Assessment of floristic diversity and traditional knowledge from the selected mountainous valleys of district Gilgit, Gilgit-Baltistan, Pakistan

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Ethnobotany Research and Applications 27:46 (2024) - http://dx.doi.org/10.32859/era.27.46.1-22
Manuscript received: 27/06/2024 – Revised manuscript received: 14/10/2024 - Published: 15/10/2024

Research

Abstract

Background: The study aims to provide a comprehensive description of floristic and ethnobotanical diversity among the localities and indigenous inhabitants of the mountainous communities in the Gilgit district. This research highlights the botanical inventory of the region and underscores the importance of indigenous knowledge for conservation, sustainable utilization, and pharmacological research.

Methods: During 2022-2023, frequent field visits were conducted to document the plant species in the region. The study recorded 252 plant species, 172 genera, and 59 families. Various analyses were performed, including life form analysis and Jaccard coefficients to assess plant diversity and similarity among different valleys. Ethnobotanical data were collected to understand the medicinal uses of the plants, including the parts used and methods of preparation. Botanical indices such as Use Value (UV) and Relative Frequency Citation (RFC) were calculated for frequently cited medicinal plants.

Results: The study found that angiospermic plants, particularly dicots, dominated over gymnosperms and pteridophytes. The leading families were Asteraceae (37 species), Rosaceae (19 species), and Fabaceae (17 species). Herbaceous plants (76%) were most prevalent, followed by shrubs (10%) and trees (14%). Hemicryptophytes (63%) were the most common life form, indicating successful environmental adaptation. Jutal valley exhibited the highest plant diversity with 201 species, followed by Danyore (167), Kargah (138), and Jutial (131). Jaccard coefficients revealed moderate to low similarity between the valleys, with Jutal and Kargah showing a moderate similarity (0.5032). Ethnobotanical insights revealed 65 plant species used to treat over 30 ailments. Leaves (25%), roots (21%), and seeds (16%) were the most commonly used plant parts, with direct usage (31%) and powder form (23%) being the predominant methods. *Bergenia stracheyi* Hook. F and Thomson. (UV: 0.32, RFC: 0.52), *Prunus armeniaca* L. (UV: 0.24, RFC: 0.44), and *Gentiana tianschanica* Rupr. (UV: 0.2, RFC: 0.48) emerged as the most frequently cited medicinal plants.

Conclusion: The study enriches the botanical inventory of the Gilgit district, highlights the significant role of indigenous knowledge in plant usage, and provides a foundation for future conservation efforts, sustainable utilization, and pharmacological research.

Keywords: District Gilgit, Floristic Diversity, Ethnobotany, Medicinal Plants, Indigenous Knowledge

Background

Gilgit-Baltistan is full of a diverse flora. A great number of economically important plants such as Wild (*Cumin, Pine, Angelica, Artemisia, Arnebia*), nuts and other large number of medicinal plants. According to Ali and Nasir (1970-1995), Five thousand and six hundred species of 22 families belongs to 150 genera have been described so far. Approximately 400 species are endemic to Pakistan (Stewart 1972), about 1000 species of vascular plants are known to occur in northern areas of Pakistan (Zahidullah *et al.* 2015). At least 189 Pteridophyte plants are reported from Pakistan, of these, 153 are Sino-Himalayan elements, while 36 show Euro Siberian elements. There is dire need for study of Algae, Liverworts, Mosses and Lichens as they are poorly known from Pakistan. Mycological studies have been done in larger extend in Pakistan as according to Mirza & Qureshi (1978) total 87 genera 3383 species of fungi have been documented from Pakistan. Approximately 80% endemic plants of flora of Pakistan lie in peaks of Pakistan and Kashmir (Ali, 2008). A total 600 medicinal value plants species have been documented from Pakistan (Hussain *et al.* 2011). The flora of Northern Areas of Pakistan has geographic resemblance with Central Asia, extending in the west from Turkey to the Gobi Desert in the east (Zahidullah, *et al.* 2015).

Medicinal plants play a crucial role in the healthcare systems of the indigenous communities of Gilgit-Baltistan (Khan *et al*. 2019). For generations, the local people have harnessed the healing properties of these plants to treat a wide range of health ailments. Traditional knowledge about the medicinal uses of plants is passed down through generations, forming an integral part of the cultural heritage of the region (Panigrahi *et al*. 2021). This indigenous knowledge is not only a testament to the close relationship between the people and their natural environment but also a valuable resource for modern medicine. Many contemporary pharmaceuticals have their origins in traditional herbal remedies, and the potential for discovering new drugs from these plants is vast (Suntar 2020).

Beyond their medicinal uses, the plants of Gilgit-Baltistan serve various other purposes. Many species are utilized for their nutritional value, providing essential vitamins and minerals to the local diet. The region's flora also holds cultural significance, featuring in traditional rituals, folklore, and crafts. The use of plants in cultural practices reinforces the identity and continuity of the indigenous communities, highlighting the interconnectedness of natural and cultural heritage.

The conservation of floristic diversity in Gilgit-Baltistan is vital for the communities' existence and their live stocks survival in the winter seasons. Ecologically, diverse plant species contribute to ecosystem resilience, helping to maintain soil fertility, regulate water cycles, and provide habitat for wildlife. Economically, the potential for sustainable harvesting of medicinal and nutritional plants can support for the local inhabitants to improve their livelihoods and promote eco-tourism, bringing much-needed income to remote communities. Scientifically, the unique flora of the region offers opportunities for research in fields such as botany, pharmacology, phytochemistry and environmental science. Our aim was to explore the floristic diversity of study area and to document the indigenous knowledge of medicinal plants from the local communities.

Materials and Methods

Study area

District Gilgit, located in the heart of the Gilgit-Baltistan region of Pakistan, is characterized by its remarkable topographical diversity and rich cultural heritage. As a prominent administrative region, it serves as a pivotal area within the Gilgit-Baltistan region, often recognized for its strategic importance due to its physical linkages with other five districts, cultural, lingual, diverse ecosystems and climatic conditions. The district has characterized by a mix of valleys and high-altitude areas, offering a unique blend of flora and fauna. Its major part lies at the confluence of the Gilgit and Hunza rivers, providing a fertile ground for a variety of plant species. The district's climate ranges from semi-arid to alpine, with significant temperature variations between summer and winter, supporting a wide range of plant communities, from lower and, semi-arid scrub to high-altitude alpine meadows. The cultural landscape of Gilgit is as diverse as its ecological zones, with several ethnic communities practicing traditional agriculture and utilizing local flora for food, shelter and medicinal purposes. This traditional knowledge forms as an integral part of the region's ethnobotanical heritage, contributing to the conservation and sustainable use of plant resources. The strategic location of Gilgit at the crossroads of ancient trade routes has historically made it a melting pot of cultures and biodiversity, including a mix of species from the neighboring regions of Central Asia, South Asia, and the Tibetan Plateau.

The current research was conducted to explore the floristic diversity of selected localities (Jutal, Danyore, Jutial, and Kargah) of District Gilgit. The Jutal and Danyore are situated within the Karakoram Range and are part of the Central Karakoram National Park (CKNP), renowned for its unique vegetation patterns and rich floral diversity. The CKNP serves as a critical habitat for several endemic plant species, showcasing alpine meadows, shrub lands, and coniferous forests. In contrast, Jutial

and Kargah are part of the Hindu Kush Range, which extends across northern Pakistan and into Afghanistan. The Hindu Kush Range presents a distinct ecological environment, with a variety of deciduous and coniferous trees, alpine plants, and a rich understory of herbs and shrubs (See Figure 1).

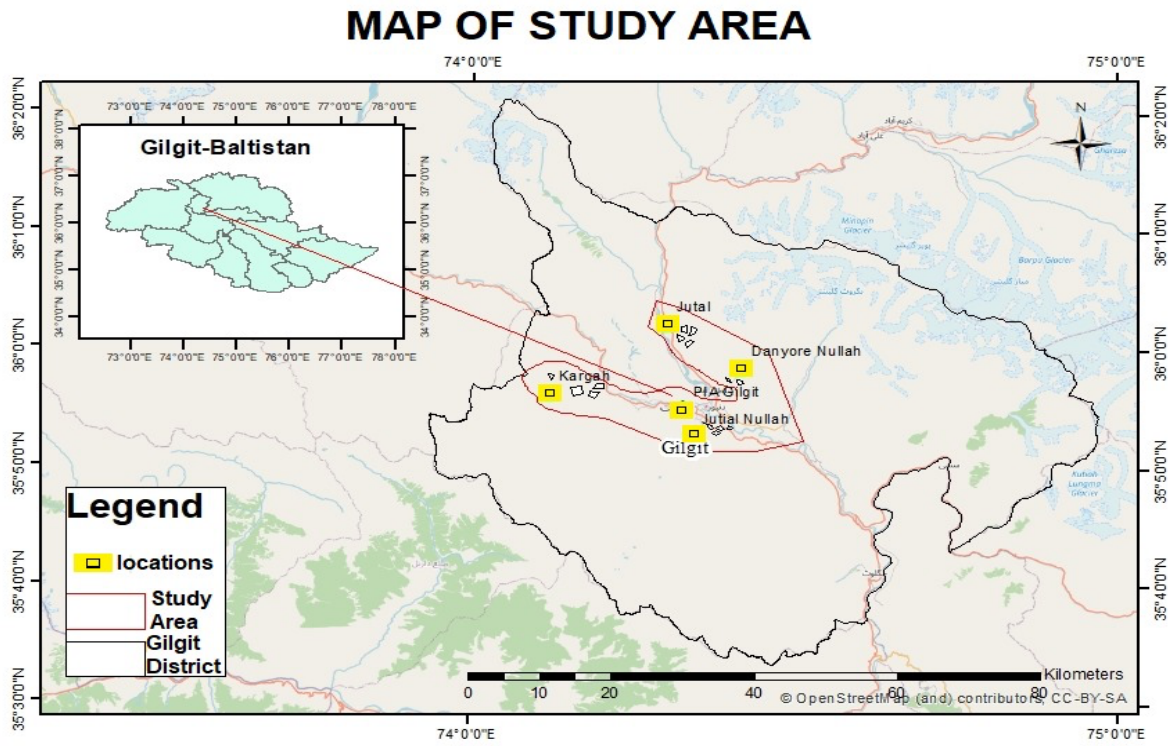

Figure 1. Map of Study Area

Field surveys for data collection

Field visits were arranged in the appropriate season (spring and summer 2022-23) to collect plant materials, asses the diversity and investigate ethnobotanical data. During the field survey, all available plant material, whether medicinal or non-medicinal, was collected for proper identification and develop a check list. A digital camera was used to capture photographs of the desired plants on the spot in their original habitat. Field numbers were recorded with the collected plant specimens in the field, and then the plants were stored in polythene bags to transport for the drying and mounting. Vernacular names of the plants, as well as their common uses, were also recorded in field notes with the help of inhabitants and community elders/ herbalists (Khan *et al.* 2015). Information about the habit category and life form of the plants were also noted through observation. Some field activities during the data collection, field records and identification of plant specimens shown in the Figure 2.

Specimen mounting and identification

The collected samples were pressed and dried by using blotting papers and plant presser then mounted on the herbarium sheet with the help of Z- tac (Singh *et al*. 2020). These mounted samples were identified and given botanical names along with authorities with the help of available literature the World Flora Online (https://www.worldfloraonline.org/). Eflora of Pakistan (http://www.efloras.org/flora/) and Flora of Pakistan (Ali & Qaiser 1993-2022, Ali & Nasir 1989-1991, Nasir & Ali 1970-1989)

Jaccard Divirsity index

The Jaccard similarity coefficient is calculated as the ratio of the number of common species to the total number of unique species in the two sets (Awang-Kanak *et al*. 2020).

We performed cluster analysis to group the localities based on their similarity in plant species composition.

To calculate the Jaccard similarity coefficient between two localities following formula were used:

$J(A, B) = |A \cap B / AUB|$

- A represents the set of species present in Locality A.
- B represents the set of species present in Locality B.
- |AΩB| represents the number of species common to both localities.
- |AUB| represents the total number of unique species in both localities.

Figure 2. (A) While collecting plant specimen, (B) pressing of collected plant specimen during collection (B) identifying plant specimen at KIU Herbarium with the help of microscope (D) collecting indigenous knowledge of medicinal plants on fields.

Ethnobotanical Data Collection

Questionnaire

Semi-structural questionnaires were also designed to collect all the required information about the ethnobotanical uses of plants, as well as through the focus group interviews in the Shina language (Ahmed *et al*., 2014). The interviews were taken from local old housewives, shepherd, farmers, and herbalists. The total key informants were 100. The focus group were constituting 73 males 30 females and Information about the plant local name, part used, mode of use was also noted down (Smita *et al*. 2012).

Relative Frequency Citation (RFC)

The collected ethno botanical data was analysed by using relative frequency citation (RFC) as;

$$RFC=FC/N$$

Where FC is frequency of citation which shows the respondents has including the use of the species.
N is total number of respondents participating in the survey (Bano *et al*. 2014).

Use Value (UV)

The Use Value (UV) represents the relative importance of medicinal plants species of the study area. It was calculated with the help of following formula (Mahmood *et al*. 2012).

$UV=\sum Ui/Ni$

Where, Ui is the number of uses mentioned by each respondent for a given plant species i and N represent the total number of respondents.

Results and Discussion

Results of floristic diversity

In the current study, 252 plant species were documented, spanning 172 genera and 59 families, including both advanced and primitive plants (See Annexure 1). The taxonomic breakup reveals diversity across Pteridophytes, gymnosperms (including gnetophytes and conifers), and angiosperms (monocots and dicots). Ferns were limited, comprising 4 species in 3 genera and 3 families. Gymnosperms included 8 species in 4 genera and 3 families, with 2 gnetophyte species. Conifers, a gymnosperm subgroup, had 6 species in 3 genera and 2 families. Angiosperms dominated, with 240 species in 165 genera and 53 families, further divided into dicots (224 species, 152 genera, 50 families) and monocots (16 species, 13 genera, 3 families) (Figure 3). Similar study conducted by Mehmood *et al*. (2015) aimed to examine the floristic diversity and medicinal plants of the KPK region in Pakistan. They also found the dominancy of angiosperm among the diversity of plants.

The study area's plant composition showcased diverse families, each contributing distinctively. Asteraceae was the most dominant family, with 37 species across 22 genera. Such kind of research on floristic diversity assessment was conducted by Hadi *et al*. (2019) at Kalash valley Pakistan. Followed by Rosaceae (19 species, 11 genera), Fabaceae (17 species, 12 genera), Poaceae (11 species, 10 genera), Lamiaceae (10 species, 8 genera), Rannunculaceae (10 species, 8 genera), Polygonaceae (9 species, 7 genera), Solanaceae (9 species, 5 genera), Boraginaceae (7 species, 4 genera), and Crassulaceae (6 species, 3 genera). The remaining documented families exhibit 1-5 species, reflecting their unique representation in the study area.

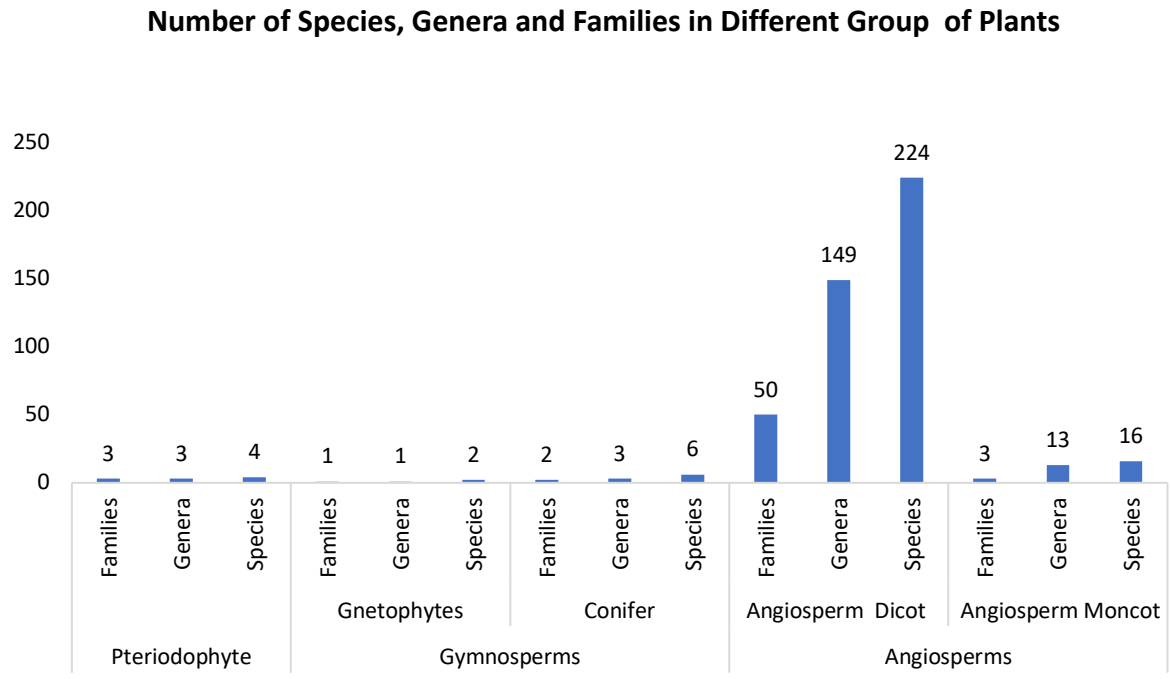

Figure 3. Diversity of different group of plants in the study area

Habit categories of plant species

The plant collection within the study area was categorized based on their habits and asses the diverse distribution patterns. Herbs were the leading category with 142 (76%) plants which show the dominant vegetation in the ecology of study area.

The previous research conducted by Badshah *et al*. (2013) also indicated that herb category is dominated in their research. Followed by shrubs with 22 (14%) plants, and trees with 12 (10%) plants (Figure 4). The presence of shrubs and trees that contribute to the varied botanical landscape of the area.

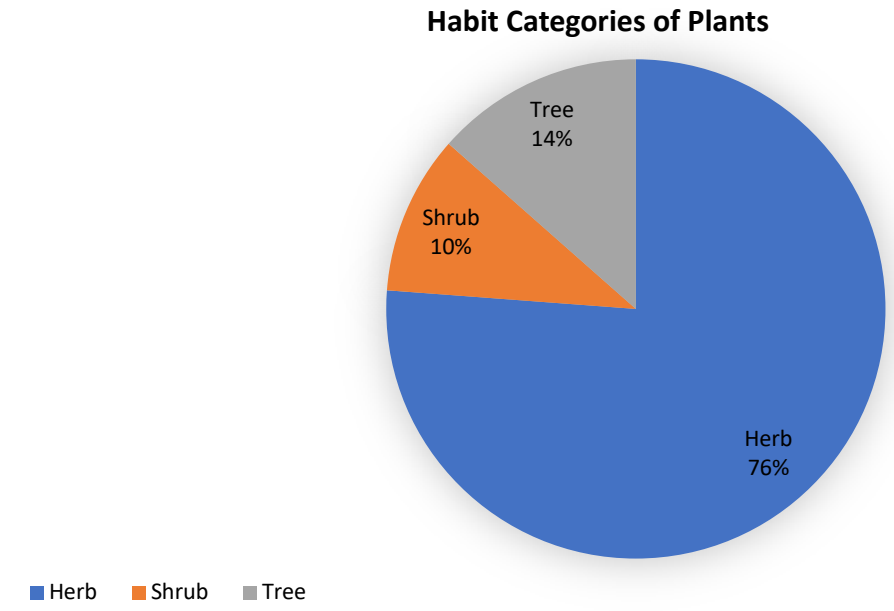

Figure 4. Different habit categories of plants of study area

Life form spectrum

According to Raunkiaer (1934) classification, the flora of study area was classified on the basis of life form spectrum. The distribution of plant life forms spectrum within the study area was characterized by distinct percentages across various categories. Notably, Chamaephytes constitute 4% of the plants, while Cryptophytes account for 1.14%. A dominant life form category presence in the study area was observed among the other life form categories was hemicryptophytes, representing a significant 63.64% of the life forms. Phanerophytes comprise 17.05% of the population, followed by therophytes at 14.20% (Figure 5). This distribution shows a diverse array of ecological adaptations, with hemicryptophytes emerging as the most prevalent life form, indicating their successful adaptation to the study area's environmental conditions. Similar results were found in previous study regarding the distribution of life form conducted by (Mehmood *et al*. 2015).

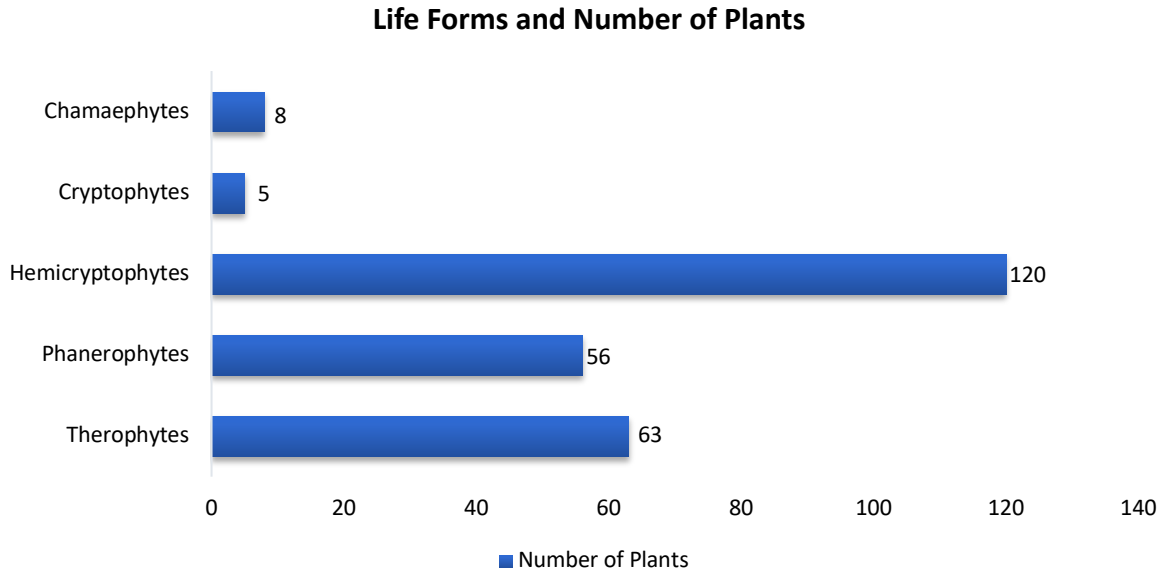

Figure 5. Life forms of plants of study area

Locality wise distribution of plants

The locality-wise distribution of floristic diversity revealed that the highest diversity was reported from Jutal (201), followed by Danyore (167), Kargah (138), and Jutial (131), respectively Shown in Figure 6. The total count for the entire study area amounted to 252 plants. It is noteworthy that despite the potential for extensive plant diversity in the study area, observed numbers may have been influenced by factors such as topography, climatic conditions and according to the timing of plant collection. The dynamic nature of plant life cycles and environmental conditions during the collection period could have impacted the visibility and presence of certain species. Some plants may not have been in their growth phase, while others may have completed their life cycle, making them challenging to identify during the collection period (Rocchini *et al*. 2004). Despite these challenges, rigorous efforts were made to collect as many plants as possible within the given timeframe. Thus, the variations in the distribution of the number of plants across different localities reflected the dynamic nature of the study area and the complexities involved in documenting the full spectrum of its floristic diversity.

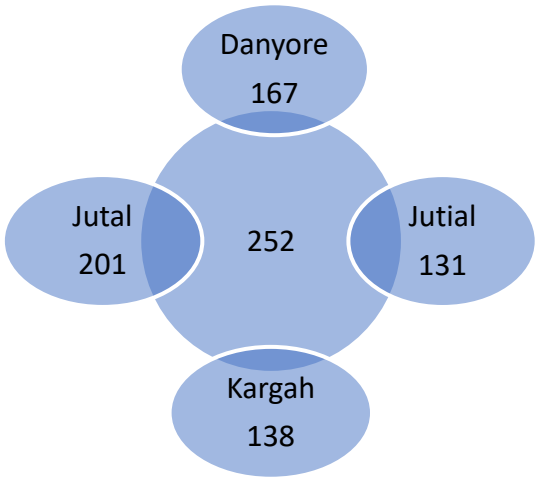

Figure 6. Number of plant species in selected localities of study area

Analysis of plant species composition across four localities

The Jaccard similarity coefficients applied to analyses the plant species composition across the four localities. The results revealed interesting insights into the plant species composition among the four selected localities. Between the Jutal and Kargah comparison, results exhibited a moderate level of similarity, with a coefficient of approximately 0.5032, suggesting that they share about half of their plant species. On the other hand, Jutal shows lower similarity as compare to danyore Danyore (0.3465) and Jutial (0.3956), indicating notable differences in the plant composition was examined. Interestingly, Kargah demonstrates slightly higher similarity with Jutial (0.4078) compared to Danyore (0.3889), implying that it shares more plant species with Jutial. Subsequently Danyore and Jutial exhibit a moderate level of similarity (0.4), indicating a substantial overlap in their plant species composition despite their distinct geographical locations shown in Figure 7). Similar kind of study conducted by (Khan *et al*. 2014) but results are not much similar with their findings. It is because of difference in geographical and ecological conditions.

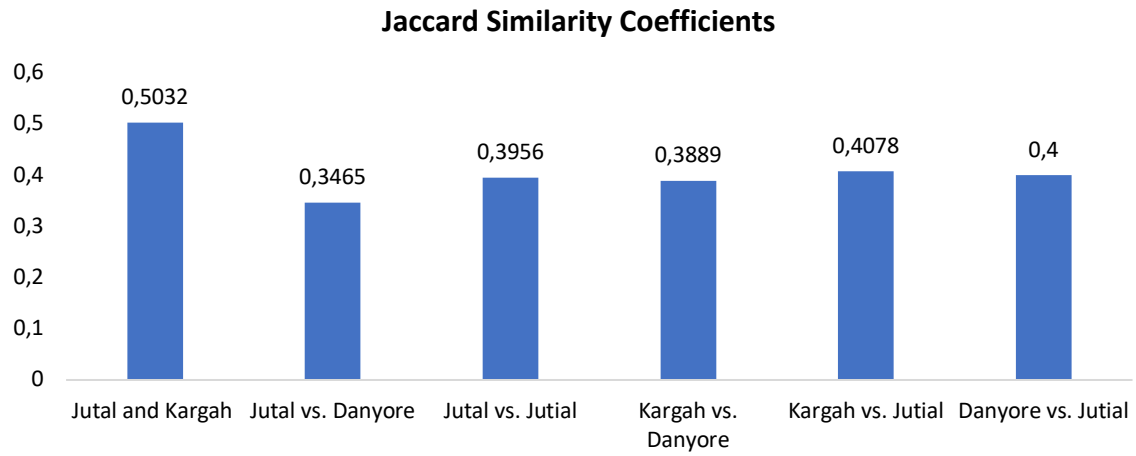

Figure 7. Jaccard Similarity Coefficient between various localities of study area

Composition of Plant Species between the mountain Ranges

The analysis of plant species composition across the Himalayas (Kargah and Jutial) and the Karakoram (Jutal and Danyore) reveals intriguing insights into the ecological dynamics of these mountain ranges. Despite their geographical separation, both the Hindu Kush and the Karakoram exhibit moderate levels of similarity in plant species composition, as indicated by their respective average Jaccard similarity coefficients of 0.4078 and 0.4. This suggests a considerable overlap in flora within each range, highlighting commonalities in environmental conditions or historical factors influencing plant distribution. While the Hindu Kush Mountain range show a slightly higher overall similarity compared to the Karakoram range, which indicates that comparable levels of plant diversity exist between these two mountain ranges. These findings underscore the resilience and adaptability of mountain ecosystems, showcasing the rich biodiversity and ecological significance of both the Hindu Kush and the Karakoram in shaping regional plant diversity. Same studies were conducted by (Sanjerehei *et al*. 2020, Rahman *et al*. 2019) explained the floral diversity and composition.

Results of Ethnobotany

The ethnobotanical research activities were also conducted during 2022 to 2023 and four localities were selected for the floristic diversity and the ethnobotanical data collection. A total of 100 informants, including 70 males and 30 females, were selected to collect the indigenous knowledge and folk wisdom regarding the medicinal plants of the area (Table 1). These informants were from the different age groups and selection of interviewers was based on their knowledge about the traditional usage of medicinal flora. Semi structured questionnaire was used to collect the data and most of the information was based on the local name of the plant, the specific part used, and the method of utilization was documented properly.

Table 1. Total number of informants from study area.

Total informant	Male			Female		
	70			30		
100	Age 15-40	Age 41-65	Above 66	Age 15-40	Age 41-65	Above 66
	35	30	05	10	18	02

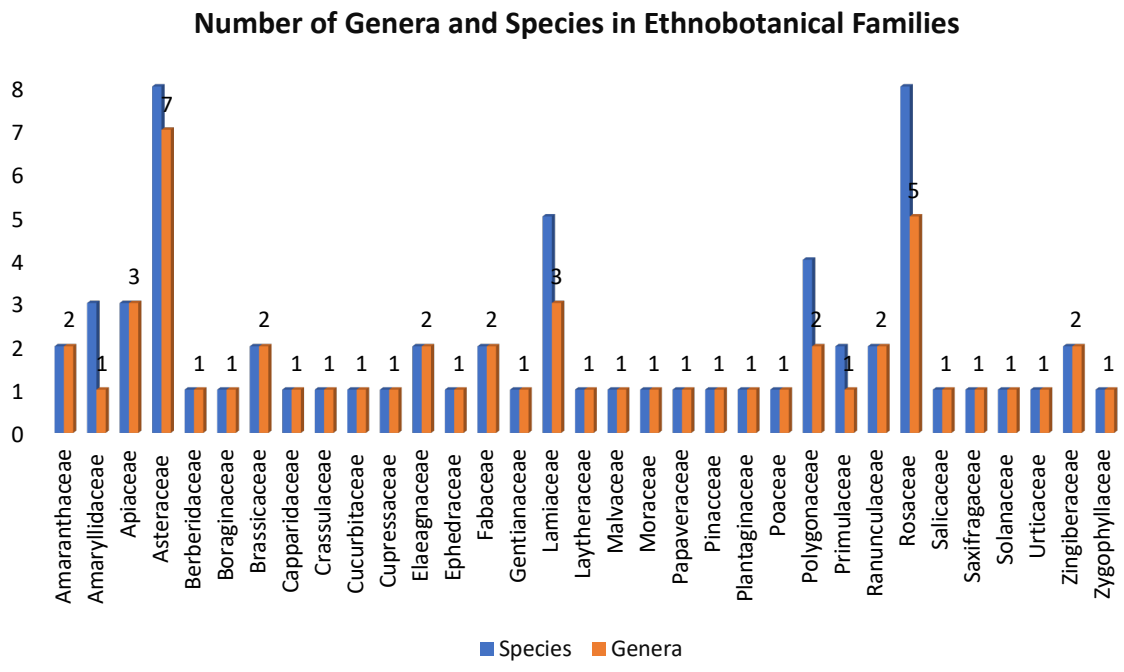

Figure 8. Number of genera and species in ethnobotanical families of study area

The ethnobotanical data revealed that, the 65 medicinal plants species were common in use for the treatment of different ailments. These 65 plant species belongs to 54 genera and 33 families. The inhabitants of the study area have been utilizing these plants for the treatment of various health ailments shown in the Annexure 2. The results indicate that Asteraceae (8), Rosaceae (8), Lamiaceae (5) and Polygonaceae (4) having highest number of medicinal plants. They are followed by Amaryllidaceae (3), Apiaceae (3), Lamiaceae (3), Amaranthaceae (2), Brassicaceae (2), Elaeagnaceae (2), Fabaceae (2), Primulaceae (2), Ranunculaceae (2), and Zingiberaceae (2). Additionally, Berberidaceae, Boraginaceae, Capparidaceae,

Crassulaceae, Cucurbitaceae, Cupressaceae, Ephederaceae, Gentianaceae, Laytheraceae , Malvaceae, Moraceae, Papaveraceae, Pinaceae, Plantaginaceae, Poaceae, Salicaceae, Sexifergaceaee, Solanaceae, Urticaceae and Zygophyllaceae each contribute a single plant species. Families Asteraceae, Rosaceae, Lamiaceae and Polygonaceae exhibit a significant range of plant species utilized in herbal medicine (See Figure 8). These ethnobotanical results have a resemblance with past researches conducted by (Salim *et al*. 2024, Abbas *et al.* 2019, Khan *et al.* 2014)

Analysis of habit categories and primary sources of herbal medicine

The analysis of habit categories of medicinal plants from the conducted research revealed 65 reported species. The primary sources of herbal medicine were categorized as follows: wild herbs (35%), cultivated herbs (26%), wild shrubs (23%), cultivated trees (10%), cultivated trees (3%), and cultivated shrubs (2%) (Figure 6). Herb category is leading groups of medicinal plants utilizing by indigenous people for their various health aliments (Khan *et al*. 2015) (See Figure 9).

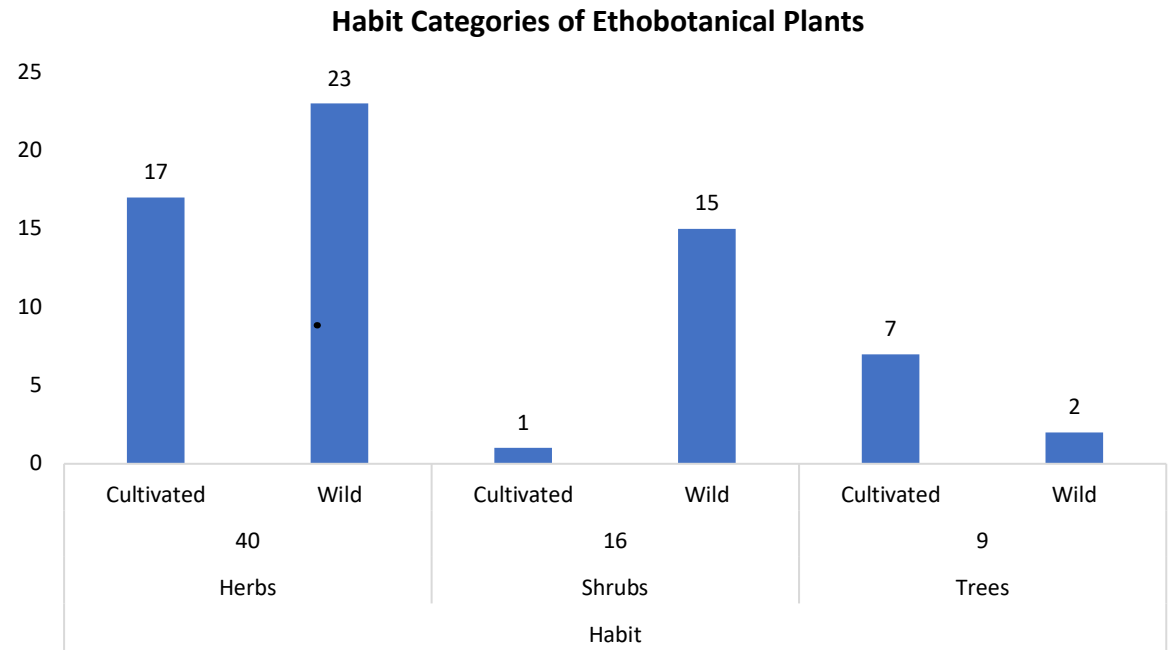

Figure 9. Habit categories and source of ethnobotanical plants of study area

Utilization of Plant Parts

Local people used various plant parts for treating different ailments, including flowers, seeds, berries, fruits, branches, stems, roots, bulbs, barks, pines, and resins. Among the reported medicinal plants, leave part (17 plants) of plants are most utilizing part used by native people for their health aliments shown in (Figure 10). Previous study shown similar results conducted by (Manzoor et al. 2023). Leaves are the major source of bioactive compounds and easily accessible for harvest without damaging the entire plant body. And roots (15 plants) used for the different aliments were the second most commonly utilized parts. Followed by seeds (12 plants), flowers (6 plants), fruits (5 plants), berries (4 plants), stems (4 plants), bulbs (4 plants), resins (2 plants), branches (1 plant), bark (1 plant), and pines (1 plant). The fleshy and attractive for common utilization. However, in Traditional Chinese Medicines (TCM), roots have been indicated as the dominant part in recipes preparation (Aziz *et al*. 2018). There was sufficient range of utilization in plant parts reported in the study areas. For the validation of the folk wisdom of these medicinally important plants should evaluate through sophisticated phytochemistry techniques and bioassay screening activities to check the potential of biological activities and compound isolation for drug development.

Method of use of Medicinal Plants

In the study area, various methods were employed by people to utilize medicinal plants, including decoction, powder, juice, paste, infusion, roast in ash, oil, cooking, and chewing. However, it was observed that the predominant method was the direct use of medicinal plants. Out of the 65 identified medicinal plants, 31% were used directly means used fresh leaves, roots and fruits. Additionally, 22% were utilized in powder form, 18% through the decoction method, 6% for juice extraction, 6% for oil extraction, 5% for infusion, 4% as paste, 3% in cooking, and 2% through chewing methods for the treatment of

various health problems (Figure 11). According to the previous studies (Mahmood *et al*. 2013, Ahmad *et al*. 2014) are resemblance with current study but not 100% similar because ethnobotany is varied from region to region.

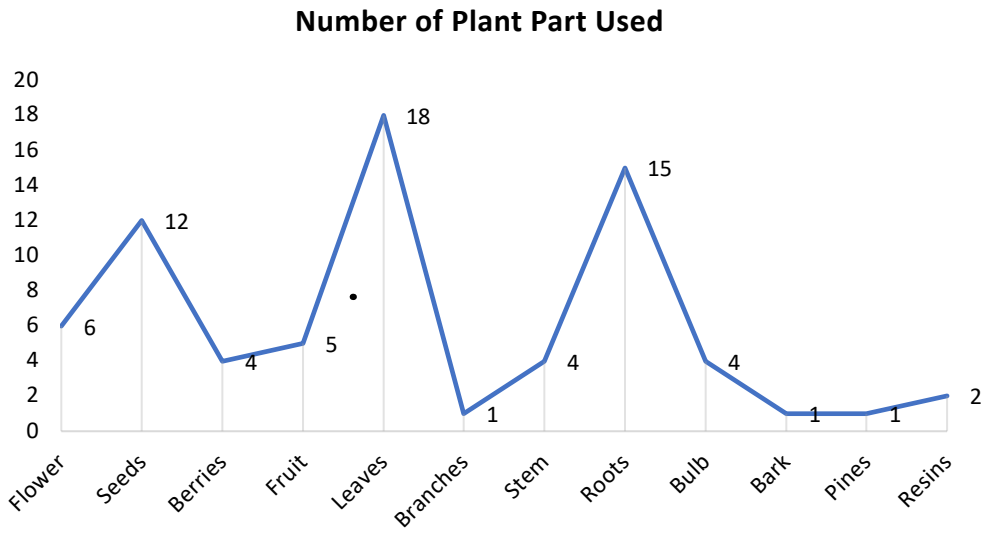

Figure 10. Number of plant parts used for different aliments

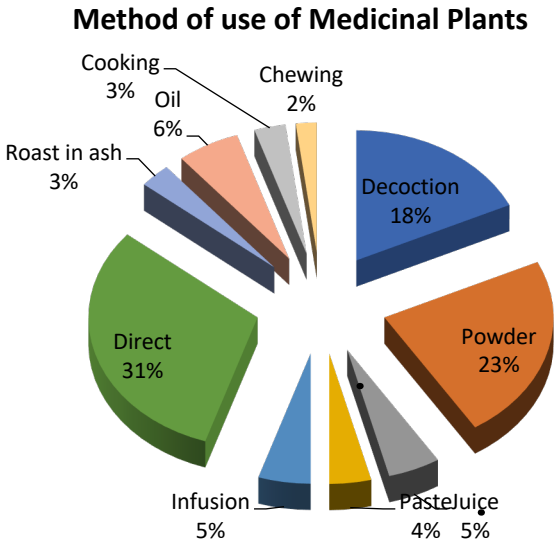

Figure 11. Percentages of method of use of medicinal plants of study area

Usage of Plants and Diseases

The results indicate that the indigenous people of the Valleys utilize 65 plants for treating over 30 different health ailments. The majority of these plants are employed to address respiratory and digestive disorders, with a subsequent focus on issues related to bones and wounds, back and joint pain, skin diseases, liver diseases, fever, headache, kidney disorders, eye diseases, toothaches, hair problems, reproductive problems, blood problems, inflammations, tumors, cancer, tonsillitis, and other purposes such as medicinal plants for cooking, immune system enhancement, memory improvement, skin problems, and promoting facial beauty. It is noteworthy that more than one plant is utilized for different ailments, as illustrated in Figure 12.

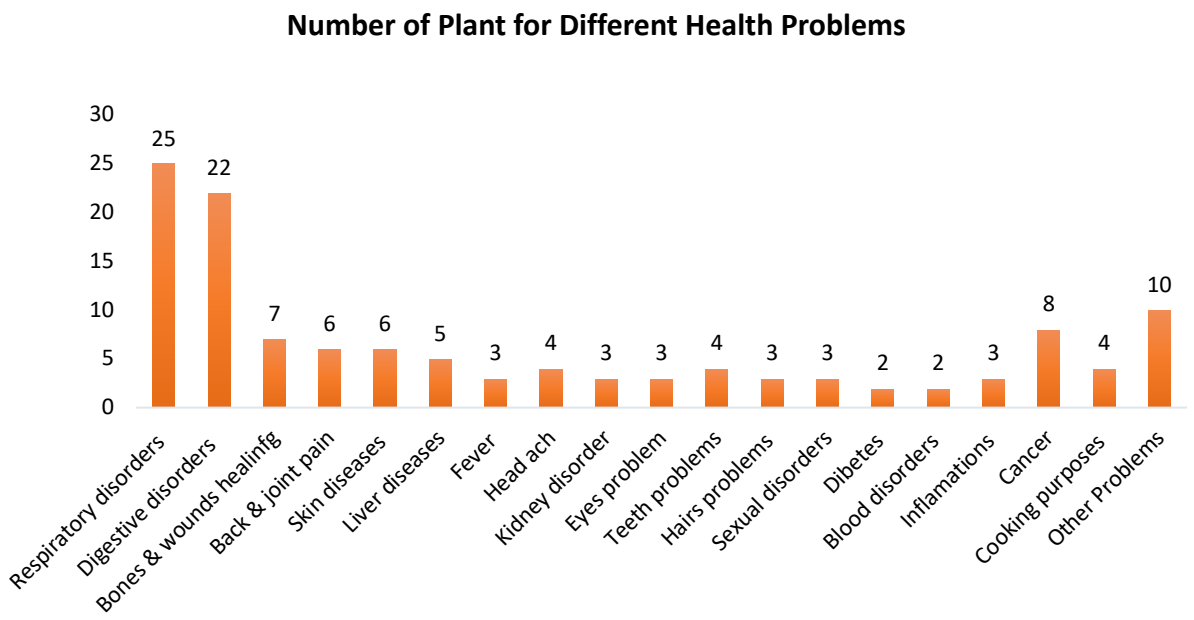

Figure 12. Number of medicinal plant sfor various health aliments

Used Value (UV) and Relative Frequency Citation (RFC)

The Used Value and relative frequency citation (RFC) were calculated in the most common occurring medicinal plant used for various disorders. Based on RFC value number of informants who cite the different plant species for the different disorders at various localities in the study area. The ethnobotanical analysis identified fifteen commonly used medicinal plants with high Used Values (UV) and Relative Frequency of Citation (RFC). *Bergenia stracheyi* Hook. F and Thomson. ranked highest with a UV of 0.32 and an RFC of 0.52, followed by *Prunus armeniaca* L. (UV: 0.24, RFC: 0.44), *Gentiana tianschanica* Rupr. (UV: 0.2, RFC: 0.48), and *Berberis lyceum* Royal. (UV: 0.2, RFC: 0.32). Other notable plants included *Delphinium brononianum* Royal., *Glycyrrhiza glabra* L., *Punica granatum* L., and *Plantago major* f. asiatica (L.) Regel, each with a UV of 0.16 and corresponding RFCs of 0.48, 0.24, 0.24, and 0.24, respectively. *Artemisia seversiana* Ehrh., *Mentha longifolia* L., and *Rheum wabbianum* Royal. had UVs of 0.12 and RFCs of 0.56, 0.36, and 0.16, respectively. *Chicorium intybus* L. followed with a UV of 0.08 and an RFC of 0.28. Finally, *Capparis spinosa* L. and *Thymus linearis* Benth. had UVs of 0.04 and RFCs of 0.24 and 0.28, respectively. Similar research study conducted (Ud Din et al, 2024) but due to difference of locality the informant citation is different and listed medicinal plants are similar with this study.

Conclusion

It can be concluded that District Gilgit is a quite rich in floral diversity with 252 species identified during the current study and many of the species are used as traditional medicines by the locals to treat numerous health conditions. It has been noted during the current study that the traditional knowledge of ethnobotany is a risk with locals, especially the young generation now more inclined towards the allopathic treatments. Therefore, it is recommended to preserve the ethnobotaical heritage of the area. It was also noted that the introduction of non-native species and encroachment into wild habitats by local communities have badly impacted the indigenous plant resources, so preserving them has become highly crucial. The findings also underscore the need for conservation strategies that involve community engagement and education to promote sustainable use and preserve ethnobotanical heritage. This research enriches the region's botanical inventory and supports future conservation efforts and pharmacological studies.

Declarations

List of abbreviations: UV Use Value, RFC Relative Frequency Citation, Traditional Chinese Medicines TCM.

Ethics approval and consent to participate: All interviewees verbally provided their prior informed consent.

Consent for publication: All individuals depicted in the images verbally gave their prior informed consent for their images to be displayed.

Availability of data and materials: Not applicable

Competing interests: The authors have no any conflict of interest for the research publication.

Funding: The Office of Research and Innovation KIU, Gilgit for providing financial support under the grant project KIU-ORIC-1 (2021)/012 for the field and laboratory work.

Author contributions: Waqar Hussain, the primary author, meticulously managed every aspect of the research, including planning, data collection, specimen preparation, identification, results analysis, and manuscript production. Qamar Abbas and Saima Saleem, both in supervisory roles, contributed to the research design and facilitated in results analysis. Sher Wali Khan assisted with specimen identification and provided guidance on data collection and methodology. Madad Ali Shah actively participated in specimen collection, supported pressing and mounting, and helped with professional formatting. Their collaborative efforts ensured a comprehensive and well-executed study on the floristic inventory and documentation of indigenous knowledge of medicinal plants in District Gilgit, Gilgit-Baltistan, Pakistan.

Acknowledgement

The authors are thankful to Dr. Sher Wali Khan a well-known taxonomist of Pakistan and Head of Department Plant Sciences who devote his precious time to identify the flora of study area. And also thankful to the Office of Research and Innovation KIU, Gilgit for providing financial support under the grant project KIU-ORIC-1 (2021)/012.

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Annexure 1. Checklist of flora of different valleys of District Gilgit.

Pteridophytes				
Family Name	**Botanical Name**	**Local Name**	**Habit**	**Life form**
Dennstaedtiaceae	*Pteridium aquilinum* (L.) Kuhn	Sumbul	Herb	Hi
Equisetaceae	*Equisetum arvense* L.	Not Known	Herb	Hi
Pteridaceae	*Adiantum raddianum* C.Presl	Not known	Herb	Hi
Pteridaceae	*Adiantum capillus-veneris* Sw.	Not Known	Herb	Hi
Gymnosperms Genetophyte				
Ephedraceae	*Ephedra gerardiana* Wall.ex Stapf.	Not Known	Shrub	Ph
Ephedraceae	*Ephedra intermedia* (Schrenk.) C.A.	Soom	Shrub	Ph
Gymnosperms Conifers				
Cupressaceae	*Juniperus communis* L.	Mathari	Shrub	Ph
Cupressaceae	*Juniperus excelsa* M. Bieb.	Chili	Tree	Ph
Pinaceae	*Picea smithiana* (Wall.) Boiss.	Kaxool	Tree	Ph
Pinaceae	*Pinus* gerardiana Wall. ex. D.Don.	Cheenh	Tree	Ph
Pinaceae	*Pinus roxburghii* Sarg.	Cheenh	Tree	Ph
Pinaceae	*Pinus wallichiana* (Wall. ex. D.Don) A.B.Jacks.	Chee	Tree	Ph
Angiosperms Monocot				
Amaryllidaceae	*Allium cepa* L.	Kasho	Herb	Cr
Amaryllidaceae	*Allium sativum* L.	Bokpa	Herb	Cr
Amaryllidaceae	*Allium oreoprasum* Schrenk	Floon	Herb	Cr
Orchidaceae	*Dactylorhiza hatagirea* D.Don.	Ner mada	Herb	Th
Orchidaceae	*Epipactis gigantea* Douglas	Not Known	Herb	Hi
Poaceae	*Agrostis gigantea* Roth	not knoewn	Herb	He
Poaceae	*Avena sativa* L.	Shsher	Herb	Th
Poaceae	*Cynodon dactylon* (L.) Pers.	Jut	Herb	He
Poaceae	*Dichanthium annulatum* (Forssk.) Stapf	Not Known	Herb	He
Poaceae	*Hordeum vulgare* L.	Yow	Herb	Th
Poaceae	*Melica persica* Kunth,	Not Known	Herb	He
Poaceae	*Saccharm bengalensis* Retz.	Phoroo	Herb	Ch
Poaceae	*Saccharum filifolium* Nees ex Steud.	Not Known	Herb	He
Poaceae	*Stipagrostis plumosa* (L.) Munro ex T.Anderson	Not Known	Herb	He
Poaceae	*Triticum aestivum* L.	Goom	Herb	Th
Poaceae	*Zea mays* L.	Makay	Herb	Th
Angiosperms Dicots				
Amaranthaceae	*Spinacia oleracea* L.	Palak Shah	Herb	Th
Amaranthaceae	*Amaranthus hybridus* Li.	Ganarii	Herb	Hi
Amaranthaceae	*Amaranthus viridis* L.	Ganar	Herb	Hi
Amaranthaceae	*Celosia argentea* L.	Not known	Herb	Th
Amaranthaceae	*Chenopodium album* L.	Kunaa	Herb	Th
Amaranthaceae	*Chenopodium botyris* L.	Himangi	Herb	Th
Amaranthaceae	*Chenopodium foliosum* Asch.	Shoi xach	Herb	Th
Amaranthaceae	*Suaeda heterophylla* Bunge ex Boiss.	Not Known	Herb	Th
Amaranthaceae	*Salsola kali* L.	Kono	Shrub	Ch
Amaranthaceae	*Salsola tragus* L.	Not Known	Herb	Th
Anacardiaceae	*Pistacia khinjuk* J.D Hooker.	Khakao	Tree	Ph
Apiaceae	*Coriandrum sativum* L.	Naski	Herb	Th
Apiaceae	*Daucus carota* L.	Kachoon	Herb	Th
Apiaceae	*Heracleum pinnatum* C.B.Clarke	Not Known	Herb	Hi
Apiaceae	*Pleurospermum candollei* (DC.) C.B.Clarke	Not Known	Herb	Hi
Asteraceae	*Allardia tomentosa* Decne.	Not Known	Herb	Hi
Asteraceae	*Allardia tridactylites* Sch.Bip.	Not Known	Herb	Hi
Asteraceae	*Anaphalis nepalensis* (Spreng.) Hand. -Mazz.	Cheki	Herb	Hi

Asteraceae	*Anaphalis virgata* Thoms.	Cheki	Herb	Hi
Asteraceae	*Arctium lappa* L.	Chiroo	Herb	Hi
Asteraceae	*Artemesia maritime* L.	Zoon	Herb	Ch
Asteraceae	*Artemisia absenthium* L.	Gabojing	Herb	Th
Asteraceae	*Artemisia brevifolium* Wall. ex DC.	Zoon	Herb	Ch
Asteraceae	*Artemisia capillaris* Thunb.	Not Known	Herb	Ch
Asteraceae	*Artemisia scoparia* Waldst.	Jaanh	Shrub	Ph
Asteraceae	*Artemisia sieversiana* Ehrh.	Khakamoch	Herb	Th
Asteraceae	*Aster alpine* L.	Not Known	Herb	Hi
Asteraceae	*Aster folconeri* Clarke.	Phti phonr	Herb	Hi
Asteraceae	*Aster himalaicus* C. B. Clarke	Phiti phunar	Herb	Hi
Asteraceae	*Cichorium intybus* L.	Ishkanachee	Herb	Hi
Asteraceae	*Circium vulgare* L.	Not Known	Herb	Th
Asteraceae	*Cousinia thomsonii* C. B. Clarke.	Kono	Herb	Hi
Asteraceae	*Crepis flexuosa* (DC.) Benth.	Ladakhi	Herb	Th
Asteraceae	*Echinops echinatus* Roxb.	Jacheer	Herb	Th
Asteraceae	*Erigeron bonariensis* L.	Dadu funar	Herb	Th
Asteraceae	*Erigeron himalayensis* Vier.	Not Known	Herb	Hi
Asteraceae	*Helianthus annus* L.	Not Known	Herb	Th
Asteraceae	*Lactuca sativa* L.	Salad	Herb	Th
Asteraceae	*Lactuca serriola* L.	Not Known	Herb	Th
Asteraceae	*Leontopodium lenitopodinum* DC.Hans-Mazz.	Not Known	Herb	Hi
Asteraceae	*Picris hieracioides* L.	Not Known	Herb	Th
Asteraceae	*Saurrurea albescen* (D.C). SCH.	Not Known	Herb	Hi
Asteraceae	*Saussauria candicans* C. B. Clarke	Not Known	Herb	Hi
Asteraceae	*Saussurea gnaphalodes* (Royle ex DC.) Sch.Bip.	Not Known	Herb	Hi
Asteraceae	*Scorzonera virgata* DC.	Not Known	Herb	Hi
Asteraceae	*Senecio levingii* C.B. Clarke	Not known	Herb	Hi
Asteraceae	*Senecio tibeticus* Hook.f.	Not Known	Herb	Hi
Asteraceae	*Sonchus asper* (L.) Vill.	Not known	Herb	Hi
Asteraceae	*Tanacetum artemisioides* Schultz-Bip. ex Hook.f.	Zoon	Herb	Hi
Asteraceae	*Tanacetum falconeri* J. D. Hooker	Zoon	Herb	Hi
Asteraceae	*Taraxacum officinale* Weber.	Dadoo	Herb	Hi
Asteraceae	*Tragopogon porrifolius* L.	Not known	Herb	Hi
Berberidaceae	*Berberis lycium* Royle	Ishkeen	Shrub	Ph
Berberidaceae	*Berberis orthobotrys* Bien.	Ishkin	Herb	Ph
Betulaceae	*Betula utilis* D.Don.	Joonji	Tree	Ph
Boraginaceae	*Arnebia euchroma* I.M.Johnst.	Not Known	Herb	Hi
Boraginaceae	*Cynoglossum glochidiatum* Wall. ex Benth	Not Known	Herb	Hi
Boraginaceae	*Heliotropium dasycarpum* Yasin J. Nasir	Not Known	Herb	Ch
Boraginaceae	*Myosotis alpestris* J. Nqsir	Not Known	Herb	Hi
Boraginaceae	*Myosotis discolor* Pers.	Not Known	Herb	Hi
Boraginaceae	*Myosotis palustris* L.	Not Known	Herb	Hi
Boraginaceae	*Myosotis sylratica* L.	Not Known	Herb	Hi
Brassicaceae	*Brassica oleracea* L.	Gobi	Herb	Th
Brassicaceae	*Brassica rapa* L.	Molu	Herb	Cr
Brassicaceae	*Sisymbrium irio* L.	Not Known	Herb	Hi
Campanulaceae	*Codonopsis clematidea* (Schrenk) C.B.Clarke	Not Known	Herb	Hi
Cannabaceae	*Cannabis sativa* L.	Thochi	Herb	Th
Capparidaceae	*Capparis spinosa* L.	Kabir	Shrub	Ch
Caprifoliaceae	*Lonicera heterophylla* Decne.	Not known	Shrub	Ph
Caprifoliaceae	*Lonicera microphylla* Willd.	Not Known	Shrub	Ph

Caprifoliaceae	*Valeriana himalayana* Grubov	Not Known	Herb	Th
Caryophyllaceae	*Cerastium alpinum* Hook.	Not Known	Herb	Hi
Caryophyllaceae	*Cerastium fontanum* Baumg.	Not known	Herb	Th
Caryophyllaceae	*Silene gonosperma* Wall.ex Benth.	Not Known	Herb	Hi
Caryophyllaceae	*Silene kunawarensis* Benth.	Not Known	Herb	Hi
Caryophyllaceae	*Silene vulgaris* (Moench) Garcke	Not Known	Herb	Hi
Convolvulaceae	*Convolvulus arvensis* L.	Hargal	Herb	Hi
Crassulaceae	*Hylotelephium ewersii* (Ledeb.) H.Ohba	Not Known	Herb	Hi
Crassulaceae	*Rhodiola heterodonta* (Hook.f. & Thomson) Boriss.	Not Known	Herb	Hi
Crassulaceae	*Rhodiola imbricata* Edgew.	Not Known	Herb	Hi
Crassulaceae	*Rhodiola integrifolia* Raf.	Nour funar	Herb	Hi
Crassulaceae	*Rhodiola wallichiana* (Hook.) Fu	Not Known	Herb	Hi
Crassulaceae	*Rosularia alpestris* (Kar. & Kir.) Boriss.	Not Known	Herb	Hi
Cucurbitaceae	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	Bovar	Herb	Th
Cucurbitaceae	*Cucumis melo* L.	Galati	Herb	Th
Cucurbitaceae	*Cucumis sativus* L.	Laa	Herb	Th
Cucurbitaceae	*Cucurbita maxima* Duch. ex Lam	Wan	Herb	Th
Ebenaceae	*Diospyros kaki* L.f.	Hermit	Tree	Ph
Elaeagnaceae	*Elaeagnus angustifolia* L.	Gunnair	Tree	Ph
Elaeagnaceae	*Elaeagnus umbellata* Thumb.	phas	Tree	Ph
Elaeagnaceae	*Hippophae rhamnoides* L.	Buroh	Shurb	Ph
Ericaceae	*Pyrola rotundifolia* L.	Not Known	Herb	Hi
Fabaceae	*Astragalus biscuspis* Fischer.	Not Known	Shrub	Ch
Fabaceae	*Astragalus falconeri* Astrag.	Not Known	Herb	Hi
Fabaceae	*Astragalus frigidus* L.	Not Known	Herb	Hi
Fabaceae	*Astragalus rhizocephalus* Baker ex Aitch	Not Known	Herb	Hi
Fabaceae	*Astragalus zanskarensis* Benth.	Hapocho	Herb	Hi
Fabaceae	*Caragana brevifolia* Komarov.	hapoochi	Shrub	Ph
Fabaceae	*Cicer microphyllum* Benth.	Not Known	Herb	Hi
Fabaceae	*Colutea nepalensis* Sims		Shrub	Ph
Fabaceae	*Glycyrrhiza glabra* L.	Shalako	Shrub	Hi
Fabaceae	*Hedysarum falconeri* Hook.	Not Known	Herb	Hi
Fabaceae	*Medicago sativa* L.	Ishpit	Herb	Hi
Fabaceae	*Pisum sativa* L.	Matar	Herb	Th
Fabaceae	*Sophora mollis* L.	Bizee	Shrub	Ph
Fabaceae	*Robinia pseudoacacia* L.	Kiker	Tree	Ph
Fabaceae	*Trifolium pretense* L.	Shoopati Phunar	Herb	Hi
Fabaceae	*Trifolium repens* L.	Shaftal Phunar	Herb	Hi
Fabaceae	*Vigna unguiculata* (L.) Walp.	Rabong	Herb	Th
Gentianaceae	*Comastoma borealis* Bunge.	Shalay char	Herb	Th
Gentianaceae	*Comastoma pedunculta* (D.Don) Holub.	Not Known	Herb	Hi
Gentianaceae	*Gentiana tianschanica* Rupr.	Plamas	Herb	Hi
Gentianaceae	*Sewrtia cordifolia* L.	Not known	Herb	Hi
Gentianaceae	*Swertia petiolate* D.Don	Not Known	Herb	Hi
Geraniaceae	*Geranium collinum* Steph. ex Willd.	Korat kacho	Herb	Hi
Geraniaceae	*Geranium himalayense* Klotzsch.	Khambar	Herb	Hi
Geraniaceae	*Geranium pretense* L.	Korat kacho	Herb	Hi
Geraniaceae	*Jaeschkea oligosperma* Griseb.	Not Known	Herb	Hi
Grossulariaceae	*Ribes alpestre* Wall. ex Decne.	Murshatoo	Shrub	Ph
Grossulariaceae	*Ribes himalense* Decne.	Not Known	Shrub	Ph
Grossulariaceae	*Ribes orientale* Desf.	Ghonashatoo	Shrub	Ph
Juglandaceae	*Juglans regia* L.	Ashow	Tree	Ph

Lamiaceae	*Isodon rugosus* (Wall.) Codd	Phaypush	Shrub	Hi
Lamiaceae	*Lamium album* L.	Not Known	Herb	Hi
Lamiaceae	*Mentha longifolia* L.	Feleel	Herb	Hi
Lamiaceae	*Mentha royleana* Wall.	Fleel	Herb	Hi
Lamiaceae	*Nepeta connata* Boyle ex Benth	Not Known	Herb	Hi
Lamiaceae	*Nepeta discolor* Boyle ex Benth.	Dojo	Herb	Hi
Lamiaceae	*Ocimum basilicum* L.	Gasmali	Herb	Th
Lamiaceae	*Salvia nubicola* Wall ex Sweet.	Not known	Herb	Hi
Lamiaceae	*Stachys tibetica* Vatke.	Not Known	Herb	Hi
Lamiaceae	*Thymus linearis* Benth.	Tumuro	Herb	Hi
Lythraceae	*Punica granatum* L.	Danou	Shrub	Ph
Malvaceae	*Abelmoschus esculentus* Moench	Bindi	Herb	Th
Malvaceae	*Malva neglecta* Wallr.	Not Known	Herb	Th
Malvaceae	*Malva verticillata* L.	Shani Shah	Herb	Th
Moraceae	*Ficus carica* L.	Faaq	Tree	Ph
Moraceae	*Morus alba* L.	Maroach	Tree	Ph
Moraceae	*Morus nigra* L.	Kini Maroach	Tree	Ph
Oleaceae	*Fraxinus hookeri* Wenz.	Kasooner	Tree	Ph
Onagraceae	*Epilobium angustifolium* L.	Not Known	Herb	Hi
Onagraceae	*Epilobium hirsutum* L.	Not known	Herb	Th
Onagraceae	*Epilobium latifolium* L.	Not known	Herb	Th
Orobanchaceae	*Orobanche cernua* Vell.	Not Known	Herb	Th
Orobanchaceae	*Pedicularis bicornuta* Koltzsch.	Not Known	Herb	Hi
Orobanchaceae	*Pedicularis biscuspid* L.	Doodh gahori	Herb	Hi
Orobanchaceae	*Pedicularis cheilanthifolia* Schrenk	Not Known	Herb	Hi
Orobanchaceae	*Pedicularis kashimiriana* Pennel.	Not Known	Herb	Hi
Papaveraceae	*Corydalis govaniana* Wall.	Not Known	Herb	Hi
Papaveraceae	*Papaver nudicaule* L.	Goshal	Herb	Hi
Plantaginaceae	*Plantago major* f. *asiatica* (L.) Regel	Kan Khapai	Herb	Th
Plantaginaceae	*Plantago lanceolata* L.	Kan Khapai	Herb	Th
Plumbaginaceae	*Limonium gilesii* Hems	Not Known	Herb	Hi
Polygonaceae	*Aconogonon alpinum* (All.) Schur	Not Known	Herb	Hi
Polygonaceae	*Bistorta affinis* (D. Don) Green.	Chumni	Herb	Hi
Polygonaceae	*Fagopyrum esculentum* Moench, Meth.	Bukak	Herb	Th
Polygonaceae	*Oxyria digyna* L.	Churki	Herb	Hi
Polygonaceae	*Persicaria lanata* (Roxb.)N.N,Tsvelev	Not Known	Herb	Th
Polygonaceae	*Podophyllum emodi* Wall.	Ech-e- maruch	Herb	Th
Polygonaceae	*Rheum spiceforme* Royle.	Jaro Chontal	Herb	Hi
Polygonaceae	*Rheum webbianum* Royle.	Chontal	Herb	Hi
Polygonaceae	*Rumex hastatus* D Don.	Churkee	Herb	Hi
Polygonaceae	*Rumex nepalensis* Spreng.	Obabl	Herb	Hi
Portulacaceae	*Portulaca oleracea* L.	Fichlee	Herb	Th
Primulaceae	*Androsace baltistanica* Y.J.Nasir	Not Known	Herb	Hi
Primulaceae	*Androsace thomsonii* Watt.	Not known	Herb	Hi
Primulaceae	*Cortusa brotheri* (Pax ex R.Knuth) Losinsk.	Not Known	Herb	Hi
Primulaceae	*Primula denticulata* Wight	Liloo	Herb	Hi
Primulaceae	*Primula macrophylla* D. Don	Sujo Liloo	Herb	Hi
Rannunculaceae	*Aconitum violaceum* Jacquem. ex Stapf	Gudi	Herb	Cr
Rannunculaceae	*Aconitum heterophyllum* Wall.ex Royle	Patrees	Herb	Hi
Rannunculaceae	*Anemone rupicola* Cambess.	Not Known	Herb	Hi
Rannunculaceae	*Aquilegia fragrans* Benth.	Ghamuk	Herb	Hi
Rannunculaceae	*Clematis montana* Buch. -Ham. ex DC	Not Known	Herb	Hi
Rannunculaceae	*Clematis orientalis* L.	Marghusii	Herb	Hi

Rannunculaceae	*Delphinium brunonianum* Royle.	Makhoti	Herb	Hi
Rannunculaceae	*Pulsatilla wallichiana* Royle.	Chai phoner	Herb	Hi
Rannunculaceae	*Ranunculus arvensis* L.	Not known	Herb	Th
Rannunculaceae	*Thalictrum foetidum* L.	Not Known	Herb	Hi
Rosaceae	*Cydonia oblonga* f. *pyriformis* (Dierb.) Rehder	Chatoor	Tree	Ph
Rosaceae	*Eriobotrya japonica* (Thunb.) Lindl.	Loukat	Tree	Ph
Rosaceae	*Fragaria nubicola* (Hook.f.) Lindl.	Kurooz	Herb	Hi
Rosaceae	*Potentilla anserine* L.	Not Known	Herb	Hi
Rosaceae	*Potentilla dryadanthoides* Juz.	Not Known	Shrub	Ph
Rosaceae	*Potentilla gelida* C.A. Mey.	Not Known	Herb	Hi
Rosaceae	*Potentilla villosa* C. L. Hitchcock.	Not Known	Herb	Hi
Rosaceae	*Pronus amygdalous* Satsch	Badam	Tree	Ph
Rosaceae	*Pronus armenica* L.	Juyain	Tree	Ph
Rosaceae	*Pronus avium* L.	Glass	Tree	Ph
Rosaceae	*Prunus bokhariensis* Royle ex C.K.Schneid.	Alou Boukhara	Tree	Ph
Rosaceae	*Pronus domestica* L.	Alucha	Tree	Ph
Rosaceae	*Pronus persica* (L.) Batsch	Choknar	Tree	Ph
Rosaceae	*Malus pumila* Mill.	Fala	Tree	Ph
Rosaceae	*Pyrus communis* L.	Shogri	Tree	Ph
Rosaceae	*Rosa webbianum* Boiss.	Shingaii	Shrub	Ph
Rosaceae	*Sibbaldia procumbens* L.	Not known	Herb	Hi
Rosaceae	*Sorbus tianschanica* Rupr.	Biyaar	Tree	Ph
Rosaceae	*Spiraea canescens* D.Don	Dira	Shrub	Ph
Rutaceae	*Citrus lemon* (L.) Osbeck	Lemo	Tree	Ph
Rutaceae	*Citrus sinensis* (L.) Osbeck	Malta	Tree	Ph
Salicaceae	*Populus alba* L.	Nelo Barfa	Tree	Ph
Salicaceae	*Populus nigra* L.	Shayou Barfa	Tree	Ph
Salicaceae	*Salix alba* L.	Brav	Tree	Ph
Salicaceae	*Salix iliensis* Regel	Brave	Tree	Ph
Saxifragaceae	*Bergenia stracheyi* Hook. f and Thomson.	Sapsar	Herb	Hi
Saxifragraceae	*Saxifraga flagellaris* Wild.	Not known	Herb	Hi
Scrophulariaceae	*Verbascum thapsus* L.	Not Known	Herb	Th
Simaroubaceae	*Ailanthus altissima* (Mill.) Swingle	Ranthus	Tree	Ph
Solanaceae	*Capsicum annuum* L.	Maroch	Herb	Th
Solanaceae	*Datura stramonium* L.	Daturooh	Herb	Th
Solanaceae	*Hyoscyamus niger* L.	Not Known	Herb	Th
Solanaceae	*Solanum lycopersicum* L.	Balugon	Herb	Th
Solanaceae	*Solanum melongena* Wall.	Sheeno Bakugon	Herb	Th
Solanaceae	*Solanum nigrum* L.	Gabeli	Herb	Th
Solanaceae	*Solanum tuberosum* Bertero ex Walp.	Aloo	Herb	Th
Solanaceae	*Solanum virginianum* L.	Not Known	Herb	Th
Solanaceae	*Solanum nigrum* Tausch ex Dunal	Gabili	Herb	Th
Tamaricaceae	*Myricaria davurica* Ehrenb.	Hukaroo	Shrub	Ph
Tamaricaceae	*Tamarix indica* Wild., Ges	Hukaroo	Shrub	Ph
Thymelaeaceae	*Daphne mucronata* Royle	Nirkoo	Shrub	Ph
Urticaceae	*Urtica dioica* L.	Jammi	Herb	Th
Violaceae	*Viola biflora* L.	Not Known	Herb	Th
Zygophyllaceae	*Peganum harmala* L.	Isphandor	Herb	Th
Zygophyllaceae	*Tribulus terrestris* L.	Dasai kono	Herb	Th

Legends: Cr=Cryptophytes, Ch=Chamaephytes, Hi=Himicryptophytes Th= Therophyte

Annexure 2. List of Ethnomedicinal Plants and their utilization for various health aliments in District Gilgit.

Family	Botanical Name	Local Name	Source	Cotyledon/G	Part Used	Method of Use	Medicinal Uses	FC		UV
Amaranthaceae	*Chenopodium album* L.	Kuna	S/W	Dicot	Root	Decoction	A root decoction is applied for relieving headaches	16	0.16	0.16
Amaranthaceae	*Chenopodium botrys* L.	Hamagi	H/W	Dicot	Leaves	Powder	The leaves powder of the plant is used for treating all kinds of cancers	33	0.33	0.33
Amaryllidaceae	*Allium cepa* L.	Kashu	H/C	Monocot	Bulb	Roast in hot ash	The Roasted Bulb is utilized for treating cough, flu, and throat infections	20	0.2	0.2
Amaryllidaceae	*Allium sativum* L.	Boqpa	H/C	Dicot	Bulb	Oil	The Bulb oil of the plant is applied for ear, throat, and stomach problems and also serves as an insecticide	16	0.16	0.16
Amaryllidaceae	*Allium oreoprasum* Schrenk	Faloon	H/W	Dicot	Leaves	Juice	The leaves of the plant are employed for alleviating abdominal pain	12	0.12	0.12
Apiaceae	*Daucus carota* L.	kaxoon	H/W	Dicot	Root/underground stem	Direct use	The roots are directly employed for various issues such as vision improment, teeth problems, and soft tissue infections like blood diseases	16	0.16	0.16
Apiaceae	*Coriandrum sativum* L.	Shotu	H/C	Dicot	Seeds	Direct	The plant seeds are directly used for addressing piles and stomach problems	20	0.2	0.2
Apiaceae	*Pleurospermum candollei* (DC.) Benth. ex C.B.Clarke	Potsing	H/C	Dicot	Seeds	Direct	Seeds are directly applied for women's health issues	8	0.08	0.08
Asteraceae	*Helianthus annuus* L.	Donghar	H/C	Dicot	Seeds	Oil /infusion	The seed oil is applied to reduce inflammations and promote hair growth	8	0.08	0.08
Asteraceae	*Cichorium intybus* L.	Ishkanigi	H/W	Dicot	Leaves and Root	Decoction and direct	A decoction of leaves and roots is used to enhance the immune system, treat pneumonia, and address kidney problems	28	0.28	0.28
Asteraceae	*Artemisia sieversiana* Ehrh.	Khakamoch	S/W	Dicot	Leaves and Root	Juice	A decoction of mashed leaves is utilized for relieving abdominal pain in children.	56	0.56	0.56
Asteraceae	*Carathmus tinctorius* L.	Poung	H/C	Dicot	Flower	Decoction	A decoction of flowers is effective for treating cough, pneumonia, and throat problems	32	0.32	0.32
Asteraceae	*Echinops echinatus* Roxb.	Jacheer	S/W	Dicot	Flower	Powder	The ground flower powder is employed to enhance male power	8	0.08	0.08
Asteraceae	*Artemesia maritime* L.	Zoon	H/W	Dicot	Roots	Decoction	A decoction of leaves is used for treating abdominal worms	8	0.08	0.08
Asteraceae	*Saussurea candolleana* C.B.Clarke	phunar	H/W	Dicot	Flower	Decoction	A decoction of flower leaves is effective for managing asthma and pneumonia	12	0.12	0.12

Asteraceae	*Tanacetum artemisioides* Sch.Bip. ex Hook.f.	Paloyo zoun	S/W	Dicot	Stem and leaves	Juice	The mashed water of aerial parts is applied to alleviate abdominal pain in children and joint pains in elders	28	0.28	0.28
Berberidaceae	*Berberis orthobotrys* Bien. ex Aitch.	Ishkeen	S/W	Dicot	Root	Powder	The ground powder of roots is used for treating bone fractures, injuries, and back pain	32	0.32	0.32
Boraginaceae	*Arnebia euchroma* I.M.Johnst.	Tail sharong	H/W	Dicot	Roots Cover	Direct use	The bark of roots is utilized for food coloring and applied for hair growth with oil	24	0.24	0.24
Brassicaceae	*Brassica rapa* L.	Molay	H/C	Dicot	Undergro und Stem	Roast in hot ash	The underground stem of the plant is used to address pneumonia	16	0.16	0.16
Brassicaceae	*Brassica oleracea* L.	Budbodi	H/C	Dicot	Leaves/se ed	Decoction	A decoction of leaves and seeds is employed for managing cough and typhoid	16	0.16	0.16
Capparidaceae	*Capparis spinosa* L.	Kabir	S/W	Dicot	Leave	Oil	The leaves of the plant are used for treating various cancers and digestive problems	24	0.24	0.24
Crassulaceae	*Rhodiola wallichiana* (Hook.) Fu	Musha	H/W	Monocot	Root	Powder	The plant powder is used to enhance male sexual power	8	0.08	0.08
Cucurbitaceae	*Cucumis sativus* L.	Law	H/C	Dicot	Fruit	Direct	The fruit is beneficial for digestion and kidney stones	4	0.08	0.08
Cupressaceae	*Juniperus excelsa* M. Bieb.	Chilee	T/W	Gymnosperm	Berries	Decoction	Berries are utilized for reducing inflammation	16	0.16	0.16
Elaeagnaceae	*Elaeagnus angustifolia L.*	Gundare	T/C	Monocot	Berries	Direct	The fruit is directly used for addressing cough infections and throat issues	16	0.16	0.16
Elaeagnaceae	*Hippophae rhamnoides* L.	Boro	S/W	Dicot	Berries	Decoction	A decoction of berries is beneficial for managing cancer	8	0.08	0.08
Ephedraceae	*Ephedra* gerardiana Wall.ex Stapf.	Soom	S/W	Dicot	Stem	Powder	The stem powder is used for treating cough, joint pain, and strengthening teeth	8	0.08	0.08
Fabaceae	*Glycyrrhiza glabra* L.	Shalaku	S/W	Dicot	Roots	Direct	Its roots, being sweet, are directly used for the treatment of tonsillitis	12	0.12	0.12
Fabaceae	*Pisum sativa* L.	Matar	H/C	Dicot	Seeds	Direct	Seeds are directly used for treating jaundice	4	0.08	0.08
Gentianaceae	*Gentiana tianschanica* Rupr.	Plamas	H/W	Dicot	Leaves	Direct use /decoction	A decoction of leaves is utilized for addressing abdominal warmth, diabetes, fever, jaundice, and stomach problems	48	0.48	0.48
Lamiaceae	*Mentha arvensis* L.	Podina	H/C	Monocot	Leaves	Direct	Leaves of the plant are employed for treating abdominal diseases, back pain, and aiding in injury healing	20	0.2	0.2

Lamiaceae	*Mentha longifolia* L.	Phileel	H/W	Dicot	Leaves	Direct use /Juice	The juice and direct use of leaves are effective for alleviating abdominal pain and stomach problems	36	0.36	0.36
Lamiaceae	*Mentha royleana* Benth.	Pheleel	H/C	Dicot	Seeds	Powder	Seed grind powder is used for managing constipation and promoting healthy digestion	8	0.08	0.08
Lamiaceae	*Ocimum basillium* L.	Gasmali	H/C	Dicot	Seeds	Direct	Seeds are used for cleaning eyes	8	0.08	0.08
Lamiaceae	*Thymus linearis* Benth.	Tumoroo	H/W	Dicot	Leaves	Decoction	A decoction of leaves is beneficial for relieving headaches	28	0.28	0.28
Laytheraceae	*Punica granatum* L.	Danoo	S/W	Dicot	Fruit cover	Infusion	The powder of fruit cover is used for addressing throat infections and inflammations	24	0.24	0.24
Malvaceae	*Malva neglecta* Wallr.	Gul lala phunar	H/W	Dicot	Flower	Decoction of dry flowers	A decoction of flower leaves is beneficial for addressing throat problems	16	0.16	0.16
Moraceae	*Ficus cerica* L.	Faaq	T/C	Dicot	Fruit/milk	Direct	The fruit aids in digestion, and the milk of the stem is used to remove thorns from body parts	4	0.04	0.04
Papaveraceae	*Corydalis govaniana* Wall.	Lasker char	H/W	Dicot	Root	Infusion	Roots of the plant, when used with oil, are effective for preventing hair fall	12	0.12	0.12
Pinaceae	*Pinus wallichiana* (Wall. ex. D.Don) A.B.Jacks.	Cheenh	T/W	Gymnosperm	Resin	Direct	Resin is applied to wounds for healing	8	0.08	0.08
Plantaginaceae	*Plantago major* f. *asiatica* (L.) Regel	Sheleeto	H/W	Dicot	Leaves & seeds	Powder /direct	Seeds are used for managing constipation and diarrhea, while leaves are beneficial for tumor treatment	24	0.24	0.24
Poaceae	*Triticum aestivum* L.	Ghoom	H/C	Monocot	Seeds	Floor is cooked in oil, Paste	Seeds are specifically used for Cancer treatment	12	0.12	0.12
Polygonaceae	*Rheum speciforme* Royal	Jaro chotal	H/W	Dicot	Root	Powder	Roots powder is used specifically for back pain	12	0.12	0.12
Polygonaceae	*Rheum webbianum* Royle.	Chontal	H/W	Dicot	Stem and leaves	Direct use	Leaves and stem are directly used for managing food-related and stomach problems	16	0.16	0.16
Polygonaceae	*Rumex hastatus* D. Don.	Churka	S/W	Dicot	Leaves	Direct	Leaves are directly used for treating jaundic	12	0.12	0.12
Polygonaceae	*Rumex nepalensis* Spreng.	Obabale	H/W	Dicot	Roots	Powder	Roots powder is employed for addressing liver problems	12	0.12	0.12
Primulaceae	*Primula denticulata* Wight	Lilo	H/W	Dicot	Roots Cover	Powder	The bark of roots is utilized for addressing eye problems	16	0.16	0.16
Primulaceae	*Primula macrophylla* D.Don.	Meyo	H/W	Dicot	Leaves	Powder	The powder of leaves is used for managing eye diseases	16	0.16	0.16

Ranunculaceae	*Aconitum violaceum* Jacquem. ex Stapf	Godi	S/W	Dicot	Leaves and Root	Direct or powder	Leaves and roots powder are utilized for managing abdominal pain and cold fever	8	0.08	0.08
Ranunculaceae	*Delphinium brononianum* Royle.	Makhoti	H/W	Dicot	Leaves and Flower	Decoction	|The aerial part is beneficial for managing pneumonia, cough, and throat problems	48	0.48	0.48
Rosaceae	*Prunus amygdalus* Batsch	Badam	T/C	Dicot	Seeds	Direct	Seeds are used for improving sharp memory	8	0.08	0.08
Rosaceae	*Prunus armenica* L.	Chitayhaniye	T/C	Dicot	Seeds & Resin	Chewing/direct	Seeds and resin are utilized for achieving smooth skin, managing stomach ulcers, and enhancing sharp memory	44	0.44	0.44
Rosaceae	*Prunus persica* (L.) Batsch	Chuknar	T/C	Dicot	Seeds	Powder	Seeds are employed for managing abdominal pain	20	0.2	0.2
Rosaceae	*Prunus bokhariensis* Royle ex C.K.Schneid.	Alou Boukhara	T/C	Dicot	Leaves	Decoction	A decoction of leaves is beneficial for managing pneumonia and cancer	12	0.13	0.13
Rosaceae	*Rosa indica* L.	Sheeno Golab	S/C	Dicot	Flower	Powder	The powder of flower leaves is used for Skin Cancer treatment	16	0.16	0.16
Rosaceae	*Rosa webbanium* Boiss.	Shengai	S/W	Dicot	Bark	Decoction	A bark decoction is beneficial for managing cough and pneumonia	24	0.24	0.24
Rosaceae	*Spiraea canesc*ens D. Don	Darah	S/W	Dicot	Stem	Paste	The powder is used for managing skin problems	8	0.08	0.08
Rosaceae	*Sorbus tianschanica* Rupr.	Biyar	S/W	Dicot	Fruit	Direct	The fruit is employed for managing liver problems	8	0.08	0.08
Salicaceae	*Salix alba* L.	Dasi brow	T/C	Dicot	Branches	Direct	Used for getting body warm and cleaning teeth	8	0.08	0.08
Saxifragaceae	*Bergenia stracheyi* Hook. f and Thomson.	Sasper	H/W	Dicot	Root	Powder	Root powder is employed for addressing back pain, diarrhea, fever, hepatitis, headaches, injuries, and teeth issues	52	0.52	0.52
Solanaceae	*Solanum lycopersicum* L.	Bolugun	H/C	Dicot	Fruit	Direct	The fruit is beneficial for managing Cancerous infections	8	0.08	0.08
Urticaceae	*Urtica dioica* L.	Jomi	H/W	Dicot	Leaves	Direct	Leaves are beneficial for managing cancer and digestive problems	4	0.04	0.04
Zingiberaceae	*Curcuma longa* L.	Haligi	H/C	Monocot	Berries	Powder	| Berries are used for managing diabetes and injuries	8	0.08	0.08
Zingiberaceae	*Zingiber officinale* Roscoe	Shengor Shengor	H/C	Monocot	Undergro und Stem	Powder	The powder, when used with tea, is effective for relieving headaches	8	0.08	0.08
Zygophyllaceae	*Tribulus terrestris* L.	Khurkuchal	H/W	Dicot	Pines	Decoction	A decoction is beneficial for managing kidney problems	12	0.12	0.12

Legends: H/C show Cultivated Herb, H/W show Wild Herb, UV represent the Use Value, FC indicate the Frequency of citation and RFC means Relative Frequency of Citation