Medicinal plant utilization among three linguistic groups in selected districts of Jammu and Kashmir

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Research

Abstract

Introduction: A number of indigenous communities reside in the Himalayan belt of Kashmir, where absence of modern health care facilities represents crucial problems to their survival. This study was conducted with the aim to document the use of medicinal plants by Gujjar, Bakerwal and Kashmiri communities of three different districts Jammu and Kashmir.

Methods: A total of 167 participants were selected through snowball sampling to collect the data using a semi-structured questionnaire. Among these, 44 were Kashmiri, 67 Gujjar and 56 Bakerwal between 24 and 80 years of age.

Results: During the study, 80 medicinal plants belonging to 36 families were documented. The most dominant family in terms of number of taxa was Asteraceae (11 species). Herbaceous taxa were the most used life form, and leaves were the most commonly used plant part. Infusion was the most preferred method used in extracts preparation. The highest number of sixteen species (20%) were uniquely used by Kashmiri, while the Gujjar use the lowest number of thirteen species (16%). A cross-cultural evaluation of plant resources indicated that the three cultures possessed 14% of the comparable plants.

Conclusion: The rural and inaccessible communities still lay a considerable emphasis on medicinal plants as a viable cure for a diverse spectrum of illnesses. But the disappearance of this vital information is imminent. To assess and retain this native knowledge for the invention of innovative new treatments, more phytochemical and pharmacological research should be done on the plants that are reportedly utilized by all of the groups.

Keywords: Medicinal plants, Traditional knowledge, Gujjar, Bakerwal, Kashmiri

Background

Traditional medicines have been used for the treatment of ailments since the time immemorial (Halberstein 2005). Traditional medicine refers to medicinal approaches including common and experimental drugs that have been passed down

orally, as well as therapeutic systems codified by a community's or ethnic group's custom. The oral culture is still alive and well among the people in the Indian subcontinent, where tribal populations in every part of the country have discovered the medicinal properties of thousands of plants (Bhattaraia *et al.* 2010; Jan *et al.* 2021b; Mir *et al.* 2021b). This knowledge is now restricted to a few closed cultures, especially remote tribal communities, and is an important part of their community, traditional values, and ecological adaptation practices for maintaining health in their people. There are approximately 25,000 effective plant-based formulations used by around 1.5 million herbal medicine practitioners in India (Verma *et al.* 2007; Bilal *et al.* 2022). A number of studies in different parts of India have been conducted to learn more about conventional healthcare systems of indigenous people.

In India, major health hazards include widespread communicable diseases, inadequate sewage infrastructure, and a lack of safe drinking water (Jeelani *et al.* 2018; Hassan *et al.* 2021; Khoja *et al.* 2022). Due to the numerous adverse effects associated with the use of synthetic medicines for a variety of ailments, medicinal plants are increasingly being regarded as a primary source of novel pharmaceuticals, and significant research is conducted in quest of strong plant-based treatments (Abdullah *et al.* 2021). However, sometimes the higher doses may cause serious implications or even death. This is why one needs to be more sensitive when using herbs at home.

Jammu and Kashmir is home to some of the world's most unique cultures. Apart from Kashmiris which is the main group of Kashmir Himalaya, Gujjars and Bakerwals make up the third largest ethnic group in Jammu and Kashmir (Ahmad 2017). For thousands of years, these communities have called this place home. According to the 2011 Indian census, they account for 8.1 % of the total population of the Union territory. The Jammu area has the largest population of Gujjars and Bakerwals, followed by the Kashmir Valley (Census 2011). Poonch, Rajouri, Anantnag, Udhampur, Kupwara, Srinagar, and Budgam are the districts with the highest concentration of Gujjars (Tufail 2014). According to an estimate, owing to a shortage of educational facilities in the higher reaches of the Union territory, about 500,000 nomadic Gujjars and Bakerwals are illiterate (Tufail 2014). For the purpose of raising livestock, both tribes rely on high altitude meadows. Members of the Gujjar and Bakerwal tribes still rely on plants from the varied flora of their surrounds for primary healing because modern medicine and doctors are not readily available in interior locations (Shah *et al.* 2015; Mir *et al.* 2021a). In their daily lives, these tribal communities have preserved their customary, spiritual, and social traditions (Dad and Khan 2011). Although there have been many attempts to record the medicinal plants used by the indigenous communities of Jammu and Kashmir (Ara and Naqshi 1992; Kaul 1997; Baig *et al.* 2013; Hassan *et al.* 2013; Lone *et al.* 2015; Bano *et al.* 2017), none of the cross-cultural ethnomedicinal study has been conducted among the Gujjar, Bakerwal and Kashmiri communities in these selected districts.

The researchers attempted to fill this gap by compiling a comprehensive list of medicinal plants used by these people to cure a variety of ailments. The main objectives of our study were, i) to gather the information regarding the usage of medicinal plants in the study region, ii) to check the cross-cultural similarity of the medicinal plant usage. Possibly, due to modernization and urbanization the indigenous knowledge associated with plants is being lost, this research aimed to document this dwindling knowledge. This information could be useful for pharmacologists, physicians, phytochemists, botanists and ethnobotanists in the development of the alternative therapies. The proposed study could provide baseline information for future pharmacological research and conservation of plants used for treatment of various ailments. The study could prove helpful in exploring the traditional medicinal values of unknown plant species and will help to explore the beneficial and unexplored vegetation of the area. As this study was a cross-cultural analysis of the usage of medicinal plants among the three groups residing in the Kashmir Himalayas, it could be helpful in finding out the most important medicinal plants of the area.

Materials and Methods

Study area

The present study was conducted in the three districts of South Kashmir in Jammu and Kashmir, viz., Kulgam (33.6450° N, 75.0180° E), Shopian (33.7170° N, 74.8361° E) and Pulwama (33.8716° N, 74.8946° E) (Fig. 1). The study area faces severe cold during winter and fair-weather during summer. The temperature ranges between -7 ^{o}C minimum in winter and up to 35 ^{o}C maximum in summers (IMD 2022). The study was conducted in areas located far from the district headquarters. The climate in the region is of temperate type. This belt of Himalaya largely supports drought-resistant and cold-loving plants belonging mostly to Conifereae, Fabaceae, Asteraceae, Poaceae, Rosaceae, etc. Area also shows greater luxuriance of gymnosperms (Dar and Khuroo 2020). The valley's inhabitants eat a lot of rice, maize, wheat, and potatoes as main food. The primary means of subsistence used in the area is agriculture, including agricultural cultivation and animal husbandry. The procurement of non-timber forest products (NTFPs), such as medicinal and aromatic plants, is another source of income in the research area.

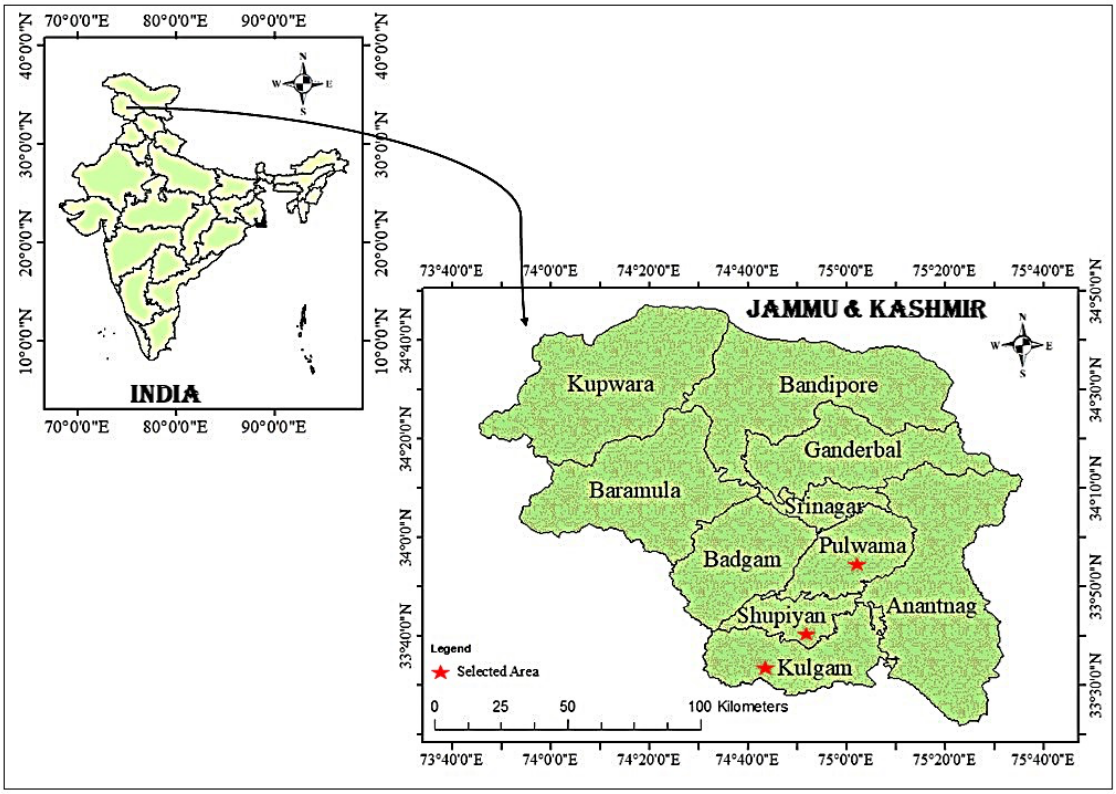

Figure 1. Map showing the study area surveyed.

Demographic features of informants

A total of 167 individuals (98 men and 69 women) were examined in order to assess the indigenous knowledge regarding the indigenous medicinal applications of plant species in the region of which 44 were Kashmiri, 67 were Gujjar and 56 were Bakerwals aged between 24 and 80 (Table 1). The selection of more male participants than women was done because; the male participants were more cooperative as compared to women who were a little bit shy and were mostly not allowed to talk to strangers other than the relatives due to their cultural heritage. Majority of the informants were illiterate. Using the snowball sampling approach, the respondents were chosen depending on their traditional knowledge of utilization of botanicals to cure various ailments. It was revealed that, they collect the plants for conventional herbal treatments from the deep forest region. Over-50-year-old informants were shown to be more knowledgeable. Other researchers from the neighboring region and other nations confirmed similar findings (Ayantunde *et al.* 2008; Ahmad and Pieroni 2016; Jan *et al.* 2017). Women were more informed than men, according to the data, which is consistent with other studies (Cornara *et al.* 2009; Bhatia *et al.* 2014). The majority of individuals also comment about their own experiences using therapeutic herbs. On the other hand, it was discovered that the younger generation had less interest in ancestors' knowledge.

Table 1. Demographic details of the informants.

Type	Variables	Number
Professions	Farmers	67
	Housewives	51
	Govt. employees	21
	Shopkeepers	28
Gender	Male	98
	Female	69
Population groups	Kashmiri	44
	Gujjar	67
	Bakerwal	56
Age groups	24-36	21
	37-49	33
	50-62	41

	63-75	44
	76-80	28
Educational qualification	Illiterate	55
	Primary	36
	Middle	39
	Secondary	17
	Graduate and above	20

Data collection

Field investigations were conducted for around two years (October 2018 to October 2020) to collect the information of ethnomedicinal usage of plants by the Gujjar, Bakerwal and Kashmiri communities. A semi-structured interview was developed for face-to-face discussions with informants, and printed questionnaires (Appendix-I) were prepared in English prior getting translated to the local languages (i.e. Gojri, Pahari and Kashmiri). Before the interviews, a verbal prior informant consent was taken from all the informants. The printed questionnaires ensured that all the participants are presented with identical questions (Martin 2008), and essential in order could be gathered throughout the conversation. In-situ and ex-situ interviewing techniques were used. Because both techniques have their own set of benefits and drawbacks, an arrangement of both, logically, produce the most information with precision. As a result, the "walk-in-the-woods" technique was chosen for in-situ and "freshly obtained plant material" for ex-situ. The "walk in the woods" provides enhanced value and accurate data, whereas "freshly harvested plant material" is appropriate for persons with restricted mobility (old people, ladies, etc.) and includes a significant amount of individuals (Thomas *et al.* 2007). In the walk-in interviews, local knowledgeable persons were taken to forest areas in person to get the exact location of the medicinal plants used. During the conversation, common diseases, medicinal plants, various raw materials, and techniques of remedy groundwork were all noted. Plant specimens and relevant elements were also gathered for the identification. Flora of Jammu and Kashmir (Singh *et al.* 2002), Flowers of the Himalayas (Polunin and Stainton 1984), and Flora of the Pir Panjal range of the north-west Himalaya were used to recognize the plant species (Singh and Kachroo 1994). Further recognition was accomplished by comparing voucher specimens to specimens that had already been recognized and had been preserved at the KASH Herbarium at the University of Kashmir in Srinagar, Department of Botany. For the accurate determination of the plants that were gathered, Mr. Akhtar H. Malik, Curator KASH Herbarium, was also consulted. Plant fragments and herbarium specimens acquired for this research have been put in the specified herbarium for future reference. According to the Plant List, the botanical names of the various plant species were amended (www.theplantlist.org). The Venn diagram was used to study the cross-cultural relationship between ethnic groups and was created using InteractiVenn software (www.interactivenn.net).

Quantitative data analysis

Use value

The use value defines the relative importance of plants known. The use value in present study was calculated by the following formula (Phillips *et al.* 1994).

$$UV = \sum Ui/N$$

Where U refers to the use reports cited for a particular plant by each informant and N is the total number of informants participated in the study. The UV helps to determine the plant species with highest use (most frequently indicated) in the treatment of ailment. When there are many use citations for a plant, its use value is high and when use citations are low, the use value is also low.

Results

Diversity of medicinal plants

The present study recorded 80 species of medicinal plants belonging to 36 families and 69 genera. The finished result with a comprehensive overview of the plant's botanical name, common name, collection number, cross-cultural resemblance, growth form, part(s) utilized, illness treated, preparation techniques, and mode of application and use value are given in Table 2. The most important families in terms of number of taxa were Asteraceae (11 species), Fabaceae (6 species), Brassicaceae, Lamiaceae, Poaceae and Rosaceae (5 species each), Amaranthaceae, Apiaceae, Boraginaceae, Moraceae and Polygonaceae (3 species each). The rest of the families were represented by two or one species. Only 6 species, *Cyndonia oblonga*, *Ficus palmata*, *Ficus carica*, *Daucus carota, Rosa indica and Phaseolus vulgaris* were cultivated while rest were wild. Approximately 80 therapeutic plants have one variety of life forms. Among these the most dominant were herbs (80%), followed by shrubs (9%), trees (8%) and climbers (4%) (Fig. 2). These communities still rely on locally accessible medicinal

plants for their treatment modality because of their rural location and limited availability of modern healthcare facilities. Additionally, because these people live quite close to a forest, it is simple for them to acquire natural plants for alleviating a variety of diseases. According to the informants, this form of healthcare is more affordable and has less side effects than contemporary allopathic medicine.

Part(s) used, remedy preparation and administration

In the proposed investigation, it was revealed that leaves (32%) were the most generally consumed plant part, followed by the entire plant (23%), roots, rhizomes, bulbs (12%), flowers (11%) aerial portion and seeds (7% each), fruits (6%), bark (1%), and stem (0.75%) (Fig. 3). These elements were applied in a variety of ways to cure illnesses. One of the significant aspects of reporting herbal remedies is that it reveals the many ways that traditional medicine is prepared. In the present study, participants were found to prepare herbal remedies by nine different ways. Among these, infusion (78 preparations), was initiate to be the most familiar technique of research of herbal medicines follow by paste (71 preparations), decoction (56 preparations), powder (23 preparations), juice (18 preparations), cooked (7 preparations), poultice (5 preparations) raw and tea (3 preparations each) (Fig. 4). In the research site, herbal remedies were administered orally and topically. The oral consumption was found to be the dominant method. However, topical administration was also followed. As they are utilized extensively throughout the year in the study area, medicinal plants have quite a relatively sparse population in the forested regions.

Plant resources usage across cultures

An effort was made by this study to check the overlap of medicinal plant usage among the three communities (Gujjar, Bakerwal and Kashmiri) living in the study region. The greater similarity (15% species) in the usage of plants was shown by Bakerwal and Gujjar ethnic groups, whereas the least resemblance (5%) was experimental between Bakerwal and Kashmiri (Fig. 5). According to the Venn diagram (Fig. 5), Kashmiris were the only one to utilize sixteen species (20%), while the Gujjars indicated utilizing minimum thirteen species (16%). A cross-cultural evaluation of plant assets suggested that (14%) plants were distributed by the three groups of study area. Both Bakerwal and Gujjar cultures are shared because to intermarriage, resemblance in regions, and transportation convenience. Bakerwal and Kashmiri cultures, on the other hand, are distinctive from one another and exhibited limited connection.

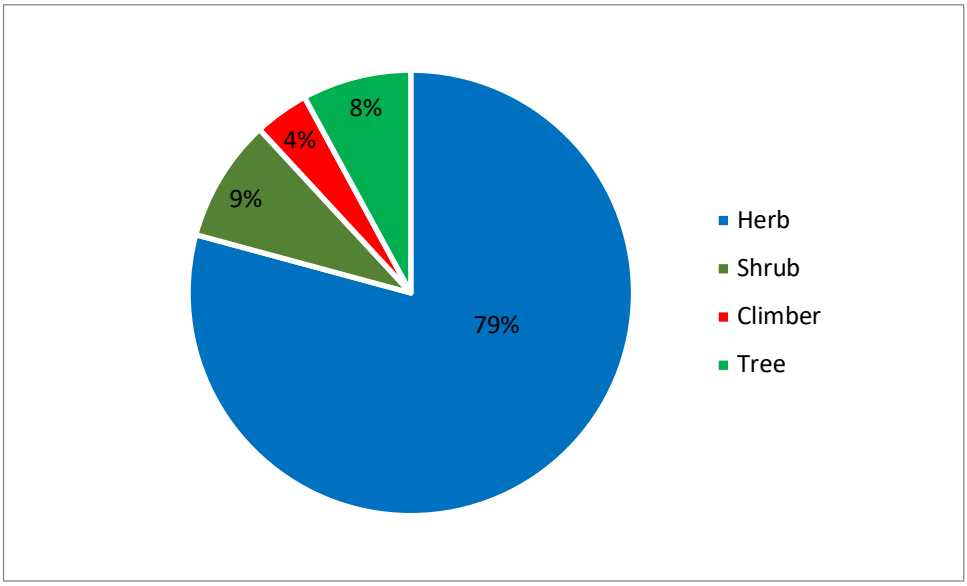

Figure 2. Distribution of species according to their life form.

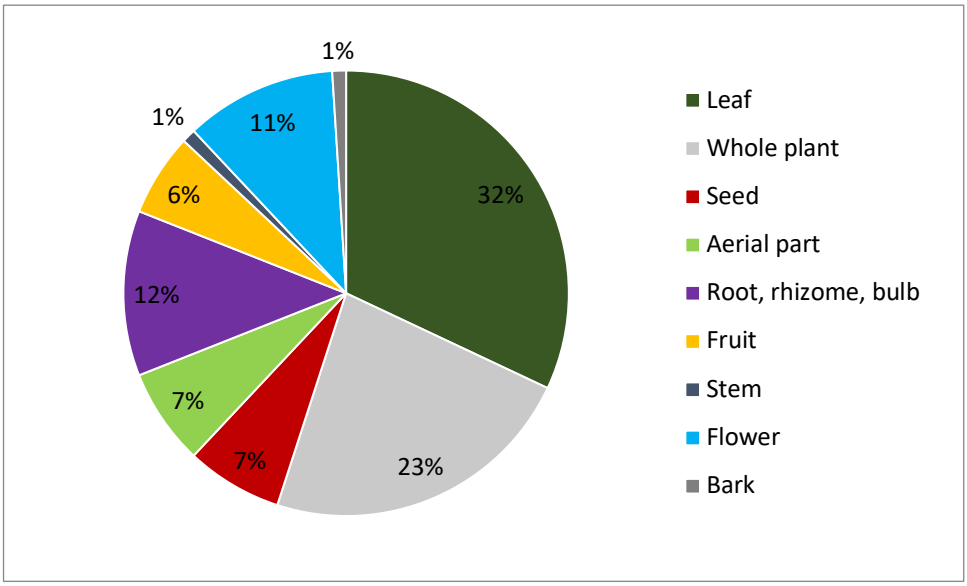

Figure 3. Percentage contribution of plant parts used.

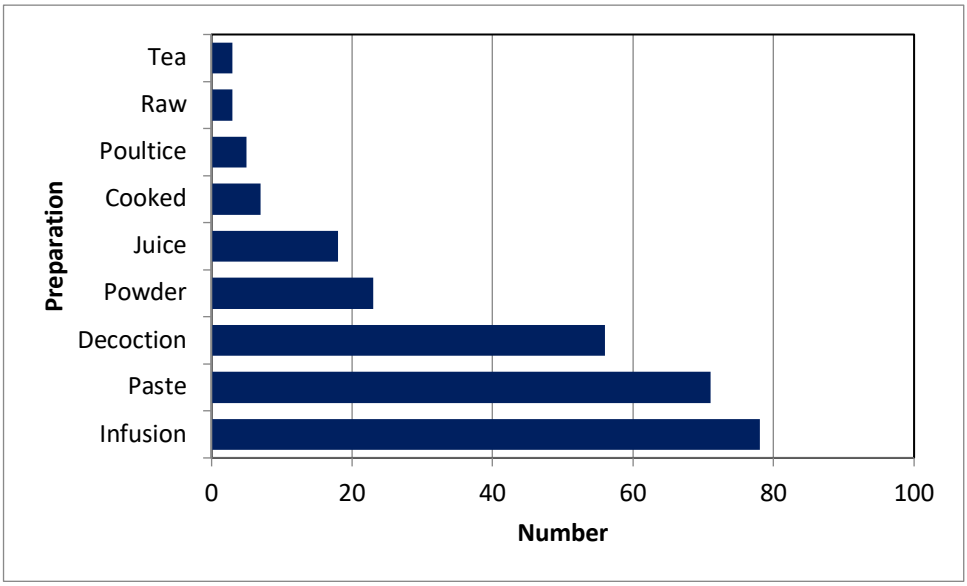

Figure 4. Contribution of herbal preparations.

Use value

The respective relevance of medicinal plants in the specific research area is evaluated using the use value index. Its value somewhere between 0 and 1. More application reports suggest higher use value for medicinal plants, whereas fewer reports indicate lower use value for medicinal plants. In the current study the highest UV of 0.64 was calculated for *Lepidium apetallum* and the lowest UV of 0.31 for *Echinocola colona* (Table 2). Since we can't ignore medicinal plants with high use values, we should also not ignore medicinal plants with low use values considering that doing so could increase the risk of losing this important knowledge and because these plants might have high medicinal values that the chosen informants are unaware of. A plant's importance is determined by its use value; if it is high, the plant is important; if it is small the plant species is not as vital. However, it is impossible to determine if the plant is utilized to treat a specific disease or a variety of diseases.

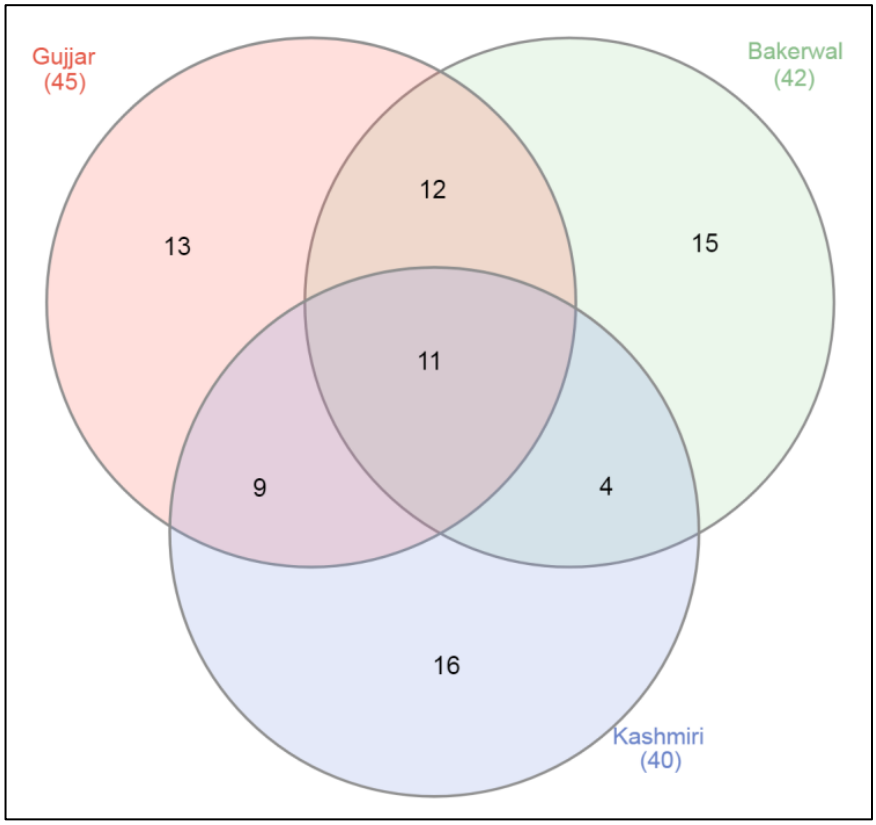

Figure 5. Venn diagram showing the overlap of ethnomedicinal usage of plants in different ethnic communities in the study region.

Discussion

Diversity of medicinal plants

The most important families in terms of number of taxa reported in the current study were Asteraceae (11 species), Fabaceae (6 species), Brassicaceae, Lamiaceae, Poaceae and Rosaceae (5 species each), Amaranthaceae, Apiaceae, Boraginaceae, Moraceae and Polygonaceae (3 species each). Our outcome was in line with the preceding studies where, according to reports, the most prominent family of medicinal plants is Asteraceae (Bhatia *et al.* 2014; Bolson *et al.* 2015). The Asteraceae family is dominant because its members are recognized for their pleasant qualities and are widely distributed throughout nature. Its herbaceous nature, widespread distribution, and richness may also play a role in the study area (Shedayi and Bibi 2012; Tariq *et al.* 2018). Herbaceous life form was found to be dominant among all other forms. The proliferation of herbs, which are mostly found in home gardens and along roadsides, may be the cause of their domination because they are simple to gather in the natural world (Shrestha and Dhillion 2003; Kayani *et al.* 2014). The community who employ medicinal plants in their healthcare system consider that the components acquired from remote, deep-forested areas have greater restorative capabilities for various disorders (Mir *et al.* 2021b).

Part(s) used, remedy preparation and management

In the present research, it was revealed that the leaf had been the plant part which was most generally used to produce herbal treatments. Our results agreed with those from other research carried throughout the world, including in the Kashmir Valley (Srithi *et al.* 2009; Ullah *et al.* 2013). The primary role of leaves in photosynthesis as well as other metabolic functions makes them the site of most secondary metabolite production, which may illustrate why leaves are used so extensively (Verpoorte *et al.* 2002). Moreover, leaves are easiest to acquire and prepare to be used in cures than other plant parts. Also, the utilization of different plant parts may alter according to species variability and bioactive components present in various plant segments (Jan *et al.* 2022). The most prominent method for preparing herbal remedies was found to be infusion (78 formulations). Based on the remedy's efficacy and shelf life, the option and processing was determined (Mir *et al.* 2022). As stated in numerous research conducted in the past, topical application is another efficient technique of herbal medicine management applied in the action of diverse peripheral ailments involving atopic dermatitis, wounds, poison strikes, musculoskeletal soreness, arthritis, etc (Seyid *et al.* 2013; Sureshkumar *et al.* 2017). Though, there might be a change in the dosage used to treat a particular illness.

Table 2. Medicinal plants used by the Gujjar, Bakerwal and Kashmiri communities in the study region.

Family, Botanical name, Collection number	Local name	Life form	Part(s) used	Preparation	Medicinal usage	Administration	Population groups			Use value
							Guj	Bkr	Kmri	
Acoraceae										
Acorus calamus L. TM2102	Vai	Herb	RZ	Infusion	Antispasmodic	Oral	1	0	1	0.43
			RZ	Infusion	Anthelminthic	Oral				
			RZ	Infusion	Acidity	Oral				
Amaranthaceae										
Amaranthus blitum L. TM2115	Liss	Herb	LF	Decoction	Stomach pain	Oral	0	0	1	0.51
			LF	Decoction	Tonic	Oral				
			WP	Decoction	Wound healing	Topical				
			RT	Powder	Muscular pain	Oral				
Amaranthus caudatus L. TM2101	Liss	Herb	LF	Decoction	Diarrhea	Oral	1	1	1	0. 50
			LF	Decoction	Dysentery	Oral				
			SD	Infusion	Indigestion	Oral				
			RT	Decoction	Laxative	Oral				
Bassia scoparia (L.) A.J.Scott TM2124	Mazan kul	Herb	WP	Decoction	Eczema	Topical	0	0	1	0.49
			SD	Infusion	Pimples	Topical				
			FR	Infusion	Headache	Topical				
Apiaceae										
Berula erecta (Huds.) Coville TM2139	NA	Herb	WP	Powder	Muscular pain	Topical	1	1	0	0.45
			AP	Powder	Rheumatism	Oral				
			LF	Paste	Joint swelling	Topical				
Chaerophyllum elegans Gaudin TM2142	NA	Herb	WP	Infusion	Indigestion	Oral	0	1	0	0.49
			ST	Decoction	Fever	Oral				
			WP	Decoction	Laxative	Oral				
Daucus carota L. TM2103	Gajar	Herb	LF	Juice	Anthelminthic	Oral	1	1	1	0.46
			LF	Juice	Dysentery	Oral				
			RT	Cooked	Fatigue	Oral				
			RT	Cooked	Lactation	Oral				
			LF	Juice	Jaundice	Oral				

Araliaceae										
Hadera nepalensis K.Koch TM2153	NA	Climber	LF	Infusion	Diabetes	Oral	0	1	0	0. 51
			LF	Infusion	Tonic	Oral				
			LF	Paste	Wound healing	Topical				
Asteraceae										
Anaphalis virgata Thomson TM2190	NA	Herb	WP	Paste	Malarial Fever	Topical	1	1	0	0.46
			WP	Paste	Chest Congestion	Topical				
Artemisia moorcroftiana Wall. ex DC TM2187	Jangli tethwan	Herb	WP	Decoction	Abdominal pain	Oral	1	1	1	0.42
			WP	Infusion	Diarrhea	Oral				
			WP	Infusion	Vermifuge	Oral				
Artemisia scoparia Waldst. & Kit. TM2172	Pari-chaw	Herb	WP	Infusion	Inflammation	Oral	1	1	0	0.55
			LF	Infusion	Liver infection	Oral				
			LF	Decoction	Fever	Oral				
Artemisia vulgaris L. TM2181	Nagdowna	Herb	LF	Infusion	Nose bleeding	Oral	0	0	1	0.53
			WP	Paste	Cough	Topical				
			LF	Paste	Chest Congestion	Topical				
			WP	Powder	Rashes	Topical				
Bidens pilosa L. TM2104	Kumber	Herb	LF	Decoction	Induce labor pain	Oral	1	1	0	0.39
			AP	Decoction	Tonic	Oral				
			AP	Powder	Muscle pain	Topical				
Bidens tripartita L. TM2111	Kumber	Herb	LF	Paste	Wound healing	Topical	0	1	0	0.43
			LF	Paste	Throat ulcers	Topical				
			LF	Paste	Skin allergy	Topical				
Carpesium abrotanoides L. TM2118	Bansario	Herb	LF	Decoction	Headache	Oral	1	0	1	0.36
			LF	Paste	Fever	Topical				
			LF	Paste	Body ache	Topical				
Conyza bonariensis (L.) Cronquist TM2129	Shashedra	Herb	WP	Infusion	Painful menstruation	Oral	1	0	1	0.39
			WP	Paste	Wound healing	Topical				
Erigeron multicaulis Wall. ex DC. TM2132	NA	Herb	LF	Infusion	Piles	Oral	1	1	0	0.43
			LF	Infusion	Diarrhea	Oral				
			AP	Infusion	Abdominal pain	Oral				

Ligularia fischeri (Ledeb.) Turcz. TM2113	Gomchwi	Herb	LF LF FL LF	Infusion Paste Paste Infusion	Jaundice Anti-inflammatory Arthritis Liver infection	Oral Topical Topical Oral	1	0	1	0.41
Tagetus minuta L. TM2145	Janlijafar	Herb	FL FL LF WP	Infusion Infusion Decoction Decoction	Blood purifier Dyspepsia Fever Bronchodilator	Oral Oral Oral Oral	0	1	1	0.41
Balsaminaceae										
Impatiens brachycentra Kar. & Kir. TM2137	NA	Herb	FL SD FL LF	Infusion Powder Paste Infusion	Tonic Snakebite Burns Aphrodisiac	Oral Topical Topical Oral	1	0	0	0.49
Boraginaceae										
Cynoglossum glochidiatum Wall. ex Benth. TM2163	Nima-jarma	Herb	RT RT RT SD	Infusion Infusion Paste Infusion	Fertility agent Muscle pain Wound healing Gynecological tonic	Oral Oral Topical Oral	0	0	1	0.38
Lindelofia longiflora (Benth.) Baill. TM2148	Showara	Herb	LF LF	Powder Paste	Wound healing Cuts	Topical Topical	0	1	0	0.34
Myosotis arvensis (L.) Hill TM2106	NA	Herb	WP WP WP	Infusion Poultice Paste	Rheumatism Joint dislocation Muscle pain	Oral Topical Topical	0	1	0	0.41
Brassicaceae										
Lepidium apetallum L. TM2109	Kulhakh	Herb	LF LF AP AP	Decoction Decoction Infusion Paste	Asthma Cough Tonic Fever	Oral Oral Oral Topical	1	0	0	0.64
Lepidium didymum L. TM2179	Jangali Halian	Herb	WP LF WP	Poultice Power Paste	Fracture Vomiting Rheumatism	Topical Oral Topical	1	1	0	0.39
Lepidium sativum L. TM2184	Halian	Herb	SD SD SD	Poultice Infusion Paste	Fracture Easy delivery Rheumatism	Topical Oral Topical	0	0	1	0.45

Sisymbrium irio L. TM2147	Tilgogul gash	Herb	SD LF SD WP WP WP	Paste Paste Powder Powder Cooked Cooked	Malaria Headache Measles Anti-diabetic Throat infection Chest infection	Topical Topical Topical Oral Oral Oral	0	0	1	0.47
Sisymbrium loeselii L. TM2127	Tilgogul gass	Herb	LF LF LF AP	Cooked Decoction Infusion Infusion	Tonic Stomachache Sore throat Chest congestion	Oral Oral Oral Oral	1	1	0	0.59
Caprifoliaceae										
Sambucus wightiana Wall. TM2138	Gudula	Herb	FL FL	Infusion Paste	Expel poisonous substance from Stomach Wound healing	Oral Paste	1	0	0	0.38
Caryophyllaceae										
*Silene coronaria (*Desr.) Clairv. ex Rchb. TM2105	Shosh gassh	Herb	FL FL	Infusion Infusion	Liver warts Lung infection	Oral Oral	1	0	1	0.35
Chenopodiaceae										
Chenopodium foliosum (Moench.)Asch. TM2176	Konh	Herb	LF FR FR LF	Paste Paste Paste Cocked	Cold Breath shortness Cough Indigestion	Topical Topical Topical Oral	0	0	1	0.54
Convolvulaceae										
Ipomea purpurea (L.) Roth. TM2169	Ishaq-e-phechan	Climber	SD SD SD	Infusion Infusion Decoction	Anthelminthic Diuretic Laxative	Oral Oral Oral	0	0	1	0.43
Cyperaceae										
Cyperus rotundus L. TM2189	Demb gass	Herb	AP RT AP AP	Decoction Infusion Paste Paste	Oligomenorrhea Lactation Wound healing Skin warts	Oral Oral Topical Topical	1	0	0	0. 50

Dryopteridaceae										
Dryopteris filix-mas (L.) Schott TM2156	Kakai	Herb	RZ	Decoction	Diarrhea	Oral	0	1	0	0.42
			RZ	Decoction	Dysentery	Oral				
			RZ	Decoction	Vermifuge	Oral				
Ebenaceae										
Diospyros lotus L. TM2159	NA	Shrub	LF	Infusion	Antiseptic	Topical	0	0	1	0.55
			LF	Decoction	Ant-diabetic	Oral				
			LF	Infusion	Astringent	Topical				
			FR	Infusion	Tonic	Oral				
			FR	Decoction	Constipation	Oral				
Euphorbiaceae										
Euphorbia peplus L. TM2134	NA	Herb	AP	Paste	Arthritis	Topical	1	1	0	0.49
			AP	Paste	Ringworm	Topical				
			WP	Paste	Warts	Topical				
			LF	Decoction	Abdominal cramps	Oral				
Fabaceae										
Astragalus grahamianus Benth. TM2121	NA	Shrub	RT	Decoction	Cold	Oral	1	1	0	0.43
			RT	Decoction	Cough	Oral				
			RT	Decoction	Chronic bronchitis	Oral				
Medicago polymorpha L. TM2120	Burahang	Herb	FL	Infusion	Morning sickness	Oral	0	1	1	0. 51
			FL	Infusion	Jaundice	Oral				
			LF	Paste	Pneumonia	Topical				
			LF	Paste	Chest congestion	Topical				
Medicago sativa L. TM2110	Burahang	Herb	FL	Powder	Vaginal itching	Topical	1	1	1	0.49
			LF	Paste	Chest congestion	Topical				
			LF	Decoction	Tonic	Oral				
Melilotus albus Medik. TM2151	Janglimethi	Herb	WP	Paste	Fever	Topical	0	0	1	0.47
			LF	Paste	Muscle pain	Topical				
			LF	Powder	Cuts	Topical				
Phaseolus vulgaris L. TM2131	Hemm	Climber	SD	Cooked	Tonic	Oral	1	1	1	0.45
			SD	Paste	Cough	Topical				
			SD	Paste	Cold	Topical				
			SD	Infusion	Blood purifier	Oral				

Trifolium repens L. TM2126	Batak neeg	Herb	LF WP LF LF	Infusion Decoction Infusion Decoction	Dry cough Debility Leucorrhoea Gout	Oral Oral Oral Topical	1	1	1	0.38
Geraniaceae										
Erodium cicutarium (L.) L'Her.ex Aiton TM2167	Painzungajj	Herb	LF WP	Powder Paste	Post-partum hemorrhage Headache	Oral Topical	0	0	1	0.36
Hypericaceae										
Hypericum perforatum L. TM2182	Shin-chae	Tree	LF LF	Tea Tea	Urinary disorder Joint pain	Oral Oral	1	1	1	0.36
Juglandaceae										
Juglans regia L. TM2158	Doon	Tree	BR BR BR	Raw Raw Raw	Toothache Gum bleeding Teeth cleaning	Topical Topical Topical	1	0	1	0.45
Lamiaceae										
Ajuga parviflora L. TM2165	Janiadam	Herb	LF LF LF	Infusion Infusion Infusion	Abdominal pain Intestinal infection Kidney infection	Oral Oral Oral	1	1	1	0.38
Clinopodium umbrosum (M.Bieb.) K.Koch TM2170	Kunakul	Herb	WP WP AP	Infusion Cocked Decoction	Astringent Tonic Carminative	Topical Oral Oral	0	1	0	0.42
Isodon rugosus Wall. ex Benth. TM2161	Maldah	Herb	LF LF LF LF	Paste Paste Powder Decoction	Insect bite Abdominal pain Snake bite Vermifuge	Topical Topical Topical Oral	0	1	0	0.49
Mentha aquatica L. TM2162	Kul pudni	Herb	LF LF LF	Decoction Infusion Infusion	Influenza Abdominal cramps Induces sweating	Oral Oral Oral	1	0	1	0.34
Stachys floccosa Benth. TM2177	NA	Herb	WP WP	Decoction Infusion	Amenorrhea Diuretic	Oral Oral	0	1	1	0.41
Liliaceae										
Gagea elegans Wall. ex G.Don. TM2186	NA	Herb	BL WP BL	Paste Decoction Paste	Cough Blood purifier Nasal Congestion	Topical Oral Topical	1	0	0	0.45

Malvaceae										
Hibiscus syriacus L. TM2152	Jabakusam	Shrub	FL	Decoction	Diuretic	Oral	0	0	1	0.46
			FL	Infusion	White discharge	Oral				
			LF	Infusion	Body ache	Oral				
Hibiscus trionum L. TM2123	NA	Herb	WP	Decoction	Diarrhea	Oral	0	0	1	0.35
			LF	Decoction	Piles	Oral				
Moraceae										
Ficus carica L. TM2116	Anjeer	Tree	FR	Juice	Indigestion	Oral	0	0	1	0. 51
			FR	Juice	Body weakness	Oral				
			FR	Decoction	Abdominal pain	Oral				
			FR	Decoction	Lactation	Oral				
Ficus palmata Forssk. TM2117	Anjeer	Tree	LF	Decoction	Stomach cramps	Oral	1	0	0	0.42
			FR	Juice	Abdominal pain	Oral				
			FR	Juice	Urine infection	Oral				
			LF	Infusion	Remove warts	Topical				
Morus nigra L. TM2146	Shahtoot	Tree	FR	Juice	Laxative	Oral	1	0	0	0.42
			FR	Paste	Cleaning throat	Oral				
			FR	Juice	Anthelminthic	Oral				
Oleaceae										
Jasminum humile L. TM2141	Sanairad	Shrub	RT	Infusion	Tonic	Oral	1	0	0	0.43
			LF	Paste	Ringworm	Topical				
Jasminum mesnyi Hance TM2143	NA	Shrub	FL	Paste	Antidepressant	Topical	0	1	0	0.46
			FL	Powder	Diabetes	Topical				
			FL	Powder	Aphrodisiac	Oral				
			FL	Decoction	Diuretic	Oral				
			FL	Infusion	Sedative	Oral				
Onagraceae										
Epilobium hirsutum Raf. TM2107	NA	Herb	FR	Juice	Abdominal pain	Oral	0	1	1	0.54
			ST	Infusion	Intestinal disorder	Oral				
			WP	Infusion	Renal disorder	Oral				
			FR	Infusion	Astringent	Topical				
			FR	Decoction	Hepatic disorder	Oral				

Plantaginaceae										
Veronica laxa Benth. TM2136	Sirri	Herb	WP WP WP	Tea Paste Powder	Heartache Chest congestion Cough	Oral Topical Oral	1	1	0	0.38
Poaceae										
Digitaria biformis Willd. TM2128	Gass	Herb	WP WP WP	Decoction Infusion Infusion	Gonorrhea Headache Debility	Oral Topical Oral	1	0	0	0.39
Echinocola colona (L.) Link TM2140	Hamgass	Herb	WP WP	Powder Paste	Wound healing Body pain	Topical Topical	0	0	1	0.31
Oplismenus compositus (L.) P.Beauv. TM2135	NA	Herb	AP AP AP	Powder Paste Paste	Wound healing Cuts Headache	Topical Topical Topical	1	1	0	0.41
Phleum digitaria L. TM2130	NA	Herb	WP WP	Paste Paste	Wounds Antiseptic	Topical Topical	0	1	0	0.34
Poa pratensis L. TM2183	Gash	Herb	SD WP	Cooked Powder	Tonic Wound healing	Oral Topical	1	0	1	0.39
Polygonaceae										
Bistorta amplexicaulis (D.Don) Greene TM2175	Maachran Chai	Herb	RT RT RT RT	Paste Infusion Infusion Powder	Headache Cold Cough Burns	Topical Topical Topical Topical	1	1	0	0.53
Persicaria lapathifolia (L.) Delarbre TM2166	Chokladdur	Herb	RT RT LF RT	Poultice Poultice Infusion Infusion	Fracture Joint swelling Fever Indigestion	Topical Topical Oral Oral	1	0	0	0.50
Polygonum aviculare L. TM2154	Bamalia	Herb	LF LF WP	Infusion Infusion Infusion	Urinary tract infection Diuretic Boils	Oral Oral Topical	0	1	0	0.46
Primulaceae										
Primula denticulata Sm. TM2133	Phool	Herb	WP WP WP	Decoction Infusion Infusion	Skin rashes Allergy Chilblain	Topical Topical Topical	1	0	0	0.43

Pteridaceae										
Adiantum radiatum L. TM2114	Guetheer	Herb	WP	Paste	Chest pain	Topical	0	1	0	0.55
			WP	Infusion	Chilblain	Topical				
			LF	Paste	Headache	Topical				
			LF	Decoction	Tonic	Oral				
			RZ	Decoction	Fever	Oral				
Pteris cretica L. TM2122	NA	Herb	RT	Decoction	Dysentery	Oral	0	1	0	0.47
			LF	Decoction	Diarrhea	Oral				
			LF	Decoction	Anthelminthic	Oral				
Ranunculaceae										
Ranunculus hirtelus Royle TM2185	Dimgassh	Herb	LF	Paste	Gonad swelling	Topical	1	0	1	0.47
			WP	Paste	Skin allergy	Topical				
			AP	Paste	Earache	Topical				
Rosaceae										
Argentina anserina (L.) Rydb. TM2164	Budmew	Herb	LF	Decoction	Kidney stone	Oral	0	0	1	0.55
			LF	Juice	Diarrhea	Oral				
			LF	Juice	Stomach pain	Oral				
			WP	Paste	Cold	Topical				
			WP	Infusion	Aphrodisiac	Oral				
Cyndonia oblonga Mill. TM2144	Bumchoont	Tree	SD	Juice	Tonic	Oral	1	1	1	0. 50
				Juice	Abdominal pain	Oral				
				Juice	Urinary infection	Oral				
Geum roylei Wall. ex. F. Bolle TM2108	NA	Herb	WP	Paste	Nasal congestion	Topical	1	0	0	0.45
			AP	Paste	Skin allergy	Topical				
			AP	Paste	Breathing problems	Topical				
Rosa indica L. TM2155	Gulab	Shrub	FL	Juice	Blood purification	Oral	1	1	1	0.55
			FL	Juice	Throat ulcers	Oral				
			FL	Powder	Cough	Oral				
			FL	Paste	Anti-inflammatory	Topical				
Rosa sempervirense L. TM2174	NA	Shrub	FL	Paste	Headache	Topical	0	1	0	0.42
			FL	Paste	Depression	Topical				
			FL	Decoction	Diabetes	Oral				
			LF	Infusion	Antiseptic	Topical				

Rubiaceae										
Gallium aparine L. TM2188	Thap gass	Herb	LF	Paste	Wound antiseptic	Topical	0	1	0	0.43
			LF	Paste	Skin allergy	Topical				
			WP	Infusion	Diuretic	Oral				
Scrophulariaceae										
Scrophularia polyantha Royle ex Benth. TM2125	NA	Herb	WP	Juice	Blood purification	Oral	1	0	0	0.45
			WP	Powder	Eczema	Topical				
			LF	Powder	Skin rashes	Topical				
			RT	Decoction	Vermifuge	Oral				
Violaceae										
Viola odorata L. TM2112	Nunposh	Herb	FL	Infusion	Sore throat	Oral	1	1	1	0.47
			FL	Paste	Chest congestion	Topical				
			FL	Paste	Bronchitis	Oral				
			FL	Infusion	Cough	Oral				

#abbreviations: UV-Use value; NA-Not available; LF-Leaf, RT-Root, WP-Whole plant, SD-Seed, AP-Aerial portion, FR-Fruit, ST-Stem, FL-Flower, RH-Rhizome, BL-Blub, BR-Bark; Guj-Gujjar, Bkr-Bakerwal, Kmri-Kashmiri; 1=Present, 0=Absent.

Diverse ethnic uses of plant resources

Comparing the results of medicinal usage of plants provides a clear picture of the depth of knowledge across the cultures. In line with our studies, Haq *et al.* (2021) from Ladakh region and Aziz *et al.* (2020) from Pakistan Himalaya conducted identical cross-cultural evaluation and came up with the conclusion that ethnic and traditional influences have altered local people's traditional herbal knowledge. Abidin *et al.* (2021) from Southwest Pakistan revealed identical outcomes, which validate our results from the Kashmir Himalayan area.

Use value

The highest prevalence value was recorded in this research for *Lepidium apetallum.* Although it is wrong that medicinal plants with limited therapeutic benefits are not as much of relevant, it indicates that either the availability of these plants or the knowledge of them is in jeopardy (Mahmood *et al.* 2013). Due to their widespread distribution and extensive awareness of their clinical application among the local population, herbal medicines in the research area possess high UV levels (Rahman *et al.* 2016). In some of the previous studies (Shi *et al.* 2015; Wang *et al.* 2017), a number of phytochemical compounds (terpenoids, flavonoids, tannins, alkaloids and glycosides) have been identified in *Lepidium apetallum* possess anti-inflammatory, antipyretic, hepatoprotective, and antibacterial properties. That gives a clear indication towards its better healing properties.

Conclusion

It can be fulfilled from this study that the study area's inhabitants have an affluent of traditional information that they received from their ancestors, and documenting of this precious knowledge has revealed new knowledge about the region. Native communities persist to use medicinal plants as their key resource of health care; however, they are also concerned about the condition of the flora in the wild. It was reported from the informants that they are not able to locate many of the plants easily from the wild which were once present in bulk. It supports the results that the local flora is under serious threat of extinction. It was observed that older people retained a huge amount of indigenous information compared to younger people; this information gap may be the result of younger people's changing trends, changing attitudes towards ethnic communities, and the growing impact of modernization. This study provides compelling proof that traditional knowledge of plant species' medical applications is fading at a frightening pace. In order to preserve this heritage, it is important to properly document the vital plants and the knowledge affiliated with them, as well as to implement the appropriate conservation measures. Otherwise, a significant number of vital medicinal plants would have become extinct in the wild. We urge ongoing phytochemical and pharmacological studies to support this cultural heritage, since such plants may be beneficial in the hunt for new bioactive molecules.

Declarations

List of abbreviations: LF-Leaf, RT-Root, WP-Whole plant, SD-Seed, AP-Aerial portion, FR-Fruit, ST-Stem, FL-Flower, RH-Rhizome, BL-Blub, BR-Bark, NTFPs-Non-timber forest products, NA-Not available, IMD-Indian Metrological Department, Guj-Gujjar, Bkr-Bakerwal, Kmri-Kashmiri.

Ethics approval and consent to participate: Individual prior informed oral consent was obtained from each participant before to conducting interviews. There was no need for further ethics approval. All work done is in accordance with the rules of the Convention on Biological Diversity's Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Resulting from their Utilization. All the participants retain their authorship and use rights to any traditional knowledge, and any use of it other than for scientific publication does need the extra prior authorization of the traditional proprietors as well as agreement on who gets to benefit from any future uses.

Consent for publication: Not applicable.

Availability of data and materials: The raw data without names of participants are available from the authors.

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Appendix-I

"(Questionnaire)"

Informant's consent for the participation in the study

I……(Name of informant) here by give my full consent and conscious to participate in this study and declare that to the best of my knowledge the information that I have provided are true, accurate and complete.

Date…….. (Signature/ Thumb impression of informant)

Informant's detail:

Name……..

Gender……

Age…….

Occupation……

Education……..

Location/Residence ……

Data about medicinal plant and its use:

Plant (Local name) ……..

Habit (Tree/ Herb/ Shrub/ Climber)……

Cultivated / Wild……..

Season of collection……

Plant part used……

Method of collection and storage……..

Name of diseases treated…… ……

Method of crude preparation……

Mode of administration……

Other uses (if any)…….. ……..

Remarks:

Plant identified as ……..(Botanical name and family)

Signature of Researcher