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QUANTITATIVE ETHNOBOTANICAL EVALUATION OF PLANT RESOURCES UTILIZATION IN KOT JAMEL DISTRICT BHIMBER, AZAD JAMMU KASHMIR, PAKISTAN WITHIN ASIA CONTEXT

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Abstract

Pakistan, a developing country, has a large population with limited access to the modern facilities especially in rural areas. Local communities rely heavily on indigenous flora for medicinal, household and culinary purposes. Therefore, documenting this traditional knowledge is of great importance. In this context, an ethnobotanical survey was conducted in Kot Jamel, Bhimber, Azad Jammu and Kashmir (AJK) being an Asian context. Semi-structured questionnaires were administered to local inhabitants to document ethnobotanical uses of plants. A total of 101 plant species were recorded belonging to 52 families, with Fabaceae representing the most dominant family in terms of species richness. Among the documented species, *Coriandrum sativum* L. was the most frequently cited plant by respondents, while *Ficus religiosa* L. showed the highest use value, particularly among wild species, *Xanthium strumarium* L. also exhibited considerable cultural importance. Respiratory and digestive disorders were among the most commonly treated ailments using traditional plant remedies, reflecting strong community consensus regarding their therapeutic applications. Comparative analysis indicated moderate similarity with previous published ethnobotanical studies indicating distinct cultural variations in plant utilization. This study highlights the deep-rooted dependence of local communities on natural vegetation for healthcare, culinary, household and small-scale industrial purposes. The majority of the population continues to rely on plant-based traditional practices rather than modern healthcare approaches, reflecting strong cultural trust in their accessibility and effectiveness. Furthermore, these findings suggested that traditional medicinal knowledge exhibits both significant regional commonalities and pronounced cultural divergence.

Key words: Ethnobotany; Fabaceae; Local flora; Folk knowledge; Traditional practices

Introduction

The study of complex interactions between humans and plants to fulfil various needs within their environment is called Ethnobotany (Tunón *et al*., 2024). Broadly, it examines the dynamics between human and plants (Rahman *et al*., 2019). It is a multidisciplinary field which brings together botany and anthropology to explore the traditional uses of local plants. Indigenous communities possess vast knowledge of local flora, however, much of this time-honored knowledge is at risk of being lost (Prance, 2000). Understanding these human-plant relationships is particularly important in regions of high biodiversity in the Asian continent including Pakistan, India and China (Wang *et al.,* 2025).

Pakistan exhibits a wide range of climates, ecological zones and topographical landscapes, which support diverse flora. Approximately 6000 species of angiosperms have been documented in Kashmir and Pakistan (Ali & Qaiser, 1986; Ali, 2008). The use of plants for medicinal purposes is as ancient as their use for food (Shinwari & Qaiser, 2011). Within the diverse landscapes of Kashmir and Pakistan, certain local communities such as those in Kot Jamel village, have developed knowledge of plants surrounding them.

Kot Jamel, a village located in Bhimber District, Azad Jammu and Kashmir (AJK), lies in the southernmost region of AJK. District Bhimber is located at 32°58′29″N latitude, 74°04′23″E longitude. Indigenous communities of the area heavily rely on traditional knowledge for the treatment of various ailments highlighting the longevity of plant usage as documented in different surveys in District Bhimber (Maqbool *et al.,* 2019). This area experiences summer temperature reaching 45°C, while winters observed temperature rarely hits 2°C and humid and most rainfall occurs in the monsoon months of July and August (Awan *et al*., 2006).

Across various regions of Pakistan, the local flora is composed of diverse species that hold significant ethnobotanical importance. Certain plants have been consistently reported due to their frequent use and cultural relevance in traditional medicines (Shinwari & Gillani, 2003). *Acacia nilotica* (L.) Delile is one such species widely utilized by the local community for its medicinal properties. Its bark and gum have been used for gastrointestinal problems such as diarrhoea and dysentery, promote oral health and treats a variety of skin conditions (Ali *et al.,* 2012). The dependency and ethnobotanical knowledge is indicated in the repeated citation of this

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species among the indigenous groups (Hussain *et al.*, 2008). Phytochemical analyses indicate the presence of tannins, catechins, alkaloids and flavonoids, which reveals the anti-inflammatory and antimicrobial properties of this plant (Ali *et al.,* 2012). Due to its wide therapeutic uses and consistent reporting by native healers, *A. nilotica* is ranked among the most utilized species in ethnobotanical surveys (Shinwari & Gillani, 2003). Similarly, recent surveys further emphasize its high Informant Consensus Factor (ICF) and Use Value (UV) values, emphasizing its reliance and effectiveness within indigenous healthcare practices (Suleiman, 2015). In the light of above mentioned literature, the objectives of this study were:

- To explore the ethnobotanical knowledge for native flora of Kot Jamel, Bhimber, AJK
- To assess the quantitative analysis of the local flora of Kot Jamel, AJK
- To study the intra-cultural variation in ethnobotanical knowledge across demographic variables (age, gender, education and occupation)
- To evaluate the cross-regional and cross-cultural consistency comparisons for flora of Kot Jamel, Bhimber, AJK

Materials and Methods

Study area: The ethnobotanical surveys were conducted in Kot Jamel, a rural settlement in Barnala Tehsil, Bhimber District, Azad Jammu and Kashmir. District Bhimber is located at 32°58′29″N latitude, 74°04′23″E longitude. The area lies within the subtropical Himalayan foothills, characterized by undulating plains, scattered mango forest patches and cultivated fields (Fig. 1).

Meteorological data of study area: Meteorological data of District Bhimber, Azad Jammu Kashmir, Pakistan for 2025 is given in Table 1. Highest temperature 38.3ºC was recorded in the month of June and lowest in December (10.8ºC). Highest rainfall was recorded 167.1mm in August 2025.

Data collection and demographic information: Ethnobotanical information was collected from 1052 local informants of Kot Jamel including elders, farmers, herbal doctors, daily wage workers, housewives and retired teachers. Respondents were randomly selected, across different genders, ages, occupations, religions, ethnic groups and educational level (Table 2).

Data was obtained using semi-structured interviews assisted by structured questionnaires and face to face communication. Confidentiality of personal information was maintained and the study adhered to the ethical guidelines for ethnobotanical research involving indigenous knowledge (Fig. 2).

Identification of plants: All the collected plant specimens were identified with the help of Flora of Pakistan (Ali & Qaiser, 1986) and nomenclature was authenticated through world flora online (https://www.worldfloraonline.org). The specimens preserved on sheets were deposited in the Herbarium at Department of Botany, University of Gujrat, Pakistan, under assigned vouchers numbers. Since both the collection sites and the herbarium repository are located within Pakistan, no transboundary access to genetic resources was involved and thus no ABS/Nagoya Protocol permits were required for this research.

Data analysis

The information collected using questionnaires was further analyzed for quantitative analysis to calculate the various ethnobotanical indices. The ethnobotanical indices analyzed were as follows:

Use value (UV): The Use Value (UV) was calculated by dividing the total number of uses (U) of a specific plant species by the total number of respondents (N) as described by Umair *et al*., (2019).

$$UV = \sum U / N$$

where, U was the total number of uses of plant; N was the total number of respondents participating in the study.

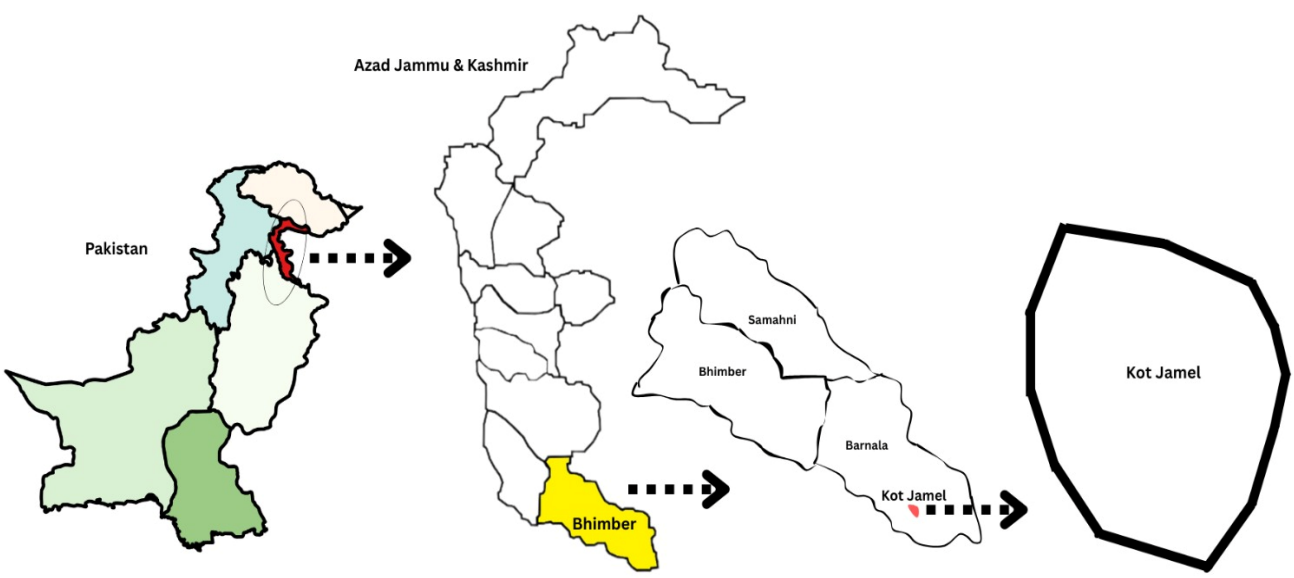

Fig. 1. Study area of Kot Jamel, Bhimber, AJK.

Table 1. Meteorological data (2025) of district Bhimber, AJK, Pakistan.

Month	High (°C)	Low (°C)	Avg. Temp. (°C)	Rainfall (mm)
Jan	19.5	2.4	10.8	69
Feb	22.0	4.0	16.6	21
Mar	27.2	11.5	19.4	55
Apr	33.5	16.8	25.1	38
May	37.2	21.0	29.1	24.5
Jun	38.3	19.8	29.0	55.5
Jul	36.1	23.3	29.7	150
Aug	36.1	20.3	29.0	167.1
Sep	34.0	19.5	26.8	117.1
Oct	25.2	10.9	18.1	48.4
Nov	24.0	9.5	16.8	12
Dec	22.6	5.4	13.9	8.5

Table 2. Demographic information of district Bhimber, AJK.

Variables	Categories	No. of respondents	Percentage
Gender	Male	413	39.25
	Female	639	60.75
Religion	Islam	985	93.63
	Christians	44	4.18
	Others	23	2.18
Language	Urdu	355	33.74
	Punjabi	45	4.27
	Kashmiri	652	61.97
Occupations	Housewives	413	39.25
	Farmers	213	20.24
	Students	59	5.6
	Hakeems	145	13.78
	Doctors	41	3.89
	Herbalist	123	11.69
	Laborers	44	4.18
	Drivers	14	1.33
Ethnic group	Kashmiri	672	63.87
	Syeds	53	5.03
	Arain	65	6.17
	Gujjar	45	4.27
	Sheikh	22	2.09
	Awan	119	11.31
	Jatt	76	7.22
Education level	Illiterate	45	4.28
	Primary	68	6.46
	Middle	212	20.15
	Higher secondary	213	20.25
	Graduation	356	33.84
	Higher education	158	15.02
Age group	25-35 years	113	10.74
	36-45 years	213	20.25
	46-55 years	338	32.13
	61-65 years	201	19.11
	66-75 years	187	17.78

Family use value (FUV): Family Use Value (FUV) was determined by dividing the sum of use value of all species belonging to a specific family by the total number of families in your research data (N) following the method of Cadena-González *et al*., (2013).

$$FUV = \sum UV/ N$$

where, ∑UV was the sum of use values of all the species of same family; N was the total number of families.

Relative frequency of citation (RFC): Relative Frequency of Citation (RFC) was used as plant's citation frequency to assess its relative importance or popularity. The following formula was used to calculate RFC as used by Perveen *et al*., (2024).

$$RFC = FC/ N$$

where FC was the number of respondents of specific plant species and N was the total number of respondents of whole survey.

Informant consensus factor (ICF): ICF was calculated using the following equation as described by Giday *et al*., (2009).

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

Here, Nur was the number of respondents reported for same species of use for specific disease category and Nt was the total number of species used for specific disease category.

Fidelity level (FL %): Fidelity level (FL) was determined following Usman *et al*., (2021) by dividing the total number of respondents for same type of use of specific category (Lp) by the total number of respondents of all the same species involved in that specific category (N).

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

Comparative analysis of ethnobotanical knowledge: Ethnobotanical documented plant species of District Bhimber were compared using Jaccard Index (JI) and Novel Percentage (NP) analysis to find cultural commonalities and differences among various neighbouring regions.

Jaccard index (JI): Jaccard Index (JI) was used to compare the similarity of species of study area of District Bhimber with previously published literature for adjacent areas. Following formula was used to calculate JI as described by Hussain *et al*., (2026).

$$JI (\%) = c/ a+b-c \times 100$$

where, a=number of species recorded in the study area, b= number of species recorded in compared area, c= number of species common in both areas.

Novel percentage (NP): Novel Percentage (NP) was used to determine the percentage of new or previously undocumented medicinal uses of plants with adjacent areas (Jhelum, Mandi Bauh-u-Din and Gujranwala). NP was calculated using following formula as described by Ahmad *et al*., (2017).

$$NP (\%) = N_u/ T_u \times 100$$

where, Nu= number of new uses or plants recorded for the first time, T_u was the total number of uses or plants in study area.

Fig. 2. Data collection during ethnobotanical survey.

Results

An ethnobotanical survey was performed, the information was collected, organized and through data analysis following results were obtained:

Demographic description: Demographic information from different variables is given in Table 2. There were total 1052 respondents including 413 males (39.25%) and 639 females (60.75%) from three types of languages distribution, 33.74% Punjabi, 4.27% Urdu and 61.97% Kashmiri (Table 2). Majority of informants were Muslims (93.63%) followed by Christians (4.18%). Regarding occupations, housewives (39.25%) comprised the largest groups of informants, followed by farmers (20.24%). Ethnic groups recorded were seven comprising Kashmiri (63.87%), and age groups of respondents were from 25-75 years and majority was from 46-55 years (32.13%), followed by 36-45 years (20.25%). There was higher number of educated informants describing graduation (33.84%).

Uses of plant species: The observation indicated that inhabitants of Kot Jamel utilized a wide spectrum of plant parts including roots, stems, leaves, twigs, fruits, seeds and whole plants using different preparation methods which include teas, decoctions, pastes, powders and fresh juices or administered orally, topically or for other intended ethnobotanical purpose.

Among the documented species, *Coriandrum sativum* L. (dhaniya) had the highest frequency of respondents (Table 3). For example, the leaves of *C. sativum* are typically used to make decoction, which is used orally to alleviate digestive disorders. The seeds of *C. sativum* are dried and then the powder is made for culinary purposes. Detailed documentation for each plant species highlighted the extensive ethnobotanical knowledge and the local reliance on these plants in Kot Jamel. Plants were used for various ailments including digestive and respiratory problems, skin infections, cardiovascular problems, urinary problems, cosmetics as well cultural uses.

Family index: A total of 52 families were identified from Kot Jamel village. Fabaceae was ranked 1st on the basis of highest number of species belonged to this family. A total of 12 spp. of Fabaceae family were found in Kot Jamel. The species of Fabaceae family are mainly used for digestive issues. There were 31 families that have only one species (Fig. 3).

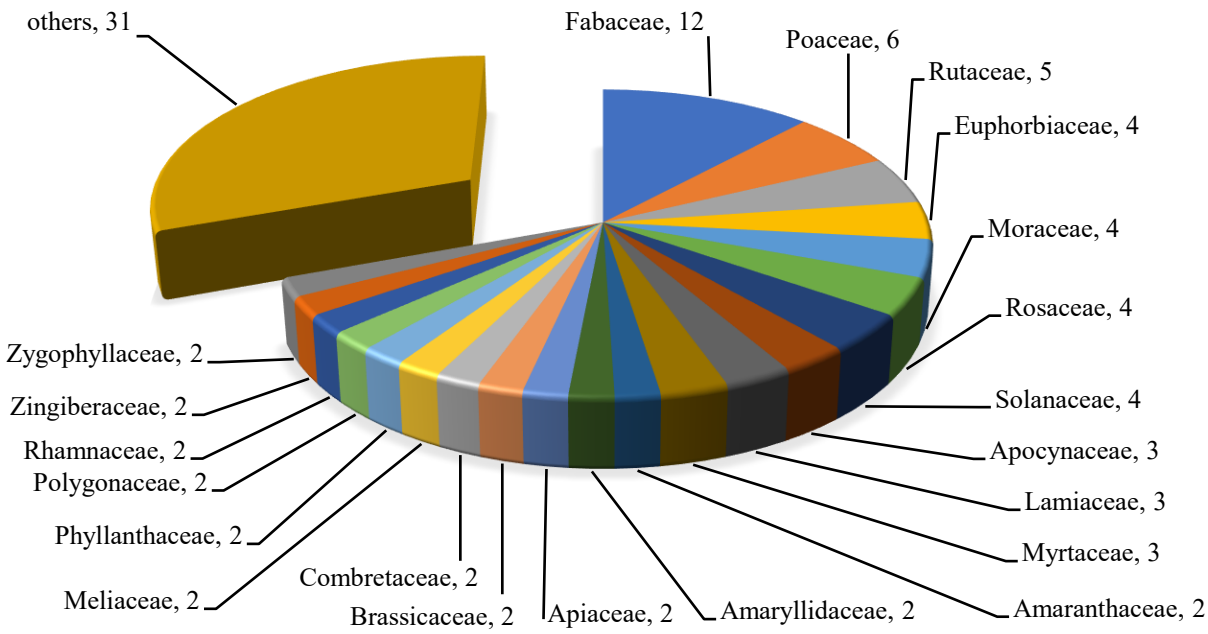

Fig. 3. Families having more than 1 representative in the study area.

Methods of use: During the survey, different preparation methods were documented on the basis of traditional knowledge of Kot Jamel. Decoction was accounted as the most used preparation methods (31%) among all other methods. It was primarily used to treat the gastrointestinal and respiratory ailments, followed by paste (20%) and powder (12%) methods of preparation. Methods just like crushing and soaking were less common (Fig. 4).

Plant part used: The analysis of plant parts used in ethnobotanical practices of Kot Jamel showed that leaves were the most frequently utilized part (28%). It was basically used to treat the skin diseases, performed major role in skin ailments contributing antioxidant, anti-inflammatory and anti-microbial properties. It was followed by fruits (13%), seeds (12%), stem or aerial parts (11%). Whole plant usage accounts for 9% while bark and roots contributed 10% and 6% respectively, and flower/pulp represent 6% of their use. Other parts collectively make up 5% of the reported uses, highlighting the community preferences for the certain plant in traditional practices (Fig. 5).

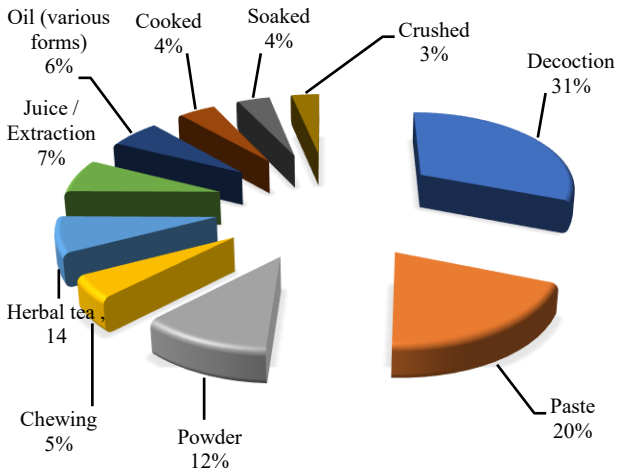

Fig 4. Preparation methods being used for different plant parts.

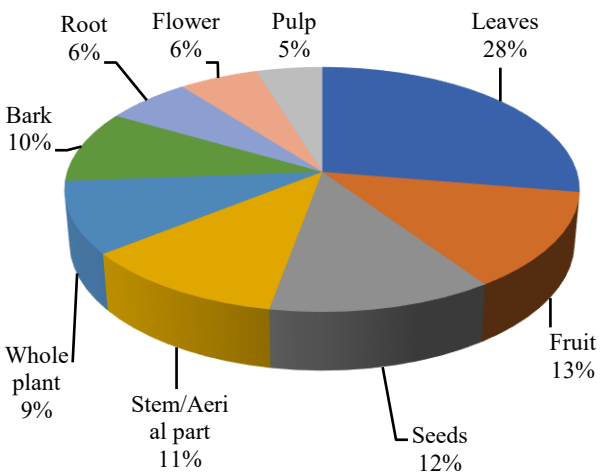

Fig. 5. Parts used in ethnobotanical practices.

Use value (UV): Data was calculated on excel for UV of each species. It was found that *Ficus religiosa* L. (Peepal) had the highest UV (0.57) and it had been used as fodder, fuel, as a cure of wounds and boils (Table 3). It was also observed that many wild plants had higher UV than the cultivated ones. The most common uses which were documented in study were related to digestion and skin problems.

Family use value (FUV): Data was calculated on excel for FUV of each species showing that *Xanthium strumarium* L. (Gokhru) had the highest FUV (0.50) and it has been used for respiratory and industrial purposes (Table 3). It was also observed that many wild plants had higher FUV than the cultivated ones.

Relative frequency of citation (RFC): Among the documented data *Coriandrum sativum* L. (Dhaniya) was the only species with highest Relative Frequency of Citation value (0.0257). It suggested that it was the most frequent cited plant among 101 plants. Most of the plants had Relative Frequency of Citation values in between 0.0038 to 0.0152 demonstrating lower mentions by the respondents (Table 3).

Informant consensus factor (ICF): The Informant Consensus Factor (ICF) was calculated for each use category to assess how much agreement existed among the natives. All the plant uses were categorized into similar medicinal and practical uses. A total of 8 categories of plant uses were made. The highest ICF value was observed for digestive problems (0.82), indicating strong agreement among informants (Table 4).

Fidelity level (FL): Data presented in Table 5 showed the Fidelity Level for important health disorders or uses of plants species during current study. The highest Fidelity Level (FL) value was observed for respiratory disorders which was 49.29%. It demonstrates the wide acceptance of different plant species among locals for their traditional uses.

Comparative ethnobotanical interpretation: The present study employed Novel Percentage (NP) and Jaccard Index (JI) to evaluate and compare ethnomedicinal novelty with previously documented studies across Punjab and adjacent macro-regions of Pakistan. Quantitative analysis provided an effective framework for the assessment of newly reported medicinal uses and the degree of overlap in floristic knowledge (Table 6).

Assessment of novel reports (Novel percentage): During this study Novel Percentage ranged from 19.72-49.12%, reflected considerable variation in the level of Ethnomedicinal novelty among the compared regions. Higher NP values observed on the Bajwat Area, Tehsil Kharian and Ratwal Village indicated that a substantial proportion of medicinal plant uses differed from those reported in earlier studies suggesting that these regions remained ethnobotanically underexplored and retained distinct traditional knowledge systems. High novelty recorded in this area may be attributed to ecological heterogeneity, limited influence of modernization and continued reliance on indigenous healthcare practices.

Commonalities and differences (Jaccard index): The calculated Jaccard Index (JI) values ranged 23.5 to 45.3%, indicating low to moderate similarity in floristic compositions and medicinal applications. Higher JI values observed for the Bajwat Area (45.3%) sharing 91 common species, Dinga (38.8%) with 39 common species and Wazirabad (38.1%) with 70 species (Khan & Ahmad, 2015), reflected a substantial overlap in medicinal plants that suggested the presence of shared flora of the regions. These values reflect a substantial overlap in medicinal plant usage, suggesting the presence of shared flora and a consistency in traditional knowledge across these specific geographical belts. Lower JI values recorded for Mangowal (23.5%) and Kotla, Kharian (29.6%), represented reduced similarity with earlier studies (Hussain *et al*., 2026), highlighted significant regional divergence in Ethnomedicinal practices. It reflected variations in ethnomedicinal applications, difference in plant parts used, preparation methods and therapeutic indications.

Table 3. Identification of plants with uses methods and prescriptions in the study area.

Botanical name	Common name	Family	Voucher code	Ethnomedicinal use and preparation	UV	FUV	RFC
Achyranthes aspera L.	Puthkanda	Amaranthaceae	UOG-BOT-1099	The leaves, root, and seeds are used for asthma, wound healing, and as a digestive aid, prepared as dry root powder, paste, seed powder, or decoction	0.44	0.36	0.0086
Adiantum capillus-veneris L.	Maidenhair fern	Pteridaceae	UOG-BOT-1100	The whole plant is used for cough and hair growth, administered as a decoction or paste	0.29	0.29	0.0067
Aegle marmelos (L.) Corrêa	Bill kath	Rutaceae	UOG-BOT-1101	The whole plant is applied for digestive aid, arthritis, and culinary purposes via decoction, pulp of fruit, or juice extraction	0.38	0.39	0.0076
Albizia lebbeck (L.) Benth.	Shareen	Fabaceae	UOG-BOT-1102	The leaf, bark, and seeds are used for skin allergy, respiratory issues, and wound healing through paste, decoction, or herbal tea	0.33	0.30	0.0086
Allium cepa L.	Pyaz	Amaryllidaceae	UOG-BOT-1103	The bulb is used as an expectorant, for hair care, and culinary use via juice extraction or in salad	0.50	0.47	0.0057
Allium sativum L.	Lehsan	Amaryllidaceae	UOG-BOT-1104	The bulb is utilized for culinary needs, blood pressure, cough, and cholesterol, prepared as an extract, raw, crushed, or cooked	0.44	0.47	0.0086
Aloe vera (L.) Burm. f.	Aloe vera	Asphodelaceae	UOG-BOT-1105	The pulp and latex are used for hair issues and skin diseases by blending or cooking	0.29	0.29	0.0067
Alstonia scholaris (L.) R.Br.	Shaitan drakhat	Apocynaceae	UOG-BOT-1106	The bark, leaf, and twigs are used for malaria, teeth problems, and skin problems via decoction, paste, or chewing	0.38	0.32	0.0076
Araucaria heterophylla (Salisb.) Franco	Araucaria	Araucariaceae	UOG-BOT-1107	The bark and leaf are used for wound healing and as an anti-inflammatory through decoction or steam	0.29	0.29	0.0067
Azadirachta indica A. Juss.	Neem	Meliaceae	UOG-BOT-1108	The leaf, wood, and bark are utilized for fever, skin diseases, and diabetes via boiled leaves, chewing, or decoction	0.38	0.35	0.0076
Bambusa vulgaris Schrad. ex J.C. Wendl.	Baans	Poaceae	UOG-BOT-1109	The leaves, culm, and soft wood are used for respiratory problems, construction, and diabetes, prepared as a decoction, by crushing, or as herbal tea	0.38	0.32	0.0076
Bauhinia variegata L.	Kachnar	Fabaceae	UOG-BOT-1110	The leaf, flower buds, bark, and timber are used for goiter, gastrointestinal issues, intestinal worms, and "zehr bad" via decoction, cooking, or paste	0.30	0.30	0.0095
Boerhavia diffusa L.	Punarnava	Nyctaginaceae	UOG-BOT-1111	The root and leaves are used for digestive, heart, respiratory, and menstrual issues, prepared as powder, decoction, or leaf extraction with coconut oil	0.40	0.40	0.0095
Bombax ceiba L.	Simbal	Malvaceae	UOG-BOT-1112	The whole plant is used for ornamental use, diarrhea, and stuffing pillows through decoction, stuffing, or cutting	0.38	0.38	0.0076
Brassica rapa L.	Mustard	Brassicaceae	UOG-BOT-1113	The seeds, flowers, and leaf are used for hair health, digestion, skin care, and as a preservative via oil, paste, or extracts mixed with yogurt	0.36	0.26	0.0105
Cajanus cajan (L.) Millsp.	Reerh	Fabaceae	UOG-BOT-1114	The seed, leaves, and fruit are used for skin, respiratory, and digestive diseases through herbal tea, cooking, or decoction	0.27	0.32	0.0105
Calotropis procera (Aiton) Dryand.	Akk	Apocynaceae	UOG-BOT-1115	The leaves, flower, and latex are used for toothache, as an antidote, and for arthritis through chewing or direct application	0.30	0.32	0.0095
Cannabis sativa L.	Bhang	Cannabaceae	UOG-BOT-1116	The whole plant is used for sedation and anti-inflammation, prepared as powder, paste, or by grinding	0.20	0.20	0.0095
Carica papaya L.	Papita	Caricaceae	UOG-BOT-1117	The fruit, seed, bark, and leaf are used for digestion, malaria, and immunity via juice, decoction, or crushed	0.19	0.19	0.0152
Cassia fistula L.	Amaltas	Fabaceae	UOG-BOT-1118	The leaves and pods are used for gastrointestinal issues, blood purification, and diabetes through decoction	0.30	0.30	0.0095
Cestrum diurnum L.	Din ka raja	Solanaceae	UOG-BOT-1119	The whole plant is used for inflammation, wounds, infections, and as an ornamental via oil extract, paste, or salads	0.40	0.37	0.0095
Cestrum nocturnum L.	Raat ki rani	Solanaceae	UOG-BOT-1120	The leaf, bark, and flower are used for ornamental purposes, pain, stress relief, and wound healing through decoction or paste	0.40	0.37	0.0095
Chenopodium album L.	Bathu	Amaranthaceae	UOG-BOT-1121	The whole plant is used as a diuretic, for anti-inflammation, and digestion via fresh leaves, powder, or extraction	0.27	0.36	0.0105
Citrullus colocynthis (L.) Schrad.	Tumbay da bair	Cucurbitaceae	UOG-BOT-1122	The dry fruit pulp is used for digestion and as an anti-diabetic agent through powder or decoction	0.33	0.33	0.0057
Citrus × *limetta* Risso	Musami	Rutaceae	UOG-BOT-1123	The fruit is used for digestive issues, skin diseases, dehydration, and constipation through juice or a decoction of the peel	0.40	0.39	0.0095
Citrus limon (L.) Osbeck	Lemon	Rutaceae	UOG-BOT-1124	The fruit is used for weight loss, detoxification, gum inflammation, and fever via juice or herbal tea	0.40	0.39	0.0095

Table 3. (Cont'd.).

Botanical name	Common name	Family	Voucher code	Ethnomedicinal use and preparation	UV	FUV	RFC
Citrus × *aurantiifolia* (Christm.) Swingle	Sweet lime	Rutaceae	UOG-BOT-1125	The fruit and leaves are used for immunity, digestive, and nervous issues via juice or steeping leaves in hot water	0.50	0.39	0.0057
Cordia myxa L.	Lasoorhay	Boraginaceae	UOG-BOT-1126	The fruit, leaf, and bark are used for immunity, gastrointestinal issues, and anti-inflammation through wrapping, soaking, boiling, or pickling	0.17	0.17	0.0219
Coriandrum sativum L.	Dhaniya	Apiaceae	UOG-BOT-1127	The whole plant is applied for gastrointestinal, immunity, cardiovascular health, and as a spice via soaking, decoction, or powder	0.15	0.22	0.0257
Cupressus sempervirens L.	Italian cypress	Cupressaceae	UOG-BOT-1128	The leaves, fruit, and stem are used for respiratory, gastrointestinal, and skin care via powder, decoction, or oil	0.33	0.33	0.0086
Curcuma longa L.	Haldi	Zingiberaceae	UOG-BOT-1129	The rhizome is used for internal wounds, skin care, immunity, and body swelling through milk infusion, cooking, powder, or paste	0.40	0.35	0.0095
Cymbopogon citratus (DC.) Stapf	Lemon grass	Poaceae	UOG-BOT-1130	The leaf, stem, and root are used for gastrointestinal issues and cough, prepared as a decoction from dried or fresh parts	0.22	0.32	0.0086
Cynodon dactylon (L.) Pers.	Khabal ghaas	Poaceae	UOG-BOT-1131	The whole plant is used for intestinal worms, bleeding from cuts, and fodder through decoction, powder, or stock	0.30	0.32	0.0095
Cyperus rotundus L.	Dela ghaas	Cyperaceae	UOG-BOT-1132	The whole plant is used for animal feed, wound healing, digestive issues, and urinary problems via cutting, extraction, decoction, or root paste	0.40	0.40	0.0095
Dactyloctenium aegyptium (L.) Willd.	Madhana ghaas	Poaceae	UOG-BOT-1133	The whole plant is used for skin problems and fodder through extraction or paste	0.20	0.32	0.0095
Dalbergia sissoo Roxb. ex DC.	Taali	Fabaceae	UOG-BOT-1134	The leaf, seed, stem, and twigs are used for skin disease, piles, gum inflammation, and furniture through decoction or paste	0.36	0.30	0.0105
Epipremnum aureum (Linden & André) G.S.Bunting	Money plant	Araceae	UOG-BOT-1135	The whole plant is used for wounds, inflammation, air purification, and as an ornamental via extract or planting	0.40	0.40	0.0095
Eriobotrya japonica (Thunb.) Lindl.	Louqat	Rosaceae	UOG-BOT-1136	The fruit and leaf are used for immunity, digestion, and respiratory health through herbal tea, powder, or dry fruit	0.25	0.29	0.0114
Eruca vesicaria (L.) Cav.	Taramira	Brassicaceae	UOG-BOT-1137	The seed, stem, leaves, and flower are used for immunity, hair fall, anti-inflammation, and cardiovascular health by cooking leaves or extracting oil from flowers and leaves	0.16	0.26	0.0238
Erythrina L. spp.	Coral tree	Fabaceae	UOG-BOT-1138	The leaf is utilized for inflammation, insomnia, and immunity through paste, decoction, or applying warm leaves	0.23	0.30	0.0124
Eucalyptus camaldulensis Dehnh.	Safaida	Myrtaceae	UOG-BOT-1139	The leaf and wood are used for respiration, flu, and as an insect repellent via decoction or steam	0.30	0.27	0.0095
Euphorbia cotinifolia L.	Lal doodhi	Euphorbiaceae	UOG-BOT-1140	The leaves are used for respiratory issues, wound healing, and color dye through tea, decoction, or boiling for dyes	0.30	0.30	0.0095
Euphorbia hirta L.	Dudhal booti	Euphorbiaceae	UOG-BOT-1141	The whole plant is used for inflammation, arthritis, and gastrointestinal issues via grinding leaves, decoction, or paste	0.30	0.30	0.0095
Euphorbia prostrata Aiton	Hazaar dana	Euphorbiaceae	UOG-BOT-1142	The whole plant is used for respiratory issues, anti-inflammation, and fever, typically as a decoction	0.30	0.30	0.0095
Fagonia cretica L.	Dhamasa	Zygophyllaceae	UOG-BOT-1143	The whole plant is used for cancer, skin problems, and as a blood purifier through powder, paste, or decoction	0.30	0.30	0.0095
Fagopyrum esculentum Moench	Papra	Polygonaceae	UOG-BOT-1144	The leaf and seed are used for digestive issues, skin problems, and detoxifying through paste, powder, or decoction	0.38	0.39	0.0076
Ficus benghalensis L.	Bhorh	Moraceae	UOG-BOT-1145	The bark, leaf, twigs, stem, and fruit are used for oral and gastrointestinal issues through chewing or consuming fresh fruit	0.18	0.31	0.0105
Ficus carica L.	Anjeer	Moraceae	UOG-BOT-1146	The fruit, leaf, and root are used for digestive issues, immunity booster, and piles through fresh/dried fruit, soaking, or decoction	0.30	0.31	0.0095
Ficus religiosa L.	Peepal	Moraceae	UOG-BOT-1147	The stem and leaf are used for fodder, fuel, wound healing, and boils, primarily as a paste	0.57	0.31	0.0067
Foeniculum vulgare Mill.	Sonf	Apiaceae	UOG-BOT-1148	The seed is used for menstrual cramps, bad breath, and digestive issues through decoction, oral intake, or infusion with tea	0.30	0.22	0.0095
Glycyrrhiza glabra L.	Malathi	Fabaceae	UOG-BOT-1149	The root and bark are used for respiratory tract infection and stomach acidity through decoction or powder	0.20	0.30	0.0095

Table 3. (Cont'd.).

Botanical name	Common name	Family	Voucher code	Ethnomedicinal use and preparation	UV	FUV	RFC
Kalanchoe pinnata (Lam.) Pers.	Pathar chat	Crassulaceae	UOG-BOT-1150	The whole plant is used for wound healing, kidney stone, and gastrointestinal issues via crushed leaves, juice, powder, or direct application	0.16	0.16	0.0181
Leucaena leucocephala (Lam.) de Wit	Subabul	Fabaceae	UOG-BOT-1151	The leaves, seed, and bark are utilized for fodder, skin issues, and immunity through decoction, paste, oil, or mixing with fodder.	0.16	0.30	0.0181
Linum usitatissimum L.	Alsi	Linaceae	UOG-BOT-1152	The seed is used for joint pain, digestion, and hair strength/growth through soaking, gel, or powder.	0.30	0.30	0.0095
Mangifera indica L.	Mango	Anacardiaceae	UOG-BOT-1153	The leaf, fruit, and seed are used for gastrointestinal issues and as an immunity booster via fresh fruit or decoction	0.20	0.20	0.0095
Melia azedarach L.	Dharek	Meliaceae	UOG-BOT-1154	The leaf, bark, stem, and resin are used for fever, skin, and timber through herbal tea or cutting	0.33	0.35	0.0086
Mentha × piperita L.	Podina	Lamiaceae	UOG-BOT-1155	The leave is used for digestive issues, headache, and as a body cooler through herbal tea, chewing, or paste	0.30	0.33	0.0095
Moringa oleifera Lam.	Sohanjna	Moringaceae	UOG-BOT-1156	The leaf, root, stem, and seeds are used for skin diseases, cholesterol, and digestive issues via dry leaves powder, seed powder, or paste	0.30	0.30	0.0095
Morus alba L.	Shehtoot	Moraceae	UOG-BOT-1157	The root, fruit, and leaf are used for digestive and respiratory issues through decoction or fresh fruit	0.20	0.31	0.0095
Murraya koenigii (L.) Spreng.	Kari pata	Rutaceae	UOG-BOT-1158	The leaf is used for digestive and culinary purposes via powder or decoction	0.29	0.39	0.0067
Musa × paradisiaca L.	Banana	Musaceae	UOG-BOT-1159	The fruit, stem, and leaf are used for digestive issues and kidney stones by consuming fresh fruit or mashed banana mixed in milk	0.29	0.29	0.0067
Nigella sativa L.	Kalwanji	Ranunculaceae	UOG-BOT-1160	The seed is utilized for asthma, bloating, gas, and stomach issues, typically through chewing	0.33	0.33	0.0114
Ocimum basilicum L.	Nyaz boz	Lamiaceae	UOG-BOT-1161	The leaf and seed are used for respiratory problems, body cooler, and digestive problems through decoction, soaking seeds, or smelling the leaf.	0.30	0.33	0.0095
Ocimum tenuiflorum L.	Tulsi	Lamiaceae	UOG-BOT-1162	The leaf and flower are used for respiratory, skin diseases, cold, and fever via chewing, juice, or herbal tea	0.38	0.33	0.0076
Orchis latifolia L.	Salab panja	Orchidaceae	UOG-BOT-1163	The root is utilized for weakness and reproductive health through powder, decoction, or pills	0.33	0.33	0.0057
Oxalis corniculata L.	Khati booti	Oxalidaceae	UOG-BOT-1164	The whole plant is used as an anti-toxin, for gastrointestinal issues/worms, and skin diseases via decoction, leaf juice, or paste	0.27	0.27	0.0105
Parthenium hysterophorus L.	Pangra	Asteraceae	UOG-BOT-1165	The whole plant is used for gastrointestinal, allergy, and immunity issues through crushed plant extract or powder	0.23	0.23	0.0124
Phoenix dactylifera L.	Khajoor	Arecaceae	UOG-BOT-1166	The fruit, seed, and leaf are used for digestive issues, cough, and wound healing through consumption, powder, or handcraft	0.33	0.33	0.0086
Phyllanthus amarus Schumach. & Thonn.	Dukong anak	Phyllanthaceae	UOG-BOT-1167	The whole plant is used for digestive issues, kidney stone, and fever via tea, paste, sap, or decoction	0.38	0.35	0.0076
Phyllanthus emblica L.	Amla	Phyllanthaceae	UOG-BOT-1168	The fruit, leaf, and bark are used for digestive, diabetes, and skin issues through raw, juice, or paste	0.33	0.35	0.0086
Pinus roxburghii Sarg.	Cheerh	Pinaceae	UOG-BOT-1169	The stem, bark, resins, and wood are used for cough, firewood, and timber through decoction or as timber	0.23	0.23	0.0124
Plantago ovata Forssk.	Ispaghol	Plantaginaceae	UOG-BOT-1170	The seed is used for constipation, weight loss, and digestive issues through soaking or mixed with water/milk	0.33	0.33	0.0086
Pongamia pinnata (L.) Pierre	Sukchain	Fabaceae	UOG-BOT-1171	The twigs, stem, seed, and leaf are used for skin, oral issues, and wound healing through chewing, extract, or decoction	0.43	0.30	0.0067
Portulaca oleracea L.	Kulfa	Portulacaceae	UOG-BOT-1172	The leaf is utilized for skin conditions, diabetes, and digestive issues through cooking, decoction, or paste with mustard oil	0.30	0.30	0.0095
Prunus armeniaca L.	Apricot	Rosaceae	UOG-BOT-1173	The fruit and seed are used for digestive issues and skin dryness via soaked dried fruit or ground seeds	0.25	0.29	0.0076
Prunus persica (L.) Batsch.	Peach	Rosaceae	UOG-BOT-1174	The fruit, leaf, flower, and bark are used for respiratory, culinary, and skin purposes through juice, fresh fruit, or herbal tea	0.38	0.29	0.0076

Table 3. (Cont'd.).

Botanical name	Common name	Family	Voucher code	Ethnomedicinal use and preparation	UV	FUV	RFC
Psidium guajava L.	Amrood	Myrtaceae	UOG-BOT-1175	The fruit and leaf are used for diabetes, respiratory problems, and digestion via juice, decoction, or fruit paste with ginger	0.30	0.27	0.0095
Ricinus communis L.	Orandi/castor plant	Euphorbiaceae	UOG-BOT-1176	The leaf and seed are used for constipation/piles, skin problems, and joint pain through warm oil, warm leaf bandages, or seed oil with milk	0.30	0.30	0.0095
Rosa × indica	Rose	Rosaceae	UOG-BOT-1177	The petals are utilized for skin care, digestive aid, and eye rashes through "Gulkand," steam collection, paste, or herbal tea	0.30	0.29	0.0095
Rumex dentatus L.	Jangli palak	Polygonaceae	UOG-BOT-1178	The root, seed, and leaf are used for skin conditions and digestive issues through decoction, paste, or cooking	0.40	0.39	0.0048
Saccharum bengalense Retz.	Saroot	Poaceae	UOG-BOT-1179	The whole plant is used for skin, diuretic, and piles via extract, decoction, or paste	0.33	0.32	0.0086
Salvadora persica L.	Miswak	Salvadoraceae	UOG-BOT-1180	The leaf and twigs are utilized for toothache, joint pain, and cough through heating leaves or peeling bark	0.30	0.30	0.0095
Senegalia modesta (Wall.) P.J.H. Hurter	Phalai	Fabaceae	UOG-BOT-1181	The bark, leave, and resin are used for wound healing, gum bleeding, and cough via powder, paste, or chewing twigs	0.33	0.30	0.0086
Senna occidentalis (L.) Link	Kaswandi	Fabaceae	UOG-BOT-1182	The leaf, seed, flower, and root are used for respiratory, digestive, and joint pain through paste, decoction, or infusion	0.43	0.30	0.0067
Setaria verticillata (L.) P. Beauv.	Kaangi/choti kangi	Poaceae	UOG-BOT-1183	The seed and leaf are used for fodder, landscaping, and as a diuretic through infusion or powder	0.50	0.32	0.0057
Solanum nigrum L.	Kench manch	Solanaceae	UOG-BOT-1184	The stem, leaf, and fruit are used for joint pain, fatty liver, and wound healing through cooking, paste, or decoction	0.30	0.37	0.0095
Syzygium cumini (L.) Skeels	Jamun	Myrtaceae	UOG-BOT-1185	The fruit, bark, and seed are used for gastrointestinal issues and diabetes through juice or fresh fruit	0.20	0.27	0.0095
Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Arjan	Combretaceae	UOG-BOT-1186	The bark is utilized for heart disease, digestion, and liver issues through powder or decoction	0.33	0.36	0.0086
Terminalia bellirica (Gaertn.) Roxb.	Baheda	Combretaceae	UOG-BOT-1187	The fruit is used for respiratory tract infection, neurological disorders, and digestive issues through fruit pulp or powder	0.38	0.36	0.0076
Tinospora cordifolia (Willd.) Miers	Gillo	Menispermaceae	UOG-BOT-1188	The leaf and stem are used for gastrointestinal, fever, and immunity via powder mixed with turmeric/milk, or soaking and grinding	0.23	0.23	0.0124
Trapa natans L.	Singarha	Lythraceae	UOG-BOT-1189	The fruit, leaf, and stem are used for urinary, digestive, and respiratory issues through boiled fruit or peel powder	0.30	0.30	0.0095
Tribulus terrestris L.	Pakhra	Zygophyllaceae	UOG-BOT-1190	The nutlets, seeds, and leaf are used for wound healing, kidney stone, and asthma via decoction, seed powder, or leaf extraction	0.30	0.30	0.0095
Trigonella foenum-graecum L.	Maithray	Fabaceae	UOG-BOT-1191	The seed is used for hormonal, digestive, and blood issues through soaking, powder, or decoction	0.33	0.30	0.0086
Vachellia nilotica (L.) P.J.H. Hurter & Mabb.	Kikar	Fabaceae	UOG-BOT-1192	The wood, leaf, bark, fruit, and gum are used for digestion, wound healing, oral infection, and timber via soaking, decoction, or powder	0.33	0.30	0.0114
Viola odorata L.	Phool bnafsha	Violaceae	UOG-BOT-1193	The leaf and flower are used for respiratory problems, brain health, and blood purifier via decoction, syrup, or paste	0.30	0.30	0.0095
Vitis vinifera L.	Angoor	Vitaceae	UOG-BOT-1194	The fruit and leaves are used for heart, cough, and constipation through fresh fruit, raisins, or leaf paste	0.38	0.38	0.0076
Withania somnifera (L.) Dunal	Asgand nagori	Solanaceae	UOG-BOT-1195	The root and leaf are used for nervous system, body weakness, and joint pain through root powder (mixed with ginger/milk etc.), oil, or decoction	0.38	0.37	0.0076
Xanthium strumarium L.	Gokhru	Asteraceae	UOG-BOT-1196	The whole plant is utilized for respiratory and industrial purposes through decoction or boiling	0.50	0.50	0.0038
Zingiber officinale Roscoe	Adrak/sund	Zingiberaceae	UOG-BOT-1197	The root is utilized for digestive issues, cough, and immunity via tea or chewing	0.30	0.35	0.0095
Ziziphus jujuba Mill.	Beri	Rhamnaceae	UOG-BOT-1198	The root, bark, and fruit are utilized for immunity, jaundice, and fever via decoction or fresh fruit	0.50	0.39	0.0057
Ziziphus mauritiana Lam.	Kokan ber	Rhamnaceae	UOG-BOT-1199	The fruit is used for skin diseases and fever through paste or fresh fruit	0.29	0.39	0.0067

Table 4. Informant consensus factor (ICF) for each disease category.

Disease category	Diseases included	Nur	Nt	ICF
Digestive disorders	Aids digestion, Gastrointestinal issues, Intestinal worms, Constipation, Piles, Acidity, Bloating	268	50	0.82
Dermatological diseases	wound healing, allergy, skin diseases, Wound Bleeding, Boils, Eye rash, Hair growth and issue, hair health, Skin Care, Hair Fall, Hair strength	184	50	0.73
Respiratory problems	Cough, asthma, arthritis, expectorant, respiratory problem, flu, respiratory tract infection	120	30	0.76
Oral and Dental uses	Gums bleeding, mouth ulcer, toothache, mouth smell	29	10	0.68
General Medicinal & Metabolic uses	Antidote, Anti-toxin, Immune booster, metabolism regulation, diabetes, goiter, hormonal aid, body cooler, weakness, weight loss, liver disorders, anti-cancer, jaundice, Menstrual issues, Cramps, Reproductive Health, Malaria, Fever, Anti-infectious	176	54	0.70
Musculoskeletal and Neurological uses	Anti-inflammatory, Pain, joint pain, Headache, Sedation, Stress relief, Nervous system problems, Insomnia, Brain Health	75	27	0.65
Circulatory & Excretory uses	BP, Cholesterol, Heart issue, Blood purification, Diuretic, Hydration support, Detoxification, Cardiovascular, Kidney Stone	80	24	0.71
Cultural and Economical Uses	Cooking, vegetables, Preservative, Pickling, Spices, Ornamental, Stuffing pillows, Landscaping, Timber, Construction, Furniture, Fuel, Fodder, Insect repellent, Dye, Fertilizer, Industrial Use	120	46	0.62

Table 5. Fidelity level of most important disorders/uses of plants.

Disorders/Uses	Common names of plants used for category	Ip	In	FL%
Digestive disorders	Puthkanda, kachnar, papita, amaltas, bathu, tumbay da bair, musami, lasoorhay, sweet lime, italian cypress, lemon grass, louqat, bhorh, anjeer, sonf, alsi, aam, shehtoot, kela, kalwanji, pangra, khajoor, dukong ainak, amla, cheerh, isphagol, orandi, jamun, bahedha, gillo, maithray, kikar	160	346	46.24
Dermatological diseases	Shareen, aloe vera, shaitan drakht, neem, srsu, hareerh, din ka raja, haldi, khabal gass, madhana, money plant, taramira, coral tree, dhudhal boti, dhamasa, paprha, pathar chat, dharek, tulsi, khati boti, sukhchain, kulfa, gulab, jangli palak, saroot, phalai, kaswandi	118	288	40.97
Respiratory problems	Maiden Hair fern, baans, punarnava, safaida, hazaar dana, malathi, kalwanji, nyaz boz, tulsi, cheerh, aarhu, amrood, phool banafsha, angoor, gokhru, adrak	69	140	49.29
Cultural and Economical uses	Bill kath, pyaz, simbal, raat ki rani, lasoorhay, shaniya, dela gaas, madhana, taali, lal dodhi, peepal, subabul, kari pata, choti kangi	72	156	46.15

Cultural interpretation of ethnomedicinal similarities and differences: Combined results for NP and JI revealed that ethnomedicinal knowledge was shaped by both ecological and cultural factors. Regions exhibiting high NP alongside moderate to high JI values demonstrated that Ethnomedicinal novelty often arose from culturally specific interpretations of commonly available plants. In such cases, shared flora was used to meet localized needs through alternative preparation methods and therapeutic applications. Regions have moderate JI and low NP values exhibited a greater degree of knowledge uniformity, suggesting that traditional medicinal practices in this area have been standardized from generation to generations.

Macro-regional implications: At the macro-regional scale, the observed variation in NP and JI values confirms that ethnomedicinal knowledge across Punjab is highly heterogeneous and culturally mediated. The persistence of novel medicinal uses in certain regions underscores the urgency of documenting traditional knowledge in areas undergoing rapid socio-economic change. Such documentation is essential not only for preserving cultural heritage but also for identifying potentially valuable medicinal practices that may contribute to future pharmacological research and biodiversity conservation efforts.

Discussion

Present study of ethnobotanical surveys revealed that Kot Jamel, Bhimber District was rich in plant diversity used for medicinal, household and culinary purposes. Most of the plants were used for medicinal purposes. Khan *et al*., (2014) reported similar patterns of reliance on wild plant species for different purposes in most of rural areas of Pakistan. Likewise, a similar pattern regarding flora diversity and native's dependency on local flora has been reported in District Bhimber and adjacent Shiwalik foothill area by Manzoor *et al*., (2022). It was found that native's use indigenous flora for medicinal and livelihood motives using folk knowledge. The subtropical climate disturbs the biodiversity rather favours the natural flora and natural vegetation zones provide favorable ecological conditions for diverse flora, while the prominence of certain species in Kot Jamel likely reflected their accessibility, cultural significance, and versatility in local diets and remedies, highlighting the continued relevance and transmission of ethnobotanical knowledge within the community (Ali *et al*., 2020).

Documented plants species belonged to the families such as Fabaceae and Poaceae having the highest number of species and use values demonstrated their importance among the locals for cultural uses such as medicines and miscellaneous. Similar ethnobotanical investigations were documented by Khanum *et al*., (2024) during the survey of in Sanghar Mountains in Bhimber explaining the importance of different families for medicinal purposes. It shows the diversity of plant species in the study area (Rehman *et al*., 2020). Families dominant in any study area might be due the presence of some active compounds (Wu *et al*., 2023).

Table 6. Comparative Ethnobotanical studies with neighboring regions for NP and JI.

Study area and reference	Recorded plant species	Plant with similar use	Plant with different uses	Common number of species	species in the current study area	Novel percentage (NP)	Jaccard index (JI)
Kotla, Kharian (Shuaib *et al*., 2022)	84	16	24	40	101	28.5%	29.6%
Gujrat District (Ali *et al*., 2020)	72	21	18	39	101	25%	27.9%
Jalalpur Jattan (Hussain *et al*., 2010)	88	22	21	43	101	23.86%	32.1%
Mangowal, Gujrat (Parvaiz, 2014)	40	13	11	24	101	27.5%	23.5%
Bajwat Area (Khan *et al*., 2021)	114	35	56	91	101	49.12%	45.3%
Tehsil Kharian (Ajaib *et al*., 2014)	50	14	22	36	101	44%	35.6%
Dinga, Gujrat (Parvaiz *et al*., 2013)	50	23	16	39	101	32%	38.8%
Wazirabad (Khan & Ahmad, 2014)	97	45	25	70	101	25.77%	38.1%
Gujranwala (Ahmad & Zafar, 2013)	71	33	14	47	101	19.72%	36.9%
Ratwal Village (Khan & Hussain, 2011)	43	19	17	36	101	39.53%	35.6%

These surveys revealed that local preparations and methods were mainly orally, with the diversity of preparation methods and use of multiple plant parts reflected a sophisticated traditional knowledge system passed down through generations. Similarly, Rehman *et al*., (2023) stated that there are various methods and local preparations among local communities. The use of semi-structured questionnaires in this study facilitated the documentation of such practices, allowing the collection of detailed, flexible, and context specific that may prove valuable for future research. Similar patterns have been observed in studies of Arang Valley, District Bajaur and Khyber Pakhtunkhwa, Pakistan: a mountainous region of the Hindu Kush range conducted by Haq *et al*., (2023). Researchers highlighted the role of semi-structured questionnaires in documenting traditional practices. Despite this rich knowledge, the oral transmission renders but it is vulnerable, particularly as the younger generation shows decreasing engagement due to migration, the increasing influence of urbanization, modernization. Studies from Kohistan and Haripur by Shinwari *et al*., (2024) reported the declining participation of youth in ethnobotanical practices, posing a long-term risk to the continuity of cultural and medicinal heritage (Luo *et al*., 2024). These findings underscored the importance of systematic documentation and community based initiatives to preserve traditional plant knowledge for future research and practical applications.

Mostly, in rural communities, plants are valued for remedies and culinary approaches because locals think it is safer to use natural remedies and culinary approaches than the chemically processed alternatives (Wang *et al*., 2025). Our findings were in alignment with the earlier ones by Ahmed *et al*., (2014), who reported that rural communities relied heavily on herbal practices due to their accessibility, affordability and cultural acceptance. For example, in Kot Jamel decoction of plant parts emerged as the most common used preparation method for medicinal, reflecting the community's preference for natural and locally prepared remedies. Similar trends have been reported in other ethnobotanical surveys, with Ralte *et al*., (2024) noting that decoction was used in 65% of herbal preparations and Umair *et al*., (2019) confirming its dominance across 121 recorded applications. The preference for decoction is rooted in its ease of preparation, efficiency in cure, and cultural beliefs. These observations indicate that traditional preparation methods remain central to community health practices, highlighting the resilience and continuity of ethnobotanical knowledge in rural Pakistan.

It was noted that people were more diverted towards self-grown and local flora for the fulfilment of their culinary, medicinal, fodder, fuel and shelter requirements. Such reliance on local flora has also been documented Khan *et al*., (2014) and Qureshi *et al*., (2009). They observed the reliance of local community on different plants for various purposes for their accessibility and economic feasibility. The highest Informant Consensus Factor (ICF) was recorded for Digestive ailments, demonstrating the highest agreement among the informants on the use of plants for gastrointestinal ailments. In support of this finding, a previous research work done by Amjad *et al*., (2020) also indicated the highest Informant Consensus Factor (ICF) for digestive disorders.

Novel Percentage and Jaccard Index in District Bhimber revealed that high NP and JI indicated shared species pools used to treat diseases in the area (Campbell *et al.*, 2022). High JI and low NP reflected strong continuity of traditional knowledge (Ouma, 2022). The studies of NP and JI suggested distinct floristic comparison accompanied by innovative use of locally available plant species in the area (Ullah *et al.*, 2025). The observed variation in similarity indices (NP and JI) reflected strong cultural influences on plant selection and use. Regions sharing ethnic composition, religious practices, and ecological conditions exhibited higher similarity, whereas geographically close but culturally distinct communities demonstrated low similarity and higher novelty. This highlights the role of cultural transmission, belief systems, and localized traditions in shaping ethnobotanical knowledge (Lulesa *et al.*, 2025).

Conclusion

It is concluded from the study that the plants documented in Kot Jamel have significant cultural value. The majority of local population continue to rely on these plant-based practices instead of modern approaches reflecting deep rooted trust in their effectiveness and accessibility. The present comparative analysis demonstrated that traditional medicinal knowledge across Punjab exhibited both strong regional commonalities and pronounced cultural divergence.

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