use, part used, dosage, mode of preparation, means of administration, market options, economical perspectives was collected through semi-structured interviews and group discussions. In order to have the rational information on the diseases treated, all the ailments were classified into 10 broad ailment categories, with different sub-categories. Identification of the specimen was done using the available literature (Stewart, 1972; John, and Antony, 2010; Pandey, 2006) and herbaria information from COPT University of Kashmir. The current study is an attempt to focus on the presence and therapeutic value of medicinal plant species of lower Jhelum valley of Jammu and Kashmir, India. After the survey was completed, the collected data was grouped in (Table-1) in which all of the plant species are listed. There were a total of 130 plant species counted which were belonging to 52 different families. Among all these, the maximum number of medicinal plants belongs to Asteraceae family which shows contribution of 16 species. Lamiacae is the second largest family in terms of species of medicinal plants with a contribution of 10 species followed by Liliaceae and Ranunculaceae with 8 species each (Fig. 1). 11 families namely Amaranthaceae, Berberidaceae, Boraginaceae, Fumariaceae, Pinaceae, Plantaginaceae, Polygonaceae, Primulaceae, Rubiaceae, Rutaceae and Scrophulariaceae contribute 2 species each. All other families are represented

by a single species.

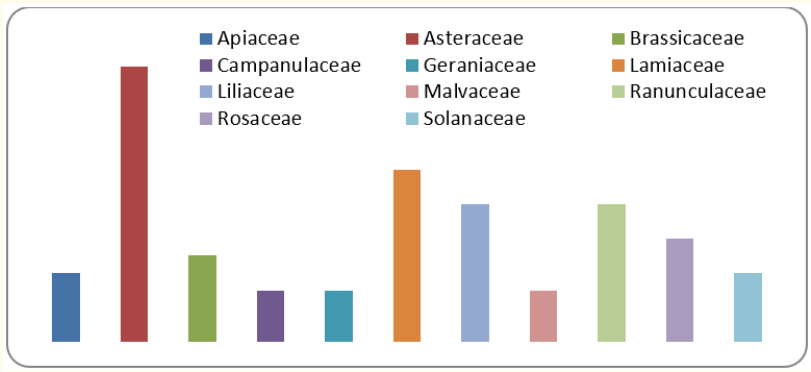

Figure 1: List of dominant families along with number of species.

These medicinal plants contain different types of secondary metabolites from which different types of drugs are prepared and used for various health related disorders. The local and tribal communities used these plant species to treat a variety of health issues such as skin infections, headaches, digestion problems, liver problems, wound healing, piles, sun burns, respiratory disorders, bad our, abdominal pain, anemia, fever, muscle pain, mouth ulcers, ring worms, stomach disorders, constipation, warts, measles, cough, cold, asthma, kidney disorders, jaundice, scurvy, eye sight, cancer, flatulence etc. Decoction, powder, extract fresh juice, and paste are the easiest and most usual methods for making home medicines from these plant species. Cuts, wounds, joint discomfort, warts, skin infections, muscular soreness, solar burns and lesions, hair loss, dandruff, headache, and fever are all examples of exterior usage. Plant components are sometimes chewed to cure mouth infections, gum disease, bad breath, and teeth. Aside from that, root and leaf extracts in the form of paste are commonly used as external wound dressings.

Sampling Methods and Informants

We studied and targeted those inhabitants who performed self-medication, doctors, and aged headmen of eight selected villages, as part of an ethno botanical investigation concentrating on the documenting of TK of the local people inhibiting the hilly and mountainous parts of the Himalaya. We also enlisted the help of local field shepherds with a basic understanding of wild plants. Adult family members were chosen as participants using snowball sampling procedures for selecting informants and determining important persons. Investigations were undertaken into the native indigenous population who knew about the medicinal plants and woodlands in the area.

Results

Floristic Composition of Medicinal Plants

Numerous wild as well as some cultivated medicinal plants were ethno pharmacologically examined from local residents of the Kashmir Himalaya as part of the current inquiry. According to the survey, 130 plant species from 102 genera and 52 families are used for medicinal purposes. These plants were discovered as herbal medicine in eight villages in the district of Kupwara in the Kashmir Himalaya, where they are commonly utilised by the locals for 15 different diseases. Table 2 contains information about the taxa studied, including botanical names, common names, life forms, parts of plants used, administration techniques, ethno botanical disease use category, citations mentioned by informants, use frequency (percentage), relative importance, and nativity of the taxa used for ailment treatments. Herbs account for 71.96 % of the plant species used in herbal therapy, followed by shrubs and trees (12.15% each), lianas

(2.81%), and parasites (2.81%). There were 130 plant taxa in all, with highest percent being dicotyledons, followed by monocotyledons, and rest being non-flowering plants such fungi, gymnosperms, lycophytes, and ferns. The majority of the plant taxa mentioned by informants were discovered as wild plants in subtropical, temperate, and alpine environments. Asteraceae (seven genera, nine taxa), Rosaceae and Lamiaceae (six genera, six taxa each), Malvaceae and Ranunculaceae (four genera, five taxa each), Poaceae and Solanaceae (four genera, four taxa each), Polygonaceae (three genera, five taxa), Brassicaceae and Plantaginaceae (four genera, four taxa each), whereas 42 families were found to have less than two taxa each.

S. No	***Botanical Name of plant***	***Family***	***Local name***	***Part used***	***Medicinal use***
1	*Atropa acuminate* Royle ex Lindl.	Solanaceae	Meti Kafal	Root, leaves	Yields atropine which is a standard drug for dilation of eye pupil; roots and leaves narcotic, sedative, diuretic and mydriatic.
2	*Achillea millefolium* L.	Asteraceae	Pahelgassa/Berigeur	Flowers, leaves and Srem	Decoction used as diaphoretic, stimulant, tonic, and also in colds. Leaves chewed for toothache and dental caries.
3	*Aconitum heterophyllum* Wall.	Ranunculaceae	Patris/Atis	Tuberous leaves	'Root extract is the source of atisine, used as a tonic; substitute for quinine and also in diarrhea and cough.
4	*Actaea spicata* L.	Ranunculaceae	Banebarry'	Root	Decoction in milk is a cure for snake bite, and is considered useful for treating nervous disorders, rheumatic fever, asthma and goiter.
5	*Aesculus indica* Colebr. ex Wall.	Hippocastanaceae	Hon Doon/Ban Khood	seeds	Fruit considered cathartic; also given to sheep in winter as tonic.
6	*Ajuga bracteosa* Wall. ex Benth.	Lamiaceae	Jan-e-adam	Fruits	Shoot extracts diuretic. Useful in stomachache and diarrhea; given to goats to cure flatulence and tonsillitis.
7	*Alcea rosea* L.	Malvaceae	Sazposh	Roots	Root decoction antiphlogistic.
8	*Allium sativum* L.	Alliaceae	Lehsan/Rhoon	Bulb	Considered good for chest problems; considered good for heart for reducing cholesterol level and blood pressure; also used as hair tonic.
9	*Amaranthus caudatus* L.	Amaranthaceae	Ganhaar	Leaves, seeds	Roasted seeds with milk used to cure urinary infection.
10	*Androsa cemucronifolia* Hardw.	Primulaceae	Zahardawa'	Root, stem and leaves	Powered plant taken for treating ringworm infection

11	*Anemone falconeri* Thomson	Ranunculaceae	Steward	Flowers	Powdered plant taken for treating cold, fever and sometimes for gastritis.
12	*Anemone obtusiloba*	Ranunculaceae		Root and seeds	Oil extract is used in rheumatism.
13	*Angelica glauca* Edgew.	Apiaceae	Chora/frin	Root	'Stimulant, curative in flatulence, dyspepsia and constipation; used internally against worms.
14	*Arctium lappa* L.	Asteraceae	Greater burdock	Root	Roots diuretic and diaphoretic.
15	*Arisaema jacquemontii* Blume.	Araceae	Samp Siltae/ Surf Makai/Surf Gand	Whole plant	Curative in respiratory problems; tubers considered to have insecticidal properties
16	*Arnebia benthamii* I. M. Johnst.	Boraginaceae	Kahzaban/Gawzaban	Root, leaves and flowering stalk	Shoot extract curative in tongue and throat diseases, fever; also good for heart.
17	*Artemisia absinthium* L.	Asteraceae	Chawoo/Tethwan	Leaves, flowering tops	Leaves and flowering tops anthelmintic and expectorant; useful for relieving joint pains and sprain swelling, source of santonin drug.
18	*Artemisia maritime* L.	Asteraceae	Safad Chaw	Leaves and flowering shoots	Strongly anthelmintic due to containing the drug santonin.
19	*Artemisia scoparea* Waldst. and Kit.	Asteraceae	Oligosporus scoparius	Flowers, young stems and seeds	Yields scoparone, highly effective as hypotensive and tranquillizing agent. Extract used as vermifuge
20	*Asparagus filicinus* Ham.	Liliaceae	Jungley Halyun	Young stems	Seed paste used in rheumatism
21	*Astragalus grahamianus* Fisch.	Fabaceae	Gagarkond/Kukerpanja	Flower, root and shoot	Roots used as tooth-brush to relieve toothache.
22	*Barbarea vulgaris* W. T. Aiton.	Brassicaceae	Yellow rocket	Whole plant	Useful in healing wounds.
23	*Berberis lyceum* Royle	Berberidaceae	Kaw dasch/Sumbul	Root and stem bark	Root extract as gargle in toothache; berries coagulant, astringent and a remedy for cholera.

24	*Bergenia ciliata* Stein.	Saxifragaceae	Zakhm-i-Hiyat	Whole plant	Decoction of rhizome is diuretic, taken in ulcer and hyperacidity.
25	*Cannabis sativa* L.	Cannabinaceae	Bang/Pang	Flowers, fruits, leaves, seeds	Dried leaf powder in small quantities used to cure excessive urination in children and to check abnormal menstruation.
26	*Capsella bursa-pastoris* L.	Brassicaceae	kralmund	Leaves, flowers and seeds	Leaves considered diuretic and febrifuge
27	*Cedrus deodara* Roxb. ex Lamb.	Pinaceae	Diar/Deodar	Inner wood	Resin used to cure toothache, as well as an extract obtained by boiling of wood locally called choora applied externallyto cattle as insect pest repellent.
28	*Celosia argentia* L.	Amaranthaceae	Mawl	Whole plant	Seeds used as demulcent
29	*Celtis australis* L.	Ulmaceae	Brimji/Batkal	Leaves and fruit	Leaf poultice anti-inflammatory. Wood considered spiritual and used as lockets for bulls
30	*Chenopodium botrys* L.	Chenopodiaceae	fakun’	Leaves and seeds	Cooked seeds considered as tonic
31	*Cimicifuga foetida* Pursh.	Ranunculaceae	Jiuntibuti	Rhizome and roots	Source of resinous substance cimicifugin, also has medicinal properties. Used to treat rheumatic fever
32	*Cirsium wallichii* DC.	Asteraceae	Kandyara	Leaves	Leaf extract used against stomach complaints
33	*Codonopsis ovate* Benth.	Campanulaceae	Bidli	Root and leaves	Used in the form of poultices for the treatment of ulcers and wounds.
34	*Codonopsis rotundifolia* Royle	Campanulaceae	Bidli	Root, shoot, leaves and fruits	Powdered root used as a poultice to treat cutaneous eruptions.
35	*Colchicum luteum* Baker	Liliaceae	Virkeom/Suranjan	Corms	Corm yields colchicines, used in rheumatism.
36	*Corydalis govaniana* Wall.	Fumariaceae	Sangrihirb	Root	Roots and seeds taken as carminative and also to cure ophthalmic diseases.

37	*Cotoneaster ramicifolia* K. Koch.	Rosaceae	Luhni	Bark	Bark paste used to heal minor fractures.
38	*Crataegus songarica* K. Koch.	Rosaceae	Wring'	Fruit	Fruit extract considered good for heart problems.
39	*Cuscuta reflexa* Roxb.	Cuscutaceae	Kuklipoth/Nelatari	Whole plant	Infusion of whole plant used as hair tonic.
40	*Cynodon dactylon* L.	Poaceae	Khabal/Dramn'	Whole plant	Whole plant poultice considered anti-inflammatory.
41	*Cynoglossum glochidiatum* Benth.	Boraginaceae	Cherun	Seeds	Seeds taken for potency and fertility.
42	*Daphne mucronata* Royle	Thymeliaceae	Kute-lal	Leaves, root and bark	'Roots purgative, bark and leaves used cutaneously.
43	*Datura stramonium* L.	Solanaceae	Tatura/datur		Leaves and seeds useful in bronchitis / asthma; antispasmodic and narcotic
44	*Descurainia sophia* L.	Brassicaceae	Zarkash	Seeds and leaves	Seeds anti-periodic, used as expectorant and tonic.
45	*Dictamnus albus* L.	Ranunculaceae	Fire Plant	Leaves, stem flowers and fruits	Root decoction curative in skin diseases.
46	*Dioscorea deltoidea* Wall.	Dioscoreaceae	Krees	Root	Yields diosgenin-a herbal contraceptive; roots yield cortisone, a steroidal hormone for the treatment of rheumatic diseases and ophthalmic disorders.
47	*Dipsacus inermis* Wall.	Dipsacaceae	WapulHaak	Leaves	Leaf decoction used by women for bathing after delivery.
48	*Dryoptteris blanfordii* Christ.	Dryopteridaceae	Deid/Kunji	Rhizome	Cures gastrointestinal problems by providing roughage and also as pH neutralizer.
49	*Ephedra gerardiana* Wall. ex Florin	Ephideraceae	Asmanibuti	Bark	Yields ephedrine, a potent bronchodilator for the treatment of asthma; also used to prevent heart block, as expectorant, and in infections of blood and bile complaints.
50	*Epimedium elatum* Morr. & Decne.	Berberidaceae	Yanga	Bark and root	Root extract used as mouthwash and also in toothache.

51	*Equisetum ramosissimum* Derf.	Equisetaceae	Satgandya	Whole plant	Decoction of plant used to cure despepsia, diarrhea and dysentery. Aerial parts used to clean teeth.
52	*Erigeron canadensis* L.	Asteraceae	Horseweed	Young leaves and stem	Leaf powder used to cure skin diseases
53	*Erodium cicutarium* (L.) L'Her. Ex Aiton.	Geraniaceae	Gardyan	Whole plant	Used as uterine-sedative and haemostatic.
54	*Euphorbia helioscopia* L.	Euphorbiaceae	Hirbi	Root, seeds and latex	Roots anthelmintic, seeds with roasted pepper are given in cholera. Latex used to stop bleeding in wounds.
55	*Ferula jaeschkeana* Vatke	Apiaceae	Junglihing	Gum	Yields a gum-resin, used in wounds and bruises.
56	*Filago arvensis* Vehlenb.	Asteraceae	Fluffweed	Whole plant	Water extract of plant taken for treating gout and rheumatism.
57	*Foeniculum vulgare* Mill.	Apiaceae	Dhania	Root and leaves	Leaves diuretic; roots purgative; seeds aromatic.
58	*Fragaria nubicola* Lind.	Rosaceae	Budmewa	Rhizome	Extract of rhizomes stimulant, diuretic, used to cure mumps and abdominal pains.
59	*Fritillaria imperialis* L.	Liliaceae	Pranik	Bulbs	Bulbs used medicinally as tonic, stomachic and curing pain in backbone
60	*Fritillaria roylei* Hook.	Liliaceae	Pranik	Root	For treating injuries
61	*Fumaria indica* (Hausskn.) Pugsley	Fumariaceae	Shahtar	Whole plant	Extract taken as a cooling 'sharbat' (drink).
62	*Galium aparine* L.	Rubiaceae	Cleavers	Leaves and stem	Extract is used as diuretic and antiscorbutic.
63	*Geranium wallichianum* D. Don	Geraniaceae	Ratna	Root and fruit	Astringent, detersive, resolutive, anthelmintic and diuretic; also used for treating cuts and boils.
64	*Geranium pretense* L.	Geraniaceae	Ratan joug	Leaves	Decoction of the leaves is used to cure diarrhea.
65	*Hemerocallis fulva* L.	Liliaceae	Day lily	Flower, leaves and tubers	Given to women after delivery. Source of vitamin A, thiamine and vitamin C

66	*Herinaria hirsute* L.	Illecebraceae	Chikhal	Whole pant	Dried powder of whole plant fried with egg and taken orally to cure gastritis and intestinal disorders.
67	*Hyoscyamus niger* L.	Solanaceae	Van Tamok/Bazar Bhang	Leaves, flowering top and seeds	Potent analgesic and tranquilizer; source of drug hyoscyamine.
68	*Hypericum perforatum* L.	Hypericaceae	Chai kul	Flowers and aerial parts	Extract in olive oil used externally for sores, wounds, ulcers, and swellings.
69	*Inula racemosa* Hook.f.	Asteraceae	Poshker	Root	Root extract considered as expectorant and general body tonic.
70	*Inula royleana* DC.	Asteraceae	Elecampane	Shoot	A paste of dried shoots is used to cure dermitis.
71	*Isodon rugosus* (Wall.) Codd.	Lamiaceae	solai/ Peunmar	Leaves and twigs	Extract of leafy twigs used as an eye wash. Leaves also considered as wormicide
72	*Juglans regia* L.	Juglandaceae	akhrot/ doon	Husk, leaves, seeds and bark	The roasted kernel taken with tea to cure constipation. The infusion of leaves and kernel oil are used to cure skin eruptions. Leaves yield ash color dye.
73	*Jurinea ceratocarpa* Benth. &hook.f.	Asteraceae	GuglDhup	Rhizome and bark	Rhizome decoction taken to cure constipation, also good for heart; source of "dhup."
74	*Lavatera kashmiriana* Mast.	Malvaceae	Junglisonchal/ 'Van Sonchal'	Whole plant	Seeds antiseptic
75	*Leontopodium jacotianum* Beauv.	Asteraceae	BabilHak	Leaves	leaf extract considered anti-inflammatory
76	*Luffa cylindrical* Roxb.	Cucurbitaceae	Chrunda	Fruits	fruits useful in diarrhea
77	*Lychnis coronaria* (L.) Desr	Caryophyllaceae		Root	Root decoction used in lung and liver complaints.
78	*Malva neglecta* Wall.	Malvaceae	Sochal	Leaves and flowers	Laxative, expectorant.
79	*Marrubium vulgare* L.	Lamiaceae			Leaf paste applied to boils and in rheumatism.
80	*Melia azadarach* L.	Meliaceae	Derak/Drewa	Leaves and flowers	Leaves and flowers insect repallents

81	*Mentha arvensis* L.	Lamiaceae	Pudina	Leaves	Dried leaf powder with water given orally to relieve vomiting, gastritis and diarrhea.
82	*Mentha longifolia* Host.	Lamiaceae	Yen/ Chalapudna	Leaves	Dried leaves used as carminative, stimulant, and also as flavouring agent. Leaves also useful in headache and stomach upsets
83	*Morus nigra* L	Moraceae	Shahtoot	Leaves	Fruit refringent, laxative and cooling; leaf paste used to heal wounds
84	*Nasturtium officinale* R. Br.	Brassicaceae	Nagbabr	Leaves	Dried leaf powder helpful in Stomachache and intestinal disorders.
85	*Nepeta cataria* L.	Lamiaceae	Gand Soi	Leaves	Leaf decoction curative in dysentery, leaves chewed to cure toothache.
86	*Oxalis corniculata* L.	Oxalidaceae	Chok chin	Leaves	Effective in treatment of boils.
87	*Pedicularis pectinata* Wall.	Scrophulariaceae	Lousewor	Leaves	Pounced leaves are given for haemoptysis.
88	*Phytolacca acinosa* Roxb.	Phytolaccaceae	Mutkafal	Root	Said to have narcotic properties.
89	*Phyteum athomsoni* Clarke	Campanulaceae	Doudh saag	Leaves	Leaves considered general body tonic.
90	*Pimpinella diversifolia* DC.	Apiaceae		Whole plant	Used as carminative.
91	*Pinus wallichiana* A. B. Jackson	Pinaceae	Biyar/Kayur	Wood	Resin considered antiseptic hence applied on wounds for quick healing.
92	*Plantago lanceolata* L.	Plantaginaceae	Chamch-e-Pater	Leaves	Leaf extract taken as a cooling drink.
93	*Plantago major* Lour.	Plantaginaceae	Gula	Seeds	Seeds used as laxative. The whole plant is useful in case of stomach upsets; used to relieve pain due to piles and in diarrhea.
94	*Podophyllum hexandrum* Royle	Podophyllaceae	Khakdi	Rhizome	Potent purgative in chronic constipation; rhizome yields podophyllin, recently tried as a possible drug in treating cancer.
95	*Polemonium caeruleum* L.	Polemonaiceae	Charity plant	Whole plant	Sedative properties. Used as astringent and diaphoretic

96	*Polygonum amplexicaule* D.Don	Polygonaceae	Mantscern	Rhizome	Rhizomes astringent, used in menorrhagia. Rhizomes boiled to make salt tea, considered good foe stomach.
97	*Polygonum hydropiper* L.	Polygonaceae	Merchedi	Leaves	The chopped fresh leaves are used to regenerate hairs on bald head. The regular hair growth occurs after 21 days of application. Fresh leaves are also rubbed over tongue infection for early relief.
98	*Portulaca oleracea* L.	Portulacaceae	Nanoori	Seeds	Styptic internally, seeds as vermifuge
99	*Potentilla atrosanguinea* G.Lodd. ex D.Don	Rosaceae		Whole plant	The whole plant is used as medicine. The decoction is useful in fever.
100	*Potentilla indica* (Andrews) T.Wolf	Rosaceae		Leaves	Leaf poultice used externally on snake bites.
101	*Primula rosea* Hort. ex Pax.	Primulaceae		Root	Dried root stock is used to cure muscular pain.
102	*Prunella vulgaris* L.	Lamiaceae	Kalveuth'	Flowers	Decoction of flowers anti-neuralgic.
103	*Pteris stenophylla* Wall. ex Hook.	Ptereidace	Kakwai'	Leaves	Fresh frond decoction considered antibacterial, and has refreshing effect.
104	*Punica granatum* L.	Punicaceae	Anar Dana/Darun	Seeds	Seeds of sour tasted variety are given to treat jaundice, and chest ailments. Also used in anardana chutni
105	*Ranunculus arvensis* L.	Ranunculaceae	buttercup'	Rhizome	For treating fever, gout, and asthma. Rhizomes considered having anti-lice properties.
106	*Ranunculus muricatus* L.	Ranunculaceae	Kakodel	Leaves	Considered to have anti- lice properties; leaf and stem extract also used as hair tonic.
107	*Rorippais landica* (Oeder) Borbas.	Brassicaceae	Yellow-cress	Whole plant	Anti-scorbatic and diuretic properties
108	*Rosa webbiana* Wall.	Rosaceae	Dubri	Flowers	Paste of petals curative in chest infections
109	*Rubia cordifolia* L	Rubiaceae		Root	A good skin ointment obtained from the root paste. Considered helpful in cough, cold and respiratory ailments.

110	*Salix alba* Thunb.	Salicaceae	Verkul'	Twigs	Young twigs used as miswak to treat toothache. Yields Acetyl salicylic acid (aspirin), the prized herbal drug for rheumatism and for dissolving blood clots in arteries and veins in heart patients.
111	*Salvia moorcroftiana* Wall. ex Benth.	Lamiaceae	Kali-zeri'	Roots	Roots given in colds and cough; seeds emetic, curative in hemorrhoids; leaf paste applied to cure boils.
112	*Saussurea costus* (Falc.) Lipsch.	Asteraceae	Kuth'	Rhizome	Used as tonic, carminative, stimulant, anti-spasmodic; for controlling bronchial asthma, and in cardiac complaints. Rhizomes also used as insect repellent in cloths and books.
113	*Scutellaria galericulata* L.	Lamiaceae	Marsh skullcap	Whole plant	Used as laxative, febrifuge, antispasmodic, astringent, and stomachic
114	*Senecio jacquemontianus* (Decne.) C. B. Clarke	Asteraceae	Groundsel	Rhizome	Rhizome paste applied to boils.
115	*Skimmia anquetilia* N.P.Taylor & Airy Shaw	Rutaceae	Nair	Leaves	Leaves aromatic, yielding skimmianine.
116	*Smilax vaginata* Decne.	Smilacaceae	Catberies/greenberies	Stem and roots	Brushing with stem relieves toothache, roots used medicinally.
117	*Solanum nigrum* L.	Solanaceae	Kachmach	Fruits	Stomachic, promotes urination, fruit used as tonic and laxative.
118	*Solidago virga-aurea* Auct.	Asteraceae	Goldenrod	Whole plant	Carminative and diuretic properties
119	*Taraxacum officinale* F.H.Wigg.	Asteraceae	Hand	Leaves and root	Expectorant; leaf decoction fed to convalescent mothers after delivery. Dried roots are used as tonic and diuretic.
120	*Taxus wallichiana* Zucc.	Taxaceae	Postul/Riar	Bark	Source of taxol, a suggestive drug for treatment of cancer.
121	*Thymus linearis* Benth	Lamiaceae	Jaind	Whole plant	Used in weak vision, complaints of stomach, chest and liver; also, for suppression of urine and menstruation.

122	*Trillidium govaniana-num* Kunth.	Liliaceae	Gildi	Whole plant	Yields diosgenin, and is used for treating diarrhoea and dysentery.
123	*Tulipa stellata* Hook.	Liliaceae	Kuker Buna	Bulb	Extract of bulbs used as tonic.
124	*Urtica dioica* L.	Urticaceae	Soi/ Kandyari	Leaves	Extract of young leaves and inflorescence diuretic and stomachic.
125	*Valeriana hardwickii* D.Don.	Valerianaceae	MushkiBala	Whole plant	Substitute for the drug valerian in several Ayurveda preparations and is used for treating hysteria.
126	*Verbascum Thapsus* L.	Scrophulariaceae	Gadi Kan	Leaves	Applied locally to cure burns; leaves used in smoking.
127	*Viola indica*W. Becker	Violaceae	Banafsha/Nun Posh	Flowers	Plant antipyretic; flowers emollient, demulcent, used in lung trouble.
128	*Viscum album* L.	Loranthaceae	Aal	Whole plant	Plant and fruit used medici-nally
129	*Zanthoxylum arma-tum* Cand.	Rutaceae		Bark, seeds and wood	Timer' fresh branches crushed to be used as tooth brush, to relieve toothache and cooling sensation to mouth. Seed mixed with Juglans regia kernals, chillies to make a delicious poultice (Chetni).
130	*Ziziphus jujube* Lam.	Rhamnaceae	Singli	Fruits	Fruit styptic, blood purifier and stomachic.

Table 1: List of medicinal plant species in the catchment area showing their medicinal importance and part used.

Plant Parts Used as Medicine

The variety of medical administration plant taxa can be seen in various modes of application. Various plant parts, such as barks, roots, rhizomes, bulbs, tubers, stems/branches, leaves, seeds, flowers/inflorescence, fruits, or even the entire plant, were discovered to be utilised as a drug/medicine by the locals in the studied area. The samples prepared were usually stored in glass bottles or other containers as homemade dry powders, which were obtained by breaking down well-dried plant components; in off-seasons or during severe snowfalls, they are difficult to collect from the forests or adjacent areas. The whole plant parts (31%) and leaves (30%) are the most commonly utilised components for medicine, followed by roots (22%), stems/branches (4%), rhizome (3%), fruits/flower/tuber (2% each) and bark (1%) of the plant were the least used portions for making medicine (Fig. 2).

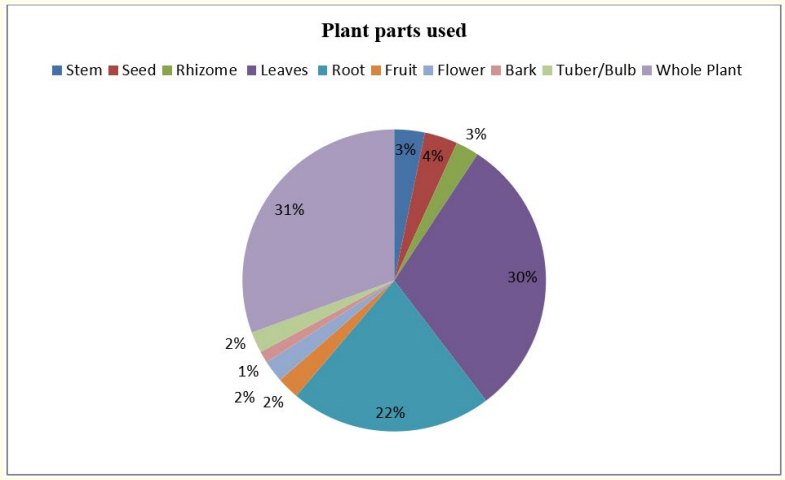

Figure 2: Percentage (%) of plant parts employed as medicine.

Methods of Preparation and Administration

The medicinal plant taxa used to treat various illnesses were prepared and delivered by locals using diverse procedures. Powder, juice/extract, paste, decoction, and chew were the five categories in which different portions of plants were used. Powder versions of the pharmaceuticals or medicines were the most popular (37%), followed by extracting the juice/extract by smashing fresh materials and mixing them with water (25%), decoction (15%), and applying paste to the affected areas (14%).The least prevalent mode of administration was chewed/raw medicine, which was observed in the researched areas (9%) of the Kashmir Himalaya. (Fig. 3).

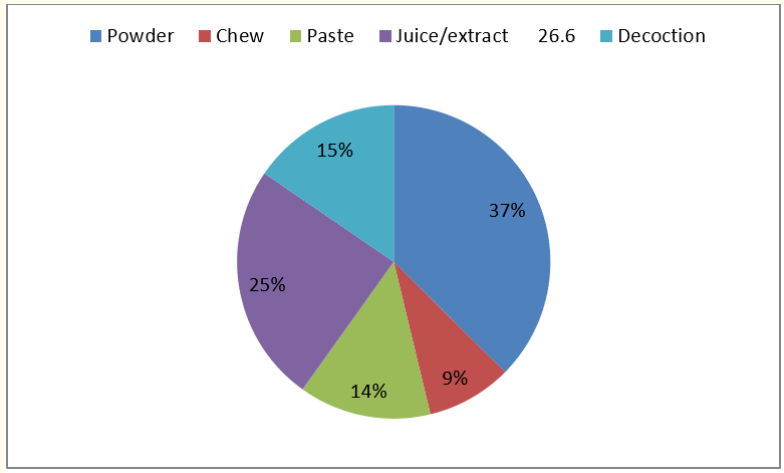

Figure 3: Plant parts used and number of taxa employed as a medicine.

The most prevalent method of herbal preparation was extracting the components in hot or cold water, and the most common mode of delivery was oral rather than topical or other forms. Aside from the plant parts, the herbalists employed ash, black salt, sugar, honey, onion, zinger, mustard oils, ghee, and local home-made wines in the current study. Internal injuries were treated with decoctions made by boiling plant materials in water, usually roots, rhizomes, barks, and other parts of the plant. External treatment included pastes or charred materials mixed with ghee, honey, or mustard oil, and these substances also helped to reduce friction during the application of the remedy. Local healers have stated that the same sections of medicinal plant species can be used for the manufacture of different substances using multiple methods in some circumstances. We discovered various routes of administration of herbal products in this investigation. Oral administration accounted for around 65% of all plant taxa (107), followed by massaging leaves or twigs (18%), taking a bath with heated water while employing plant parts (13%), and inhaling smoke (4%).

Discussion

The Indian population is estimated to be 136.64 million, with 40-50% belonging to 550 tribal groupings (scheduled castes/scheduled tribes) speaking 325 distinct languages (statisticstimes.com, retrieved on August 24, 2021). They generally live in isolated areas with limited access to modern health care and rely on natural resources for survival. Medicinal plant conservationists and indigenous knowledge experts from all over India have donated their efforts. The residents of Kupwara's hilly district have extensive knowledge of medicinal plants. In this investigation, we identified 130 different species of plants with great medical value that were utilised by the local population as medicines. In order to study the association between age and indigenous knowledge of herbal medicine, we interviewed a diverse group of people ranging in age from 25 to 75 years old. The majority of respondents in the research area believe that traditional healers should always be men, hence 77 of the respondents in this survey are men, which is corroborated by a similar study conducted by Singh et al., (2020) in the Kashmir Himalayan region. Several studies have found that ethnomedical knowledge and indigenous cultural practices increase with age, and those local residents over the age of 50 are the primary custodians of cultural practices in their community (Raghuvanshi et al., 2021; Mir, 2014) But we may argue that old knowledge is becoming extinct as a result of increasing modernization and no longer appears to match with current reality (Reyes-García, 2013). Nowadays, modern healthcare procedures are mostly used to solve health-care issues (Voeks and Leony, 2004). In this study, it was discovered that illiterate informants have more indigenous knowledge than educated informants, and as a result, we discovered a substantial negative linear association between medicinal plant taxa and educational level. Several research in nearby Himalayan areas and neighboring nations in similar ecosystems corroborated this conclusion (Singh et al., 2021; Behera, 2007; Bhatia et al., 2015) Traditional information was exchanged across the three communities, resulting in the standardization of plant traditional knowledge. Traditional plant knowledge may have been homogenized or exchanged as a result of ecological and social causes. As previously said, due to their adaption to a contemporary lifestyle, the Kashmiri community uses medicinal plant species in a limited way compared to other communities (erosion of traditional knowledge). The Gujjar and Dard people reported a huge number of medicinal plant species, which they attribute to their habitation in high-altitude mountains with more biodiversity. The great reliance of the Gujjar and Dard communities on the indigenous medical flora reflects a high reliance on the native medicinal flora, which poses substantial risks such as unsustainable use/overharvesting of traditional medicinal plants. Critically endangered species including *A. heterophyllum*, *A. acuminata*, *A. chasmanthum*, *G. kurroo*, *P. hexandrum*, *D. costus*, and *T. govanianum* require careful protection and management. As a result, policymakers should push for the sustainable use of plant resource.

Documenting local flora in concurrence with ethnobotanical knowledge is critical for identifying spatial distribution patterns in plant variety and composition, as well as for sustaining and safeguarding traditional knowledge and natural ecosystems (Singh et al., 2021; Barik et al., 2018; Singh et al., 2017). The most dominant families used for local herbal formulation and medicine include Asteraceae, Rosaceae, Lamiaceae, Malvaceae, Ranunculaceae, Poaceae, Solanaceae, Polygonaceae, Plantaginaceae, and Brassicaceae, according to floristic data. This is backed by other research in the area, which attributes these families' dominance to their widespread distribution, abundance, predominant herbaceous habit, and high germination rate (Dar et al., 2020; Voeks, 1996; Lone, 2009) The reason for the diversity of these families in hilly areas could be one of three things: (1) the taxa in these families had a wider distribution range and

could easily adapt due to their herbaceous habit, (2) climatic conditions favour seedling survival and allow plants to bear seeds, which could easily disseminate to new climate areas, or (3) the invasive nature of the plant taxa in these families. These families have been described by many pharmacopoeias to be a rich source of alkaloids and flavonoids, which are needed for growth and as building blocks of the body (Dar et al., 2020) allowing residents to use different taxa of these families as medication.

The Asteraceae family is the largest angiosperm family (Cano, 2009; Bell, 1971) and various members of this family have been reported to have a high concentration of phytochemicals that may have important biological functions in human and animal studies, such as antitumor, antibacterial, antifungal, anti-inflammatory, antioxidant, and so on. The existence of numerous classes of bioactives, including diterpenoids, flavonoids, and polyphenols, was discovered in phytochemical studies of Asteraceae members [Singh et al., 2019; Singh et al., 2021; Behera et al., 2007; Sicari et al., 2021) Earlier research in the surrounding areas, such as the Bungus valley, revealed that around 30 plant taxa belonging to 18 families are used in daily life and as traditional plant remedies for treating various ailments, with the Asteraceae, Fabaceae, and Lamiaceae families being the most popular (Chaurasia et al., 2012). A study (Lone, 2009) investigating local peers (herbal saints) and hakims revealed 20 plant taxa for addressing skin disorders at higher altitudes of the Kashmir Himalaya, such as the Lolab valley (Lone, 2009). The Solanaceae and Poaceae families dominated the plant list of the Lolab valley (Lone, 2009).

Plants belonging to Lamiaceae family (236 genera, 6900-7200 taxa) have been found to have a variety of aromatic (volatile, essential oils, terpenoids, phenolics, alkaloids, and flavonoids) bearing plant taxa (Frezza, 2021; Panuccio et al., 2018; Vescio et al., 2021) and almost all of them have applications in the food and pharmaceutical industries for the development of value-added flavour and fragrance products useful for human healthcare (Dar et al., 2020; Dutta et al., 2021; Valerio et al., 2021). Chemical GC/MS analysis of various species revealed the presence of valuable monoterpene hydrocarbons, oxygenated monoterpenes, sesquiterpene hydrocarbons, oxygenated sesquiterpenes and diterpenes, phenylpropenoid, and several non-terpene derivatives, including high-value constituents such as citral, eugenol, geraniol, menthol, phellandrene, and a variety of additional phytoconstituents (Kelayeh et al., 2018; Huang et al., 2015; Verma et al., 2015) which are used to manufacture cosmetics, fragrances, flavouring compounds, and medications.

The number of herbaceous taxa was followed by shrubs and trees in terms of growth types. Herbs were used often, which could be attributed to their simple availability from neighboring forests, as well as the abundance of herb species as medicine in natural ecosystems (Dar et al., 2020). Herbs were identified as the principal constituents of forest ecosystems in the published literature reflecting the richness of plants in the Kashmir Himalaya, and local populations use them for their everyday requirements (Dhar and Kachroo, 1983).

Use value

To calculate approximately the relative importance of medicinal plant species in the study area, use value (UV) was calculated on the basis of informant's citations. The usage value in our study ranged from 0.15-0.38. (Table 2). The highest usage value was found in *Achillea millefolium* (0.33) followed by *Chenopodium album* and *Phytollaca acinosa* (0.31 each); *Ajuga bracteosa* (0.30); *Cannabis sativa* and *Senecio chrysanthemoides* (0.30 each). *Solanum tuberosum* had the lowest usage value (0.01). The high use value of medicinal plant species reflects the region's abundance of these plants as well as the local population's reliance on them to treat a variety of maladies (Hussain et al., 2019). Many of the plants found to have high use value by native people in Baramulla district have been mentioned in previous medicinal literatures and are also used in Unani and Ayurvedic medicine systems, and some of the plants mentioned in this study have been scientifically validated using pharmacological assays. Many chemical constituents in *Achillea millefolium*, including essential oils, sesquiterpenes, phenolic compounds, and others, give it a wide range of pharmacological properties, including spasmolytic, anti-inflammatory, analgesic, haemostatic, anti-diabetic, cholagogue, antitumor, antioxidant, antifungal, antiseptic, and liver protective effects (Ali et al., 2017). *Chenopodium album* is used by the residents of the study region to increase bowel movement and to treat intestinal worms and diarrhea. Antiviral, antifungal, anti-inflammatory, antiallergenic, antiseptic, and immunomodulatory effects have all been discovered in this plant (Amjad and Alizad, 2012). *Chenopodium album* is also said to have the most powerful anti-breast

cancer properties (Khoobchandani et al., 2009).

Disease Category	*Ailments*
Dermatological	Burns, Bruises, Hair fall, Rashes, Swellings, Cleansing agent, Killing lice, Allergy, Itching, Chilblain, Hair growth, Skin allergies, Insect sting, Sunburn, Cracked heals, Boils, Snake bite, Skin irritation, Fungal infections, Anti-inflammatory, Measles, Scabies
Dermatological	Burns, Bruises, Hair fall, Rashes, Swellings, Cleansing agent, Killing lice, Allergy, Itching, Chilblain, Hair growth, Skin allergies, Insect sting, Sunburn, Cracked heals, Boils, Snake bite, Skin irritation, Fungal infections, Anti-inflammatory, Measles, Scabies
Wounds	Wounds
Nervous disorder	Headache, Depression
Respiratory	Chest congestion, Common cold, Cough, Asthma , Bronchitis, Throat infections
Gastrointestinal	Abdominal pain, Worms, Diarrhoea, Stomach disorders , Constipation, Vomiting, Stimulate bowel movement, Stomach cramps, Indigestion, Purgative, Dysentery, Vermifuge, Expel poisonous substances from stomach, Anthelminthic
Gynaecological	Fertility, Post-partum haemorrhage, Lactation, Menorrhagia, Oligomenorrhea, Swelling of nipples, Dysmenorrhea, Morning sickness
Skeltomuscular	Rheumatism ,Fractured bones, Strengthening bones, Muscular pain, Arthritic pain, Swelling of joints, Poliomyelitis ,Back pain
Cardiovascular	Blood pressure, Blood purifier
Antipyretic	Fever, Malaria
Body weakness	General weakness, Body tonic
Ear, Mouth, Eye (EME)	Inflamated gums, Toothache, Eye diseases, Ear-ache, Bad smell, Mumps, Ulcers, Tonsillitis
Liver and Kidney	Excessive urination, Urine infection, Jaundice, Diuretic

Table 2: Disease categories based on ailments recorded.

In the present study, the different taxa recorded to have the highest use-value were *V. jatamansi*, *F. cirrhosa*, *A. jacquemontii*, *A. racemosus*, *R. acetosa* and *A. calamus*. The high use of these taxa as herbal medicine was supported by numerous findings (Dar et al., 2020; Bhatia et al., 2015; Soni et al., 2012) which indicated the significance of these plants in the Himalayas and their utility in diverse communities of tribal Himalayan populations. *A. heterophyllum* and *A. absinthium* have been used locally to treat a range of gastrointestinal diseases, counting bladder infections, diarrhea, and inflammation (Paramanick et al., 2017). The herb *A. brevifolia* is also used to treat gastrointestinal problems. Lactones and terpenoids (e.g., trans-thujone, -terpinene, 1,4-terpeniol, myrcene, bornyl acetate, cadinene camphene, trans-sabinyl acetate, guaiazulene, chamazulene, camphor, and linalool (Al-Shamaony et al., 1994) are the primary phytochemicals reported from *A. absinthium*. Another notable taxon is *C. intybus*, which is used to treat gastrointestinal ailments, asthma, and gall stones, as well as being farmed on an industrial basis in many countries (Petrakou et al., 2020). The ICF, which tells us about the homogeneity or agreement of knowledge about medicinal plants among the informants, was used to determine the consensus among the informants. Metabolic syndromes, parasite (antihelmintic) and neurological system-related ailments were shown to be prominent, followed by gastrointestinal and dermatological diseases. Eight categories of ailments were identified, including diseases of the eyes, ears, and nose, dermatological disorders (abscess, eczema, acne, itching, ringworm, alopecia, blemishes, leukoderma, dandruff, boils, cuts, burns, scabies, wounds), fever (malaria, high body temperature), cardiovascular problems (blood purifier, heart disorders, heart attacks, strokes), and gynecological (persistent cough, loss in weight, fatigue), GI issues (hepatotoxic, ulcer, choleretic, constipation/indigestion, dysentery, diarrhea, excess gas, heartburn, nausea, stomach pain, vomiting, kidney stone) and metabolic

syndromes (obesity, diabetes, blood pressure, excessive body fat, abnormal cholesterol, jaundice) had the highest ICF values (0.90), with 6, 13, 9, 6, 10, 28 and 6 species used for each category, respectively. The ICF values for gastrointestinal diseases were marginally lower in this study compared to other conditions in the Kashmir Himalayan area of Kupwara. There have been a number of other studies that have found comparable findings when it comes to the plant taxa used to treat specific illnesses, such as gastrointestinal diseases, respiratory disorders, and dermatological disorders (Heinrich et al., 1998; Andrade-Cetto, 2009).

Many plant taxa are utilised as medicine for diarrhoea, cough, stomach, and abdominal pain, according to this inquiry. The treatment of gastrointestinal illnesses yielded the most taxa, with informant consensus (ICF = 0.90, 28 taxa), which is consistent with prior ethno botanical investigations (Guarrera et al., 2001; Bhatia et al., 2014] diseases of the skin (Heinrich et al., 1998; Andrade-Cetto, 2009). Plant taxa that have been identified as a rich source of vitamins, flavonoids, and other nutraceutical components for the treatment of gastrointestinal problems [Huq, et al., 2014; Ashraf et al., 2015; Alamgeer et al., 2018; Ahmad et al., 2010; Ali et al., 2018; Malik et al., 2018) are mentioned as *C. rotundifolia*, *C. govaniana*, *P. hexandrum*, *S. pseudocapsicum*, *F. cirrhosa*, *P. hydropiper*, *A. heterophyllum*, *B. aristata*, *L. album*, *A. obtusilobum*, *R. emodi*, *A. heterophyllum*, *B. aristata*, *L. album*, *A. obtusilobum*, and *R. Anticancer*, gastrointestinal, respiratory, and dermatological characteristics have been discovered in these species. The taxa *A. heterophyllum*, *A. absinthium*, *D. costus*, and *B. ciliata* are primarily used to treat gastrointestinal disorders (Guan and He, 2015; Srivastava et al., 1984). The recorded ICF was also good for respiratory disorders (ICF = 0.88, 29 taxa), and this conclusion is corroborated by similar research published in other publications (Petrakou et al., 2020; Palabas, 2021). The findings can be linked to a variety of causes, including extreme weather changes and a high proportion of wetness, cold, bacteria, and spores, all of which can cause respiratory tract abnormalities (Arora et al., 2016; Kayani et al., 2014; Banerjee et al., 2004; Street et al., 2013). The plants that were employed mainly for the treatment of respiratory ailments were *D. costus*, *C. impatiens* and *C. domestica*, and were supported by the literature (Mahboubi et al., 2018).

Skeleto-muscular diseases (ICF = 0.89, 21 taxa) are frequent in the research area, and *D. costus*, *B. aristata*, *S. alba*, and *V. jatamansi* are plants used to treat muscular and joint issues. Stress and routine injuries may be to blame for these muscle and joint illnesses (Menkovic et al., 2018; Bello et al., 2019; Shukla et al., 2021). The roots of *D. costus* are ground to powder and mixed with mustard oil to make a paste, which is then used for the treatment of arthritis (Chakraborty et al., 2017). In the traditional medical system *B. aristata* is used in the treatment of rheumatoid arthritis (Kumar et al., 2009; Kumar et al., 2016). Human diseases related to dermatological disorders/skin problems (ICF = 0.91, 19 taxa) also represent the highest number of plant taxa, as found in other studies [Katare et al., 2020; Wani and Pant; Alamgir et al., 2017), followed by gastrointestinal and respiratory disorders, which may be due to residents' exposure to UV radiation at high altitude mountainous regions, resulting in chronic skin infection, diseases, and open-air defecation (Tangjitman et al., 2015). As described in other studies (Shukla and Sinclair et al., 2009; Jan et al., 2021), *D. stramonium* and *C. deodara* grow extensively in the study area and are used by the locals to treat dermatological problems. To treat wounds, cuts, and boils, a fresh extract of *D. stramonium* leaves is applied to the diseased area of the skin (Khanday and Singh, 2017). Because of the presence of active oil components, thymol and carvacol, ajwain (*T. ammi*) seeds produce essential oil, which is used in the pharmaceutical industry as an antimicrobial, antiinflammatory, antioxidant, cytotoxic, antilithiasis, nematicidal, anthelmintic, and antifilarial agent. It has also been reported to have a wide application in traditional medicine, It's used to treat gastrointestinal conditions like *C. sativa*, also known as "bhang" in India, includes cannabidiol and tetrahydrocannabinol (THC), which are used as antipsychotic, schizophrenic, and anxiolytic ingredients (Asati et al., 2017) and grows abundantly in the research region. So far, 65 species of pseudo capsicum have yielded at least 670 chemicals (Kaunda and Zhang, 2019) the majority of which exhibit strong anticancer and antioxidant properties. The Jammu and Kashmir Himalayas have been shown to have a considerable number of invasive and exotic plant species in recent decades, which could be owing to naturally induced climate change and biological invasions in natural habitats.

Conclusions

According to the current study, the native inhabitants of the study area have some of the best plant knowledge in the Kashmir Himalaya. This study, however, also illustrates the degradation of conventional knowledge among younger generations, which makes traditional knowledge more vulnerable. The loss of valuable knowledge can be reduced or restored with the appropriate policies and

rules. Furthermore, school curricula and raising awareness among youngsters can help to prevent future deterioration of traditional knowledge, allowing knowledge to be passed down from generation to generation. On the other hand, this research fills a void in ethnobotanical research, and the vast floristic diversity demonstrates the tremendous potential of indigenous people's traditional knowledge to aid in the establishment of cheap health care. The medicinal plants' frequency of usage and informant consensus factor can help with phytochemical and pharmacological studies, as well as conservation efforts. Through findings supported by chemical and pharmacological research, this study validated the scientific confirmation of majority of the described taxa for efficient efficacy against the disease. This study added to the evidence that plants used in traditional medicine are still important in the Himalayan hills and valleys. It also proved that the utility of a plant taxon in community culture is linked to local availability, life forms, and seasonal illnesses. Traditional knowledge in underdeveloped nations requires scientific standardization in terms of dosage, administration, and disease diagnosis accuracy. There is also a need for legal laws in terms of conservation and protection. Traditional wisdom in poor nations has been validated. Human activities such as house construction, dam construction, over-harvesting, and grazing have been identified as the main threats to local biodiversity, and this, combined with high demand for medical herbs on the market, puts increased pressure on plant taxa in the Himalayas and around the world. As a result, the most endangered and vulnerable plant species should be reassessed and introduced into the research region, either through law or through ecosystem restoration efforts. The findings of this study will undoubtedly serve as a future reference material for scientists working in the fields of systematic, biochemical, and pharmacological research.

Declaration of competing interest

The authors declare that they have no competing interests that could have appeared to influence the work reported in this paper.

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