Ethnobotanical survey of medicinal flora of Harighal, Azad Jammu & Kashmir, Pakistan

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ABSTRACT

Background: The present study is the first quantitative ethnobotanical evaluation of Harighal, an inaccessible and unexplored area of District Bagh Azad Jammu and Kashmir (AJK). The major objectives of the present study were exploration, quantification and comparison of ethnobotanical knowledge among different rural communities of the study area.

Methodology: Data about traditional uses of important medicinal plants was gathered from 79 informants (49 men and 34 women) using a semi-structured questionnaire. To access novelty and agreement of informants about plant use, various quantitative indices including use value, relative frequency of citation, relative importance, fidelity level and informant consent factor were employed. Furthermore, data presented in the present study was also compared with twenty-two papers published from adjoining areas.

Result: A total of 150 medicinal plants belonging to 98 genera and 60 families were documented. Asteraceae, Fabaceae and Rosaceae were the dominant families having 15 species each. Herbs were the most used life form, and leaves were the most exploited plant part. Decoctions were the most preferred method used in preparation of herbal recipes. Mentha longifolia had the highest use value, Berberis lycium had the highest relative frequency of citation and Galium aparine had the highest relative importance value (1.05, 0.81 and 96, respectively). The highest informant consensus factor (ICF) was reported for digestive disorders. Mentha longifolia, Punica granatum, Zanthoxylum alatum and Olea ferruginea had 100% fidelity values. The Jaccard index revealed that uses of plants were more similar in two neighboring areas i.e. Pearl Valley and Toli Peer.

Conclusion: In spite of living in the twenty first century, people of the study area still rely very much on herbal medicines as an effective way to treat various ailments. Elders and health practitioners of the study area are well aware of indigenous knowledge about medicinal plants, but young people are not much interested in herbal practices. Thus, valuable knowledge about the use of plants is on the verge of getting lost. The documentation of indigenous knowledge from such an unexplored area and the subsequent pharmacological and phytochemical validation of novel plant uses could serve as baseline for drug development.

Key words: Ethnobotany, Medicinal flora, Used value, Fidelity level, Azad Jammu & Kashmir, Pakistan
**Background**

Ethnobotany designates a complex connection between local inhabitants and indigenous plants of an area [1-4]. Traditional knowledge is often orally transmitted from to children [5-8] and contributes to the maintenance of indigenous culture and natural resource management [9-13]. In traditional cultures, plants are being utilized for various purposes [14-18]. Differences and similarities in traditional knowledge and practice among two different cultural groups living within the same ecological region are fascinating, as they can provide understanding of how cultural reflection can change individual viewpoints about the environment and also guide interactions between human beings and resources in the ecosystem [19]. Quantitative ethnobotanical indices help to elucidate and reflect the importance of plants to local inhabitants of any area and are used to measure the cultural significance of food and medicinal plant species [20-23].

Medicinal plants are imperative for the livelihoods of underprivileged communities across the world [24-29]. In developing countries, 80% population are still relying on plant-based medicines an an economical and safe alternative to often inaccessible allopathic medicine [30,31]. Even in the developed world, herbal remedies are extensively used, e.g. 30-50% of the population in China, 40–50% in Germany, 48% in Australia, 42% in the USA and 49% in France use herbal medicine as supplementary health care [32-34]. However, traditional knowledge on plant species is decreasing gradually across the globe [14]. This knowledge is usually held by hakims (traditional healers) and elderly people and be passed to the next generation via verbal communication only [35], thus there is a serious danger of knowledge loss due to the progression in the modern health care system, rapid urbanization and poor relations between younger and old generation [36-39]. The documentation of traditional ethnomedicinal knowledge is of high importance, and may contribute to the development of new drugs.

Pakistan has a large wealth of medicinal and aromatic plants due to its diverse habitat, climate and soil types and harbors about 1572 plant genera and 5521 species [40]. Among them, 400-600 species are used for therapeutic purposes. Eighty percent of this medicinal flora restricted in Northwestern areas of Pakistan and Azad Kashmir [41-43]. In the early 1950s, 84% of population of Pakistan depended upon plants for treating various ailments but nowadays this practice is restricted to remote areas due to modernization and rapid change in lifestyle [44]. A few ethnobotanists documented the traditional knowledge about medicinal plants and herbal
recipes from Pakistan and Azad Jammu and Kashmir [45-49]. However, Tehsil Harighal of District Bagh is still unexplored, especially due to topographical challenges like hilly terrain and steep slopes, and cultural and religious restrictions that limits researcher access to document ethnobotanical knowledge. Therefore, the current study was designed to document the indigenous knowledge about medicinal plants used for primary health care particularly focusing on methods of preparation and administration of herbal recipes. The data was further analyzed by using various numerical indices and compared with previous studies to determine the novelty of work. We hypothesized that due to the remoteness of the area, the ethnobotanical knowledge would considerably differ from other areas of Pakistan.

**Materials and methods**

**Study area**

Harighal (33°54′34″N to 73°01′73°38′E), a Tehsil of District Bagh, is located in western Himalayan foothills of Pirpanjal, with altitude ranges between 900-2300m (Fig. 1) [50]. The climate is subtropical-temperate with about 1500mm average annual precipitation. The summers are hot with temperature ranges between 21°C - 40°C while winters re cold with temperatures around 2°C during January (Fig. 2) [51].

The area is remote, with difficult mountainous terrain and quite far from urban centers. Local inhabitants have poor socioeconomic conditions, lacking government services and modern healthcare facilities. The roads and other infrastructure are poorly developed, and many inhabitants are dedicated to agriculture, livestock, and their own small-scale business. Some are educated and are government servants, while very few are serving abroad. Indigenous ethnomedicinal knowledge which is mostly in the hand of elder people and health practitioners.

**Data collection**

Ethnomedicinal data was collected from 79 informants including 45 men and 34 women during April 2017 to March 2018, using semi structured questionnaires and group discussions, after obtaining prior informed consent from the participants. Questionnaires were prepared according to Edward *et al.* [52]. The ethical guidelines provided by International Society of Ethnobiology (http://www.ethnobiology.net/) were strictly followed. The ethical approval to conduct the study was given before initiating surveys from the Ethics Committee of the Women
University of Azad Jammu & Kashmir, Bagh. In addition to this, legal permission to conduct interviews was given by members of municipality committee. A Prior Informed Consent form (PIC) was signed by all the informants after explaining the objective and consequence of study. The PIC was translated into local *Pahari* language. Sample size was determined by following Kadam and Bhalerao [53].

**Plant collection and identification**

The medicinal plants were collected dried, pressed and mounted on standard herbarium sheets following [54]. The specimens were identified with the help of plant taxonomist and confirmed using flora of Pakistan (https://http://www.efloras.org/flora_page.aspx?flora_id=5) [55,56]. Further verification of identified specimens was done at Herbarium of Medicinal and Aromatic Plant in AJ&K established by Pakistan Agriculture and Research Council (PARC). Tropicos and international plant name index (IPNI) were used to obtained correct and legitimate scientific names. The final voucher specimens were deposited in herbarium of the Women University of AJ&K, Bagh.

**Ethnobotanical indices**

The homogeneity and validation of collected ethnomedicinal data was checked by applying following quantitative indices:

**Informant consensus factor (ICF)**

The agreement between the respondents about usage of plants for curing various groups of ailments was checked by informant consent factor. It was calculated by following Heinrich *et al.* [57] using given formula:

\[ Fic = \frac{Nur - Nt}{(Nur - 1)} \]

Where;

- Nur = Use-reports in selected group of diseases,
- Nt = Species used for treating various diseases of that group

**Relative frequency of citation (RFC)**
The harmony between respondents on medicinal uses of plants in the study area was determined by RFC. It was calculated by following Vijayakumar et al. [58] using given formula:

$$RFC = FC/N$$

Where;

FC = Informants reporting use of a given species, N = total number of informants.

**Use value index**

Use value reflects the relative importance of reported plant species in area and was determined by following Vijayakumar et al. [58] using given formula:

$$UV = \frac{\sum Ui}{N}$$

Where;

Ui = Use reports cited by each respondent for given species, N = Total number of respondents.

**Relative importance**

It was calculated following Khan et al. [24] by using given formula.

$$RI = (RelPH + RelBS) \times 100/2$$

PH = Pharmacological attribute of the selected plant, Rel PH = Relative pharmacological attributes of a given plant.

$$RelPH = \frac{PH \text{ of a selected plant}}{\text{maximum PH of all plant species}}$$

BS = Body systems treated by selected plant species, Rel BS = Relative body systems treated by selected species.

$$RelBS = \frac{BS \text{ of a given plant}}{\text{maximum BS of all reported plant species}}$$

**Fidelity level (FL)**

Fidelity level indicates the preference of particular plant species by informants to treat specific disease. It was calculated following Alexiades and Sheldon, [59] by using given formula

$$FL\% = \frac{Np}{N} \times 100$$

Where;
Jaccard index ($JI$)

The similarity of knowledge between different communities was determined by comparing the findings of current study with already published work in neighboring areas applying Jaccard index. It was calculated following Gonzá et al. [60] by using given formula:

$$JI = \frac{C \times 100}{(a + b) - c}$$

Where;

- $a = \text{Species of the study area}$
- $b = \text{Species of the neighboring area}$
- $C = \text{Number of species common to both area}$

RESULTS AND DISCUSSION

Demography and knowledge variation

A total of 79 informants were interviewed to collect medicinal plant knowledge based on their gender, age and education (Table 1). The first category used for classification of informants was gender and 45 men and 34 women were interviewed. The easier availability and approachability to male informants and the prohibition of interaction of women with strangers, as well as and veiling (parda) forced us to interview more men than women. Demographic data demonstrates that women (average known species = 5.72; average cited uses = 9.38) had more knowledge about plants than men (average known species = 4.98; average cited uses = 8.05). Division of labor between genders in the area may be one reason for this difference, as men generally manage the fieldwork and earning, while women manage the indoor activities and domestic life, which are highly associated with herbal preparations to keep the family healthy. Similar findings were reported by other studies including Qaseem et al. [45] from Kotli, Ahmad et al. [49] from Neelum valley and Kyani et al. [61] from Abbottabad. Age was used as second classification criterion and informants were classified into three major categories i.e. above 60, between 40-60 and less than 40. Elders (age above 60) had more knowledge about plants than young people (age less than 40). Another reason for lower knowledge of young informants was their limited interest in herbal preparations due to changes in lifestyle with advent of
industrialization and modernization. These findings were supported by other reports including Qaseem et al. [45] from Kotli and Umair et al. [62] from Hafizabad. Education was a third influential factor. Uneducated informants had a vast ethnobotanical knowledge, while tan educated informants had a more limited knowledge of plants. Likewise, traditional health practitioners had a broad traditional knowledge about medicinal uses of plants compared to other professions. Highly educated informants usually relied on allopathic medicines for their immediate healthcare, and had least knowledge about herbal medicines and their preparation methods. These finding are supported nationally by Kayani et al. [61]; Yaseen et al. [63] and internationally by Giday et al. [64]; Tugume et al. [65].

Diversity of ethnomedicinal flora

A total of 150 medicinal plants belonging to 60 families and 98 genera were reported from study area (Table 2). The herbaceous life form was dominantly (78 sp.; 52%) used in herbal preparation followed by shrubs (27 sp.; 18%), trees (25 sp.; 16.6 %), grasses (12 sp.; 8%), ferns (5 sp.; 3.3%) and epiphytes or climbers (Fig. 3). These findings are in accordance with previous reports [45,46,66,67]. The predominance of the herbaceous habit in mountainous areas is a common ecological phenomena throughout the world [34,49,68]. The reason might be the high rainfall and moisture content at higher altitudinal areas [23,46,61].

Asteraceae, Fabaceae and Rosaceae were the dominant families having 15 species each (Table 2; Fig. 3). They were followed by Lamiaceae and Poaceae having 12 species each (Fig. 4). Our results are in accordance with Amjad et al., [46]; Kayani et al. [61]; Tariq et al. [69]. The prevalence of these families might be due to their abundance, easy availability, familiarity of their members to local inhabitants of the study area. The member of these families might contain high amount of secondary metabolites to cure various ailments [70-73].

Plant part(s) used

Herbal recipes were prepared by using different plant parts in investigated area. Leaves (30.2%), whole plants (16.6%) and roots (14.4%) were the more preferred plant parts used in herbal preparations (Fig. 5). Similar results were documented in other studies from Pakistan and other countries [45,49,74-77]. Presence of a high amount of easily extractable crude drugs, phytochemicals and other bioactive ingredients and easy collection and abundant availability of
leaves might be the reason for their extensive utilization [24, 49, 78–80]. Roots were second plant part extensively used in herbal preparations followed by whole plant as these too are easily assessable and contain high amount of bio-active metabolites ([30, 31, 81]. But in spite of the importance of whole plant and roots in herbal preparation their use is not recommended, as uprooting plants for roots could cause their extension. The excessive use of roots or whole plants should be discouraged in the case of threatened species as this practice has negative impact on population and growth, often leading to extinction of species [82, 83].

**Method of preparation and administration**

Different recipes were prepared from medicinal plants by using different methods based on the actual site and type of disease treated. Decoction was the most common method (41 sp.; 17%) for preparation of herbal recipes, followed by paste (36 sp.; 15%), powder (30 sp.; 13%), extract (28 sp.; 12%) and juice (30 pp.; 13%) (Fig. 6). Our findings are supported by previous documentation [22, 34, 45, 46, 67, 84]. Ease of preparation might be a reason for the extensive use of decoctions to treat ailments, as it can be prepared by mixing specific part of plants with soup, tea, water, honey, milk and butter [85]. The availability of active metabolic compounds might increase due to the fact of heating which speed up the biological reactions [86–89]. Sometimes whole plants were used in herbal preparations. Very few plant species were used in combination with other herbs. The amount of medicinal plants and frequency of dose varied based on patient condition, health, age and disease severity. The frequent mode of application was internal (76.2%) and only few preparations from some plant species were practiced externally (Fig 4). Our findings are in accordance with Qaseem et al., [45]; Ahmad et al. [49]; Kayani et al. [61].

**Informant consensus factor (ICF)**

The informant consensus factor was analyzed based on disease categories, as a single plant might be used to treat 3–4 or more disease categories. A high ICF value reflects high dependence of local inhabitants on medicinal plants [90] and low ICF values indicate less consistency of informant’s knowledge. Ailments were classified in to 18 categories to develop informant consensus. The ICF value ranged from 0.23 to 0.95. The maximum value of ICF was estimated for digestive disease category (0.95) followed by skin problems (Fig. 7). This was strongly supported by Qaseem et al. [45]; Umari et al. [91]; Shaheen et al. [47]; Amjad et al. [46];
Ahmad et al. [49] and Bib et al. [34] who also reported the maximum ICF for digestive diseases in their investigated area. The digestive disorder was also reported as first use class by other ethnic communities across world [92-98]. The prevalence of digestive disorders among the local inhabitant might be due to inadequate availability of hygienic food and drinking water [45,47,99,100]. The most important plants mentioned in the digestive disease category were *Helianthus annuus*, *Berberis lycium*, *Cannabis sativa*, *Ailanthus altissima*, *Micromeria biflora*, *Mentha longifolia*, *Thymus linearis*, *Punica granatum*, *Melia azadirachta*, *Acacia nilotica*, *Morus alba*, *Ficus palmata*, *Oxalis corniculata*, *Rubus ellipticus*, *Rubus niveus*, *Fragaria nubicola*, *Eriobotrya japonica*, *Rosa indica*, *Pyrus pashia*, *Prunus armeniaca*, *Prunus persica*, *Zanthoxylum armatum* and *Galium aparine*. Due to wide variety of biochemical with diverse biological activities in plants, the local people were well-known with these plants. They play an important in the lives of human beings to treat various illnesses.

**Relative frequency of citation and use value**

Relative frequency of citation (RFC) is used to identify the highly important species in various ailments as cited by local people [36]. The value of RFC ranged between 0.93 - 0.04. *Berberis lycium* had highest RFC value (0.81). Other plant species with significant RFC value were *Ajuga bracteosa*, *Prunella vulgaris*, *Adiantum capillus-veneris*, *Desmodium polycarpum*, *Pinus roxburgii*, *Rosa brunonii*, *Punica granatum*, *Zanthoxylum armatum* and *Jasminum mesnyi* (Table 3). The plants species with high RFC value were abundant in the area therefore the local people were much familiar with them particularly with reference to ethnomedicinal perspective over a long time period. Likewise, the plants with special properties to cure particular disease were well known among the local culture therefore, their precise properties to treat particular disease have got famous and deep rooted. The plant species with high RFC values would be interesting for phytochemical and pharmacological profiling and possible future drug discovery, as well as authentication at a commercial level [45,49,61,101].

Use value reflects the relative importance of every species with reference to more use reports cited by local informants. The use value ranged between 1.05-0.08. *Mentha longifolia* (1.05), *Olea fereuginea* (1.02), *Zanthoxylum armatum* (1.01) had high use value while other species with significantly high use value were *Solanum villosum* (0.93), *Cynoglossom lanceolatum* (0.94), *Rosa indica* (0.95) and *Punica granatum* (0.97) (Table 3). UV value is
directly related with use reports. Plant species with more use reports have high use value and vice versa [22,45,46]. These plant species are used in repetitive manner and are biologically more active [102]. It is not necessary that the plant which has low UV value become unimportant or not biologically active as the RFC and UV are constant in particular area but they may be change according to the variation in the knowledge of indigenous people from area to area or within area.

Species with high RFC and UV show high healing potential for particular disease. Species with high RFC and UV were often overharvested by inhabitants so prioritized for conservation and sustainable use otherwise will extinct from the area in near future [49,61,103]. The ethnomedicinal knowledge is at risk because there might be no resource left for younger generations. The main reason for this is that the local inhabitants of the area, especially young generations have little interest and understanding or knowledge about ethnomedicinal plants, and are already dependent upon allopathic medicine for their healthcare [23,103,104].

**Relative importance**

Relative importance value is used to determine the diversity of a species for treating various ailments. *Galium aparine* (96) and *Mimosa pudica* (91) had highest RI values while *Verbena officinalis* (81.5), *Fragaria nubicola* (81), *Verbascum thapsus* (79) and *Melia azadirachta* (73) had high RI values (Table 3). It was observed that species with high RI value was used frequently for treating several ailments. The natives have too much ethnomedicinal knowledge regarding these plants. Therefore, importance of these species increase as the number of treated systems increases [46,103,105].

**Fidelity level**

The fidelity value reflects the preference of particular plant species as reported by local people for curing particular ailment in the area. The FL value of reported species ranged from 18.2 to 100%. Fidelity values of four plant species viz *Mentha longifolia*, *Punica granatum*, *Zanthoxylum armatum* and *Olea ferruginea* were found 100% and these species were used to cure stomachache, dysentery, rheumatism and other digestive disorders. Other medicinal plants having high FL value were *Solanum villosum* (93.8), *Cynoglossum lanceolatum* (91.8), *Dalbergia sissoo* (83.8), *Bidens biternata* (85.7%), *Rubus ellipticus* (86.5%) and *Melia*
azadirachta (84.6%) (Fig. 8). These species were mostly used to cure the digestive problems like diarrhea, dysentery, indigestion, stomach-ache and gastrointestinal pain etc. High FL of a species reflects extensive use of a specific plant species to treat a specific disease dominant in area [30,34,103]. Species with high FL value are important model plants which can be subjected to further pharmacological studies [49,61,106]. Some other studies in literature also recoded high fidelity level for species used to cure digestive problems [30,103,107]. The species with low FL values were not well known by the natives in term of ethnomedicinal knowledge. This forecast that may be in upcoming generation the ethnobotanical knowledge about these plant species may be completely depleted [49,103,108].

Novel uses

In this study we compared our results with 22 published papers from adjoining and areas with similar vegetation across Pakistan and world. The highest values for the Jaccard Index (JI) were result of the studies published by Amjad et al. [46] and Shaheen et al. [23] on Toil peer (AJK) and Perl valley respectively. The least value for JI was found in the studies of Jadhava et al. [109] on Sangli, Maharashtra, India and and Gidey et al. [110] on the Kunama ethnic group in Northern Ethiopia. High similarity reflects similar culture, traditions vegetation and geography among the areas along with high level of cross-cultural exchange of traditional knowledge among the community while high differences or lest value of JI reflects that areas don’t share common cultural values. Further the ethno-ecological knowledge is often specifically influenced by origin and culture of indigenous communities.

The comparative study of current findings with reported research revealed some novel uses which were not reported earlier from this region. These included the use of the extract of the whole plant of *Crepis multicaulis* and *Maytenus nemorosa* to treat eye infections. An extract iof the aerial parts of *Swertia cordata* was used to treat hepatic disorders. Leaves of *Cotoneaster racemiflora* aerewre used to stop bleeding and pus. The root extract of *Spiraea canescens* is was to as enema to treat venereal conditions. A bark infusion of *Dichanthium annulatum* was used to cure cough. A pasted based on the whole plant of *Polygonum ramosissimum* was used to treat urinary tract infections. The seeds of *Persicaria maculosa* were used in powdered form to treat cholera.
Conclusion

This study is first to report the traditional uses of the indigenous medicinal plants from the remote areas of tehsil Harighal, Bagh. The documented data reflect that local peoples are still highly dependent upon medicinal plants for treating various diseases, as public health facilities are hard to reach, and still have a large knowledge of medicinal plants. Digestive disorders were most common in the area due to unavailability of clean water and hygienic food. The plant species with high RFC, UV and FL were *Mentha longifolia*, *Berberis lycium*, *Zanthoxylum armatum*, *Punica granatum*, *Galium aparine*, *Mimosa pudica* and *Verbena officinalis*. These species have good healing potential due to the presence of high amount of bioactive constituent. UV and RFC are strongly correlated with each other. Many medicinal plants are used extensively by the inhabitants of the area, but unfortunately the inhabitants who reside near to cities are already unaware of the ethnobotanical knowledge. The knowledge is mainly in the hand of elder people and health practitioners, and young generation are not much interested in herbal recipes. This lack of interest, as well as impacts like overgrazing, deforestation and soil erosion are reducing the medicinal flora in the area, and strategies related to resource conservation and further ethnobotanical and pharmacological research are highly recommended for the conservation of this precious treasure.

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Declarations

*Ethics approval and consent to participate*

The present research work is purely based on field survey. The ethical approval to conduct the study was given before initiating surveys from the Ethics Committee of the Women University of Azad Jammu & Kashmir, Bagh. In addition to this, legal permission to conduct interviews was given by members of municipality committee. A Prior Informed Consent form (PIC) was signed by all the informants after explaining the objective and consequence of study. The PIC was
translated into local *Pahari* language. The ethical guidelines provided by the International Society of Ethnobiology (http://www.ethnobiology.net/) were strictly followed.

*Consent for publication*

Present paper does not contain any individual's person data; therefore this section is Not Applicable to our study

*Availability of data and materials*

All data are included in the manuscript

*Funding*

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*Competing interest*

The authors declare that they have no competing interest.

*Authors Contribution*

MSA, UZ and AMA designed project, involve in data collection, analysis and prepared final draft of manuscript, MA and SMHG, helped in statistical analysis, RBU completely revised and commented the manuscript.

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Table 1. Demographic information of the Informants

| Variables      | IC  | Number | ANSRI | ANURI |
|----------------|-----|--------|-------|-------|
| Gender         |     |        |       |       |
| Men            |     | 45     | 4.98  | 8.05  |
| Women          |     | 34     | 5.72  | 9.38  |
| Total          |     | 79     |       |       |
| Age-Class      |     |        |       |       |
| 20-40          |     | 22     | 3.96  | 3.10  |
| 41-60          |     | 46     | 8.40  | 4.96  |
| 60-80          |     | 11     | 12.70 | 11.35 |
| Education      |     |        |       |       |
| Illiterate     |     | 26     | 5.95  | 4.08  |
| Elementary     |     | 18     | 12.25 | 6.70  |
| Secondary      |     | 13     | 11.90 | 6.11  |
| HSE            |     | 10     | 6.60  | 5.55  |
| Bachelor degree|     | 7      | 6.15  | 5.01  |
| Higher education|    | 5      | 10.80 | 6.71  |
| Professions    |     |        |       |       |
| THPs           |     | 13     | 25.55 | 13.64 |
| Mid Wives      |     | 10     | 13.2  | 10.43 |
| Herders        |     | 06     | 9.10  | 8.12  |
| Housewives     |     | 18     | 6.85  | 6.15  |
| Farmers        |     | 08     | 5.25  | 4.45  |
| Teachers       |     | 10     | 6.71  | 7.10  |
| Others         |     | 14     | 4.55  | 3.93  |

IC. Informants category, ANSRI. Average number of species reported by each informant, ANURI. Average Number of Use reported by each informant, HSE. Higher secondary education, THPs. Traditional health practionaires
Table 2. Medicinal uses of the reported taxa and their comparison with previous reports

| Scientific name / Voucher number | Local name | Habit | Part used | Method of preparation | Mode of application | Diseases treated | Previous use reports |
|----------------------------------|------------|-------|-----------|-----------------------|-------------------|-----------------|---------------------|
| **Acanthaceae**                  |            |       |           |                       |                   |                 |                     |
| *Dicliptera bupleuroides* Nees in Wall. UZ-02 | Somni | H     | LV        | PT                    | External           | Wounds          | 10, 20, 3©, 4©, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| *Justicia adhatoda* L. UZ-31     | Baikher   | S     | BK        | PD                    | Internal           | *Stomachache, Constipation* Asthma Cough | 10, 20, 30, 4©, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 18©, 190, 200, 210, 220 |
| **Amaranthaceae**                |            |       |           |                       |                   |                 |                     |
| *Amaranthus aspera* L. UZ-90     | Puthcanda  | H     | W.P       | PT                    | External           | Scorpion stings and Snake bites *Eye diseases* Inflammation | 1, 2, 3, 4, 5, 6▲, 70, 8▲, 9©, 100, 110, 120, 130, 140, 150, 160, 170, 18©, 190, 200, 21▲, 22◊ |
| *Alternanthera pungens* Kunth UZ-79 | Khaki buti | H     | LV        | DT                    | Internal           | Infection, Cuts and external injury | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| *Amaranthus spinosus* L. UZ-71   | Jungli Ganayar | H     | LV        | DT                    | Internal           | Bilioussness, Eye infection *Constitution* | 10, 2▲, 30, 40, 50, 6▲, 70, 8▲, 9©, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21▲, 220 |
| *Amaranthus viridis* L. UZ-50    | Ganyar    | H     | W.P       | PD                    | Internal           | Diarrhea, *Malaria, Jaundice* Antidote against snake and spider bites | 1▲, 2▲, 30, 40, 50, 6▲, 70, 8▲, 9©, 100, 110, 120, 13▲, 140, 150, 160, 170, 18▲, 190, 200, 21▲, 22▲ |
| **Amaryllidaceae**               |            |       |           |                       |                   |                 |                     |
| *Allium griffithianum* Boiss. UZ-42 | Piazi   | H     | A.P       | CK                    | Internal           | Carminative, *Dyspepsia, Flatulence* | 10, 20, 3©, 4©, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Apiaceae**                     |            |       |           |                       |                   |                 |                     |
| *Angelica glauca* Edgew. UZ-101  | Choora    | H     | RT        | IF                    | Internal           | *Fever, Colds* | 10, 20, 30, 40, 5▲, 60, 70, 80, 90, 100, 110, 120, 13▲, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| *Torilis japonica* (Houtt.) DC. UZ-69 | Lahndara | H     | SD        | PD                    | Internal           | Antifungal, Antiviral, Expectorant, Tonic, Acidosis and Scabies *Indigestion* | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Apocynaceae**                  | Garanda    | S     | W.P       | PD                    | Internal           | Joint pain, Scabies, *Jaundice* | 10, 20, 30, 4©, 50, 6▲, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| Family               | Species                          | Common Name | Habitat | Uses                                                                 | Dosage                                                                 |
|---------------------|---------------------------------|-------------|---------|----------------------------------------------------------------------|------------------------------------------------------------------------|
| **Araliaceae**       | *Hedera nepalensis* K. Koch.    | Bail        | Internal | Stimulant, Rheumatism, Diaphoretic                                   | 10, 2▲, 3▲, 4▲, 5, 6©, 7▲, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Asclepiadaceae**   | *Vincetoxicum hirundinaria* Medik. | Medhshing    | Internal | Boils, Pimples                                                       | 10, 20, 3©, 4©, 5, 6©, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Aspleniaceae**     | *Asplenium dalhousiae* Hook.     | Gutti       | Internal | Typhoid                                                              | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Asteraceae**       | *Achillea millefolium* L.       | Kangari      | Internal | Laxative, Diuretic, Stimulant, Brain tonic, Female organ problems, Colds and Fever, Bleeding, Wound healing | 10, 20, 30, 40, 5▲, 6▲, 7©, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Anaphaliaceae**    | *Anaphalis adnata* Wall. ex DC. | Dialect      | Internal | Anthelmintic, Skin diseases                                          | 10, 20, 30, 4©, 5, 6©, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Asteraceae**       | *Artemisia vulgaris* L.         | Chaow        | Internal | Sore throat                                                          | 10, 2▲, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Bidens biternata** | (Lour.) Merr. & Sherff.         | Palouthi     | Internal | Toothache                                                            | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Bidens biternata** | (Lour.) Merr. & Sherff.         | Kandiara     | Internal | Sore jaws                                                            | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| **Bidens biternata** | (Lour.) Merr. & Sherff.         | Kali Buti    | Internal | Rheumatic joints, Bleeding piles, Homeostatic, Stimulant, Astringent, Diuretic, Dysentery, Diarrhea, Hemorrhages, Eye infection | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| Plant Name | Common Name | Part Used | Use | References |
|------------|-------------|-----------|-----|------------|
| Gerbera gossypina (Royle) Beauverd | Put putiola | LV, PT | External | Bone fractures, Wounds, Cuts, Pain, Skin diseases |
| Helianthus annuus L. | Souraj mukhi | FL, SD, ET | Internal | Skin diseases, Diuretic, Curing chest infections, Liver ailments |
| Launaea procumbens (Roxb.) Ram. & Raj. | Hund | W.P, R.F | Internal | Diabetes, Pain |
| Silybum marianum (L.) Gaertn. | Kandiyar | LV, EX | Internal | Astringent, Bitter, Diaphoretic, Diuretic, Stimulant, Stomachic, Tonic, Respiratory tract infection |
| Sonchus oleraceus (L.)L. | Dodak | LV, CK | Internal | Abdominal pain |
| Tagetes minuta L. | Sadberga | LV, JC | Internal | Earache |
| Taraxacum officinale (L.) Weber ex F.H.Wigg. | Hend | RT, JC | Internal | Diuretic, Liver tonic, Diabetes |
| Xanthium strumarium L. | Souriyala | LV, FT, PD | Internal | Chronic mild fever, Cooling, Infections, Urinary problems |
| Asparagaceae | Noorialam | LV, IF | Internal | Analgesic, Aphrodisiac, Treat pain, Fever, Inflammation, Allergy, weakness |
| Balsaminaceae | Batmandar | W.P, EX | Internal | Urinary tract infection, Fever Burns |
| Berberidaceae | Sumbal | FT, ET | Internal | Expectorant |

References:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
| Family                | Genus                   | Common Name       | Habitat | Externally | Internally | Uses                                                                 | References |
|----------------------|-------------------------|-------------------|---------|------------|------------|----------------------------------------------------------------------|------------|
| Boraginaceae         | Cynoglossum lanceolatum | Churoun           | H       | RT         | EX         | Internal Throat ache                                                  | 18, 19, 20, 21, 22, 70, 80, 90, 100, 110, 12, 130, 140, 150, 160, 170, 180, 190, 20, 21, 220 |
|                      |                         |                   |         | FL         | FG         | Brain refreshment                                                     | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      |                         |                   |         | LV /       | EX         | Diuretic, Blood purifier                                             | 80, 91, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
| Brassicaceae         | Capsella bursa-pastoris  | Saag              | H       | W.P        | ET         | Internal Astringent, Stimulant, Chest infections                     | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      |                         |                   |         | SD         | PD         | Internal Bleeding                                                    |             |
|                      |                         |                   |         | SD         | FU         | Internal                                                              |             |
| Buxaceae             | Sarcococca saligna      | Ladan/ bansathra  | H       | LV         | DT         | Internal Joint pain, Purgative (motion)                               | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      | (D. Don) Muel           |                   |         | RT         | JC         | Internal Gonorrhea                                                    |             |
| Cannabaceae          | Cannabis sativa L.      | Bhang             | H       | LV         | PD         | Internal Astringent that bowels, Stomachic, Leprosy, Tonic, Narcotic action | 1, 2, 3, 4, 5, 6, 70, 80, 90, 10, 11, 12, 13, 14, 150, 160, 170, 180, 190, 200, 21, 220 |
| Caprifoliaceae       | Viburnum grandiflorum  | Guch              | S       | W.P        | EX         | Internal Typhoid, Whooping cough                                     | 1, 20, 30, 4, 5, 6, 70, 80, 90, 10, 11, 12, 13, 14, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      | Wall. ex DC.            |                   |         | SD         | PD         |                                                                         |             |
|                      |                         |                   |         | SD         | JC         |                                                                         |             |
| Celastraceae         | Maytenus nemorosa       | Patakhi           | S       | W.P        | EX         | Internal Toothache, Eye inflammation                                 | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      | Marais                  |                   |         | W.P        | DT         |                                                                         |             |
| Chenopodiaceae       | Chenopodium album L.    | SkhaBotey         | H       | W.P        | DT         | Internal Skin diseases                                               | 1, 2, 3, 4, 5, 6, 70, 80, 90, 10, 11, 12, 13, 14, 150, 160, 170, 180, 190, 200, 21, 220 |
| Convolvulaceae       | Convolvulus arvensis L. | Hirrankhur        | C       | W.P        | EX         | Internal Piles, Dandruff, Constipation                               | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
|                      |                         |                   |         | SD         | PD         |                                                                         |             |
|                      | Ipomoea purpurea (L.)   | Bahrwa            | H       | W.P        | PO         |                                                                         | 10, 20, 30, 4, 5, 6, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 21, 220 |
| Family Name         | Species Name | Common Name | Use          | Disorders                                      | References |
|---------------------|--------------|-------------|--------------|------------------------------------------------|------------|
| Commelinaceae       | Commelina benghalensis L. | Kanchara | External | Skin diseases | 10, 20, 30, 40, 50, 6©, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| Cornaceae           | Cornus macrophylla Wall. | Kandar | Internal | Backache | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220 |
| Cuscutaceae         | Cuscuta reflexa Roxb. | Neeladari | Internal | Jaundice, Dandruff | 10, 20, 30, 40, 50, 6©, 70, 8©, 9©, 10©, 11©, 12©, 13©, 14©, 15©, 16©, 17©, 18©, 19©, 20©, 21©, 22© |
| Cyperaceae          | Cyperus rotundus L. | Kah | Internal | Dysentery, Gastric problems, Intestinal disorders | 10, 2 ©, 3 ©, 4 ©, 5 ©, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
| Dryopteridaceae     | Dryopteris filix-mas (L.) Schoot | Kungi | Internal | Antibacterial activity | 10, 20, 30, 40, 50, 6©, 70, 8©, 9©, 10©, 11©, 12©, 13©, 14©, 15©, 16©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
| Elaeagnaceae        | Elaeagnus umbellata Thunb. | Kankolii | Internal | Stimulant in cough, Pulmonary infections | 10, 2 ©, 3 ©, 4 ©, 5 ©, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
| Euphorbiaceae       | Euphorbia helioscopia L. | Dhoudhal | External | Anthelmintic, Healing wounds, Poisonous effect that cause swelling in skin | 10, 2 ©, 3 ©, 4 ©, 5 ©, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
|                     | Ricinus communis L. | Arind | Internal | Laxative, Constipation, Skin diseases, Joint pain, Muscles swelling, Eye infection | 10, 2 ©, 3 ©, 4 ©, 5 ©, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
| Fabaceae            | Acacia modesta Wall. | Kikar | Internal | Anti-inflammatory, Toothache | 10, 20, 30, 40, 50, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
|                     | Acacia nilotica (L.) | Desi kikar | Internal | Astringent, Piles, Dysentery, Diarrhea | 10, 20, 30, 40, 50, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
| UZ-84 | Astragalus canadensis L. | Tindni | P | PD | External | Anti-dandruff | 180,190,20▲,21▲,220 |
|-------|---------------------|-------|---|----|---------|----------------|---------------------|
| UZ-125 | Bauhinia variegata L. | Kachnar | T | FL | Internal | Stomachache | 10, 20, 30, 40, 50, 60, 70, |
| UZ-14 | | | | | | | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| UZ-95 | Crotalaria juncea L. | Sunn | H | SD | Internal | Tonic, Carminative, Tanning agent | 10, 20, 30, 40, 50, 60, 70, |
| UZ-55 | Dalbergia sissoo DC. | Shishm | T | RV | Internal | Hair tonic, Skin diseases | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| UZ-142 | Desmodium elegans DC. | Halphaat | S | RT | Internal | Hypertension, Antidote | 10, 2▲, 3▲, 4, 50, 60, 70, |
| UZ-46 | Indigofera linifolia (L. f.) Retz. | Jund | H | LV | External | Skin allergy | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| UZ-136 | Lathyrus aphaca L. | Jangli matter | H | U.SD | Internal | Narcotic | 10, 2▲, 3▲, 4, 50, 60, 70, |
| UZ-78 | Lespedeza juncea (L.f.) Pers. | Kuchani | H | RT | Internal | Diarrhea, Dysentery | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| UZ-105 | Lotus corniculatus L. | Sril | H | FL | Internal | Antispasmodic, Cardiotonic, Sedative | 10, 2▲, 3▲, 4, 50, 60, 70, |
| UZ-66 | Medicago polymorpha L. | Maina | H | W.P | External | Tonic, Carminative | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| UZ-118 | Mimosa pudica L. | Choi Moi | H | LV | Internal | Skin inflammation | 10, 2▲, 3▲, 4, 50, 60, 70, |
| UZ-105 | Trifolium resupinatum L. | Tilpetra | H | SD | Internal | Dysentery, Indigestion | 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |

**Useful Information:**
- **Anti-dandruff**
- **Stomachache**
- **Tonic, Carminative, Tanning agent**
- **Hair tonic, Skin diseases**
- **Colic, Astringent in epistaxis**
- **Eye pain, Body pain**
- **Abdominal pain, Skin diseases**
- **Hypertension, Antidote**
- **Skin allergy**
- **Diarrhea, Dysentery**
- **Antispasmodic, Cardiotonic, Sedative**
- **Tonic, Carminative**
- **Skin inflammation**
- **Dysentery, Indigestion**
- **Hemorrhoids, Urinary infections, Cancer, Diabetes, Hepatitis, Obesity, Sores, Piles, Glandular swellings**
- **Digestive disorder like Abdominal pain.**
| Family | Species | Common Name(s) | Parts Used | Uses | References |
|--------|---------|----------------|------------|------|------------|
| **UZ-85** | *Vicia sativa* L. | Phalli | C | Indigestion, Tonic, Diuretic, Demulcent, Laxative, Asthma, Cough, Bronchitis, Skin diseases, Urinary problems | 80,190,200,210,220, 10, 20, 30, 40, 50, 6▲, 70, 8©, 90, 100, 110, 120, 130, 140, 150, 160, 170, 18©, 190, 200, 210, 220 |
| **UZ-25** |  | W.P | IF |  |
| **Geraniaceae** | *Geranium rotundifolium* L. | Rattan joge | H | Mouth ulcers, Stomach ulcer, Hemorrhoids | 10, 2▲, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 |
| **Gentianaceae** | *Swertia cordata* (Wall. ex G. Don) C.B. Clarke | Cheratbota | H | Digestive problem, Liver problems, Diarrhea, Nausea |  |
| **Juglandaceae** | *Juglans regia* L. | Akhrot | T | Brain and physical weakness, Toothache | 1©, 2©, 3▲, 4▲, 5, 6▲, 7, 8▲, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18▲, 19▲, 20▲, 21, 22 |
| **Lamiaceae** | *Ajuga bracteosa* Wall. ex Benth. | Rattibotti | H | Blood purifier, Pimples, Inflammation, Earache, pain | 10, 2, 3©, 4©, 5, 6▲, 7, 8©, 9©, 10, 11, 12, 13, 14, 15, 16, 17, 18©, 19, 20▲, 21, 22 |
| | *Callicarpa macrophylla* Vahl | Bengli | S | Alleviating pain in rheumatism, Diarrhea, Dysentery | 10, 2, 3©, 4©, 5, 6▲, 7, 8©, 9©, 10, 11, 12, 13, 14, 15, 16, 17, 18©, 19, 20▲, 21, 22 |
| | *Micromeria biflora* (Buch.-Ham. ex D.Don) Benth | Shahibooti | S | Headache | 10, 2▲, 30, 40, 5©, 6▲, 70, 8©, 9©, 10, 11, 12, 13, 14, 15, 16, 17, 18©, 19, 20▲, 21, 22 |
| | *Ocimum sanctum* L. | Bebrii | H | Cooling agent, Gastric problem | 10, 2, 3©, 4©, 5, 6▲, 7, 8©, 9©, 10, 11, 12, 13, 14, 15, 16, 17, 18©, 19, 20▲, 21, 22 |
| **UZ-94** |  | W.P | DT |  |
| **UZ-53** |  | LV / BK | RB |  |
| **UZ-132** |  | BK | PT |  |
| **UZ-134** |  | LV | PT |  |
| **Origanum vulgare** L. | **Sahthar** | H | W.P | PD | Internal | Stomach-ache, Antispasmodic, Antibacterial |
|-------------------------|------------|---|-----|----|---------|--------------------------------------------|
| **Otostegia limbata** (Benth.) Boiss. | S | RT | AS | External | Wound healing |
| **Phlomis bracteosa** Royle ex Benth. | H | LV | EX | Internal | Fever, Cough |
| **Prunella vulgaris** L. | H | W.P | EX | Internal | Relieve respiratory difficulties, Joint problems, |
| **Salvia lanata** Salisb. | H | A.P | VG | Internal | Stomachache, Liver complaints |
| **Thymus linearis** Benth. | H | W.P | JC | Internal | Stomachache, Liver complaints |
| **Lythraceae** | **Punica granatum** L. | S | SD | PD | Internal | Stomachache |
| **Malvaceae** | **Abutilon ramosum** (Cav.) Guill. & Perr. | S | RT | PD | Internal | Stomach ailment |
| **Meliaceae** | **Melia azadirachta** L. | T | FT | SD | Internal | Diabetes, Blood pressure, Blood purifier, Blood pressure |
| **Moraceae** | **Moraceae** | T | FT | SD | Internal | Diabetes, Blood pressure, Blood purifier, Blood pressure |

**Lythraceae**
**Punica granatum** L.
**Malvaceae**
**Abutilon ramosum** (Cav.) Guill. & Perr.
**Meliaceae**
**Melia azadirachta** L.
| Genus/Species | Common Name | T | FT | R.F | Internal/External | Condition/Effect | References |
|---------------|-------------|---|----|-----|------------------|------------------|------------|
| *Ficus carica* L. | Injeer / Barh Phugwarah | T | FT | R.F | Internal | Constipation | 10, 2©, 3©, 4©, 50, 60, 70, 80,90,10▲,110,120,130,140,150,16▲,17▲,180,19▲,200,210,22▲ |
| *Ficus palmata* Forssk. | Phugwarah | T | FT | R.F | Internal | Laxative, Alterative | 10, 2▲, 3▲, 4, 5, 60, 70, 80,90,100,110,120,13©,140,150,160,170,18©,190,200,210,220 |
| *Morus alba* L. | Toot | T | LV | DT | Internal | External | 10, 2▲, 3▲, 30, 40, 50, 60, 70, 80,90,100,110,120,13©,140,150,160,170,18©,190,200,210,220 |
| *Morus nigra* L. | Shatoot | T | FT | R.F | Internal | Cooling, Alterative, Laxative | 10, 2▲, 3▲, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,18▲,190,200,210,22© |
| *Myrtaceae* | *Eucalyptus camaldulensis* Schlecht | Safeda | T | BK | RB | External | Toothache | 10, 20, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| *Oleaceae* | *Jasminum officinale* L. | Chambili | S | RT | DT | Internal | Ringworm | 10, 2▲, 3▲, 30, 40, 50, 60, 70, 80,90,100,110,120,13▲,140,150,160,170,180,190,200,21▲,220 |
| *Olea ferruginea* Wall. ex Aitch. | Kao | T | LV | DT | Internal | Antiseptic, Antiperiodic, Diuretic, Astringent, Throat infection | 10, 2▲, 3▲, 30, 40, 50, 6▲, 70, 80,90,100,110,120,130,140,150,160,17©,18©,190,20▲,210,22▲ |
| *Onagraceae* | *Oenothera rosea* L. | Buti | H | LV | IF | Internal | Hepatic pain, Kidney disorders | 10, 2▲, 3©, 4©, 50, 6▲, 70, 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| *Oxalidaceae* | *Oxalis corniculata* L. | Khattiboti | H | W.P | EX | Internal | Diarrhea, Skin diseases, Dysentery, Blood purification | 10, 2▲, 3▲, 30, 40, 5, 6▲, 70, 8©,9▲,10▲,110,12▲,130,140,150,160,170,18▲,190,200,210©,22▲ |
| *Pinaceae* | *Pinus roxburghii* Sarg. | Chir | T | RS | PT | External | Wound healing, Healing cracks in feet, Antidote | 1, 2▲, 3▲, 4▲, 5, 6, 7, 8, 90,100,110,120,130,140,150,160,170,18▲,190,200,210,220 |
### Plantaginaceae

| Species | Collector | Department | Use | Medicinal Uses |
|---------|-----------|------------|-----|----------------|
| *Plantago lanceolata* L. | Ispgol | LV | Wound inflammation | Astringent for healing throat sores |
|          |           |            | Internal | Purgative |
|          |           |            | Internal | Nervous system disorder, Respiratory tract, Cardiovascular system, Metabolism |

### Poaceae

| Species | Collector | Department | Use | Medicinal Uses |
|---------|-----------|------------|-----|----------------|
| *Chrysopogon serrulatus* Trin. | Bari Gaas | W.P | External | Used for skin care |
|          |           |            |          | Muscle and joint fractures |
| *Cynodon dactylon* (L.) Pers. | Khabbal | LV | External | Allergies |
|          |           |            |          | Estrogenic, Anti-tumor, Kidney ailments, Bladder ailments |
| *Dactylis glomerata* L. | Gadu | W.P | Internal | Astringent, Cough |
|          |           |            |          | Diuretic |
|          |           |            |          | Used for suppressing tumors |
| *Dichanthium annulatum* (Forssk.) Stapf | Murgah | G | Internal | Cardiac treatments, Anti-proliferative |
|          | Ghass    |            |          | Used for suppressing tumors |
| *Digitalis ciliata* Trautv. | Diljit | SD | Internal | Gonorrhea |
|          |           |            |          | Diuretic |
| *Echinochloa colona* (L.) Link | Sanawakri | W.P | Internal | Fever, Anti-inflammatory, Jaundice |
|          |           |            |          | Stimulant |
| *Eleusine indica* (L.) Gaertn. | Madhana ghass | RT | Internal | Asthma, Bruises, Anthelmintic activity in |
|          |           |            |          |              |
| *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. | Sariyalagh ass | RT | Internal | Asthma, Bruises, Anthelmintic activity in |
|          |           |            |          |              |
| *Imperata cylindrica* (L.) Raeusch. | Dibb | W.P | Internal | Asthma, Bruises, Anthelmintic activity in |
|          |           |            |          |              |
| UZ-115 | Lolium temulentum L. | Grass | G | SD | PD | Internal | paralysis, Antioxidant, Anti-inflammatory Sedative | 80,190,200,21▲,22◊ |
|--------|---------------------|-------|---|----|----|----------|---------------------------------------------------|---------------------|
| UZ-65  | Setaria pumila (Poir.) Roem. & Schult. | Kangni, Loomar Gaas | G | LV | EX | Internal | Eye drops Fast healing Cooling agent | 10, 20, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| UZ-97  | Themeda anathera (Nees ex Steud.) Hack. | Bari ghass | G | A.P | PO | External | Backache, Blood purifier | 10, 2▲, 3©, 4©, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| Polygalaceae | Polygala abyssinica R. Br. ex Fresen. | Arna | H | RT | JC | External | Evil eye, Antidote to snake bite | 10, 2▲, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| Polygonaceae | Persicaria maculosa Gray | Ochi | H | SD | PD | Internal | Dysentery, Cholera Astringent, Scabies Wound healing Urinary tract infection | 10, 20, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| UZ-51  | Polygonum ramosissimum Michx. | Bannali | H | W.P | PT | Internal | Laxative Astringent in skin disorder | 10, 2▲, 3▲, 4▲, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 8▲,190,200,210,220 |
| UZ-40  | Rumex hastatus D.Don | Jnglipalak | H | LV | DO | Internal | | | |
| UZ-59  | Primulaceae | Anagallis arvensis L. | Billibooti | H | W.P | EX | Internal | Lowering fever, Depression, Tuberculosis, Liver problems, Epilepsy Improving the complexion, especially for freckle | 10, 20, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| UZ-47  | Androsace rotundifolia Hardw. | Thandijarri | H | RH | EX | Internal | Ophthalmic Stomachache, Emetic | 10, 2▲, 3©, 4©, 50, 60, 70, 80,90,100,110,12▲,130,140,150,160,170,1 | 180,190,200,210,220 |
| UZ-58  | Pteridaceae | Adiantum tenerum Sw. | Hansraj | F | FD | JC | Internal | Cough, Fever, Dysentery, Ulcers Burning sensation, Epileptic fits | | |
| UZ-130 | Onychium japonicum | Pathba | F | LV & | JC | Internal | Dysentery, Diarrhea | | |
| (Thunb.) Kunze | Pteris vittata L. | Nanore | F | FD | PT | External | Antibacterial for wounds |
|----------------|-----------------|--------|---|----|----|----------|-------------------------|
| UZ-28          |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                |                 |        |   |    |    | 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| Ranunculaceae  | Clematis grata Wall. | Tootal | S | LV | DT | Internal | Diabetes |
| UZ-89          |                 |        |   |    |    | 10, 2 ▲, 3 ©, 5 ©, 6 ▲, 7 ▲, 8 ▲, 9 ▲, 10 ▲, 11 ▲, 12 ▲, 13 ▲, 14 ▲, 15 ▲, 16 ▲, 17 ▲, 18 ▲, 19 ▲, 20 ▲, 21 ▲, 22 ▲ |
|                | Ranunculus arvensis L. | Chachumb a | H | A.P | CK | Internal | Asthma |
| UZ-80          |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                | Ranunculus muricatus L. | Kor-Kandoli | H | A.P | MX | Internal | Asthma |
| UZ-91          |                 |        |   |    |    | 80,90,100,110,120,130,140,150,160,170,1 |
| Thalictrum revolutum DC. | Beni | H | W.P | JC | Internal | Blood purifier, Curing fever |
| UZ-112         |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                | Rosaceae        | Cotoneaster racemiflora Wall. ex Lindl. | Luni | S | LV | TE | Internal | Stop bleeding and pus |
| UZ-08          |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                | Duchesnea indica (Jacks.) Focke | Budimewa | H | FL | BO | Internal | Blood circulation Swelling, Boils, Burns |
| UZ-48          |                 |        |   |    |    | 10, 2 ▲, 3 ▲, 4 ▲, 5 ©, 6 ▲, 7 ▲, 8 ▲, 9 ▲, 10 ▲, 11 ▲, 12 ▲, 13 ▲, 14 ▲, 15 ▲, 16 ▲, 17 ▲, 18 ▲, 19 ▲, 20 ▲, 21 ▲, 22 ▲ |
|                | Eriobotrya japonica (Thunb.) Lindl. | Loukat | T | W.P | D | Internal | Cough, Constipation Nose bleeds, Coughing up blood, Diarrhea, Depression, Skin diseases Demulcent, Expectorant, Digestive disorders, Respiratory problems Common cold |
| UZ-29          |                 |        |   |    |    | 10, 20, 3 ▲, 4 ▲, 5 ©, 6 ©, 7 ©, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 © |
|                | Fragaria nubicola (Lindl. ex Hook.f.) Lacaita | Boodimava | H | FL | BO | Internal | Anti-diarrheal, Anti-dysenteric, Diabetes, Sexual diseases |
| UZ-148         |                 |        |   |    |    | 10, 2 ▲, 3 ▲, 4 ▲, 5 ©, 6 ©, 7 ▲, 8 ©, 9 ©, 10 ©, 11 ©, 12 ©, 13 ©, 14 ©, 15 ©, 16 ©, 17 ©, 18 ©, 19 ©, 20 ©, 21 ©, 22 ▲ |
| Potentilla reptans L. | Gul bota | H | W.P | JC | Internal | Anti-diarrheal, Intestinal infections |
| UZ-137         |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                | Potentilla reptans L. | Gul bota | H | W.P | JC | Internal | Anti-diarrheal, Intestinal infections |
| UZ-137         |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, |
|                | Potentilla reptans L. | Gul bota | H | W.P | JC | Internal | Anti-diarrheal, Intestinal infections |
| UZ-137         |                 |        |   |    |    | 10, 20, 30, 40, 50, 60, 70, | 80,90,100,110,120,130,140,150,160,170,1 | 80,190,200,210,220 |
| Species                        | Common Name | Type | Use          | Categories                                      | Effects                                                                 |
|-------------------------------|-------------|------|--------------|------------------------------------------------|-------------------------------------------------------------------------|
| Prunus armeniaca L.           | Hari, Khubani | T    | Internal    | Laxative                                       | Softening effect on the skin                                           |
| Prunus domestica L.            | Alucha      | T    | Internal    | Laxative                                       | Softening effect on the skin                                           |
| Prunus persica (L.) Batsch     | Aruu, Peach | T    | Internal    | Laxative, Softening effect on the skin        | Softening effect on the skin                                           |
| Pyrus malus L.                 | Saib        | T    | Internal    | Laxative                                       | Softening effect on the skin                                           |
| Pyrus pashia Buch. - Ham. ex D. Don | Tangi | T    | Internal    | Laxative                                       | Softening effect on the skin                                           |
| Rosa brunoii Lindl. UZ-121     | Chal        | S    | Internal    | Laxative, Constipation                         | Heart tonic, Skin diseases                                             |
| Rosa indica L. UZ-30           | Galab       | S    | Internal    | Laxative, Constipation                         | Heart tonic, Skin diseases                                             |
| Rubus ellipticus Sm. UZ-109    | Aakhara     | S    | Internal    | Laxative, Diarrhea, Bleeding                  | Diarrhea, Bleeding                                                     |
| Rubus niveus Thunb. UZ-19       | Garachi     | S    | Internal    | Laxative, Diarrhea, Blood purifier, Dysentery, Colic, Pain, Whooping Cough | Diarrhea, Fever, Blood purifier, Dysentery, Colic, Pain, Whooping Cough |
| Spiraea canescens D. Don UZ-57 | Jhar, Mariala | RT | Internal    | Laxative, constipation, Stomachic diseases    | Constipation, Stomachic diseases                                        |
| Rubiaceae                      | Galium aparine L. UZ-119 | H | Internal    | Laxative, Anti-ascorbic; Diuretic, Aperients | Constipation, Stomachic diseases, Anti-ascorbic; Diuretic, Aperients   |
| Rutaceae                      |             |     |             |                                                |                                                                          |
| Family | Genus | Common Name | Collector | Type | Use | Conditions | Reference |
|--------|-------|-------------|----------|------|-----|------------|-----------|
| **Zanthoxylum armatum** DC. UZ-106 | Timber S SD / BK BR RB | Internal | Tonic, Cholera, fever, Dyspepsia, **Stomachache** Toothache | 10, 2 ◊, 3 ©, 4 ©, 50, 6 ▲, 70, 80,90,10 ▲,11 ▲,120,130,140,150,160,170,18 ©,190,200,210,220 |
| **Salicaceae** | *Populus nigra* L. UZ-123 | Sfeeda T BK EX | Internal | Arthritis, Gout, **Lower back pain**, Urinary complaints, Gout, Digestive disorders, Liver disorders, Fever, Relieve the pain of menstrual cramps Hemorrhoids Infected wounds and sprains, Caries of teeth and bones | 10, 2 ▲, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| **Sapindaceae** | *Aesculus indica* (Wall. ex Camb.) Hook. UZ-141 | Bankhore T FT SD PD | Internal | **Colic, Rheumatism** Leucorrhoea | 10, 20, 3 ©, 4 ©, 50, 60, 70, 80,90,10 ▲,110,120,130,140,150,160,170,180,190,200,210,220 |
| **Dodonaea viscosa** (L.) Jacq. UZ-139 | Snathaa S LV PT | External | **Healing agent** | 10, 20, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,18 ©,190,200,210,220 |
| **Scrophulariaceae** | *Verbascum thapsus* L. UZ-18 | Gidar H LV DT | External | Sunburn, Ulcers, Tumors, **Piles** Antibacterial, Sedative, Narcotic Toothache, Relieve cramps, Convulsions | 10, 2 ▲, 3 ▲, 4 ▲, 50, 6 ▲, 70, 80,90,10 ▲,110,120,13 ▲,140,150,160,170,18 ▲,190,200,210,220 |
| **Simaroubaceae** | *Ailanthus altissima* (Mill.) Swingle UZ-92 | Draviyae T BK LV EX | Internal | **Dysentery, Diarrhea** Blood purifier | 10, 2 ▲, 30, 40, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |
| **Solanaceae** | *Solanum villosum* Mill. UZ-09 | Kaach, H LV DT | Diuretic | **Tongue infection in children** | 10, 20, 3 ©, 4 ©, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,18 ©,190,200,210,220 |
| **Urticaceae** | *Debregeasia salicifolia* (D. Don) Rendle UZ-39 | Sindari S A.P IF | External | Eczema, **Dermatitis** | 10, 20, 3 ©, 4 ©, 50, 60, 70, 80,90,100,110,120,130,140,150,160,170,18 ©,190,200,210,220 |
| | *Urtica dioica* L. | Kinjii H RT IF | Internal | **Diuretic** | 10, 20, 30, 40, 50, 60, 7 ▲, |
| UZ-49 | RT | PT | Internal | Anti-allergic |
|-------|----|----|----------|--------------|
| Valerianaceae | | | | |
| Valeriana jatamansi | | | | |
| Mushk | H | RH | EX | Internal | Anti-allergic |
| Jones. | | | | | Intestinal pain, Neurosis, Constipation |
| UZ-60 | | | | | 10, 20, 3▲, 4▲, 50, 60, 7▲, 80,90,10▲,110,12▲,130,140,150,160,170,180,190,200,210,22▲ |

| Verbenaceae | | | | |
| Vitex agnus-castus L. | | | | |
| T | LV | EX | Female reproductive system disorders, Diuretic, Digestive disorders, Antifungal, Anti-Anxiety, Stomachache |
| UZ-88 | | | | Stomachache | 10, 2▲, 30, 40, 50, 60, 70, 8©,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |

| Verbena officinalis L. | | | | |
| Chandni | H | W.P | IF | Internal | Anti-allergic |
| UZ-67 | | | | | Feminine reproductive system disorders, Diuretic, Reduces inflammation, Control bleeding, Anti-malarial, Nervous exhaustion, Depression, Asthma, Migraine, Jaundice |
| | | | | | 10, 2▲, 30, 40, 50, 60, 70, 8©,90,100,110,120,130,140,150,160,170,180,190,200,210,220 |

| Violaceae | | | | |
| Viola odorata L. | | | | |
| Banafshan | H | W.P | BO | Internal | Flu, Cough, Jaundice |
| UZ-100 | | | | | 10, 20, 30, 40, 5▲, 60, 70, 8©,90,10▲,110,120,130,140,150,16▲,170,180,190,200,210,220 |

Habit: H, Herbs; S, Shrubs; T, Trees; F, Ferns; E, Epiphyte. Part(s) Used: LV, Leaf; FT, Fruit; RT, Root; ST, Stem; A.P, Aerial Parts; W.P, Whole Plant; FD, Fronds; SD, Seed; FL, Flower; BK, Bark; BL, Bulb; RH, Rhizome; IF, Inflorescence; SH, Shoot; LX, Latex; BR, Branches; RS, Resin; GR, Grain; P, Pods; Pulp, PL; Oil, OL. Method of Preparation: PD, Powder; DT, Decoction; EX, Extract; PT, Paste; JC, Juice; PO, Poultice; IF, Infusion; CH, Chewed; VG, Vegetable; TE, Tea; RB, Rubbing; ET, Eaten; CK, Cooked; BO, Boiled; BO, Ash; AS, Fluid; FU, Fragrance; FG, Mixture, MX. Rel PH, Relative number of pharmacological properties attributed to a single plant. Rel BS, Relative number of body systems treated by a single species. RI, Relative Importance. FC, Frequency of Citation. RFC, Relative frequency of citation. UV, Use value (©) = Plants with similar use(s); (▲) = Plants with dissimilar use (s); (◊) = Plants not reported in previous study. Bold written uses highlights the frequent use for a given plant.
| Scientific name          | FC | RFC | Ui | UV  | RelPH | RelBS | RI  |
|--------------------------|----|-----|----|-----|-------|-------|-----|
| *Abutilon ramosum*       | 3  | 0.04| 3  | 0.04| 0.08  | 0.13  | 10.5|
| *Acacia modesta*         | 30 | 0.4 | 33 | 0.44| 0.17  | 0.25  | 21  |
| *Acacia nilotica*        | 64 | 0.86| 65 | 0.87| 0.42  | 0.38  | 40  |
| *Achillea millefolium*   | 38 | 0.15| 46 | 0.62| 0.5   | 0.75  | 62.5|
| *Achyranthes aspera*     | 50 | 0.67| 66 | 0.88| 0.25  | 0.38  | 31.5|
| *Adiantum tenerum*       | 19 | 0.25| 21 | 0.28| 0.58  | 0.63  | 60.5|
| *Aesculus indica*        | 34 | 0.45| 39 | 0.52| 0.33  | 0.5   | 41.5|
| *Ajuga bracteosa*        | 42 | 0.56| 54 | 0.72| 0.42  | 0.5   | 46  |
| *Allanthus altissima*    | 60 | 0.81| 64 | 0.86| 0.25  | 0.25  | 25  |
| *Allium griffithianum*   | 42 | 0.56| 48 | 0.64| 0.25  | 0.13  | 19  |
| *Alternanthera pungens*  | 10 | 0.13| 23 | 0.31| 0.17  | 0.13  | 15  |
| *Amaranthus spinosus*    | 36 | 0.48| 39 | 0.52| 0.25  | 0.25  | 25  |
| *Amaranthus viridis*     | 51 | 0.68| 57 | 0.77| 0.42  | 0.5   | 46  |
| *Anagallis arvensis*     | 22 | 0.29| 29 | 0.39| 0.5   | 0.5   | 50  |
| *Anaphalis adnata*       | 14 | 0.18| 18 | 0.24| 0.17  | 0.25  | 21  |
| *Androsace rotundifolia* | 6  | 0.08| 11 | 0.14| 0.25  | 0.38  | 31.5|
| *Angelica glauca*        | 20 | 0.27| 27 | 0.36| 0.17  | 0.25  | 21  |
| *Artemisia vulgaris*     | 52 | 0.7 | 55 | 0.74| 0.17  | 0.25  | 12.67|
| *Asplenium dalhousiae*   | 34 | 0.45| 34 | 0.45| 0.08  | 0.13  | 10.5|
| *Astragalus canadensis*  | 8  | 0.1 | 8  | 0.1 | 0.08  | 0.13  | 0.5 |
| *Bauhinia variegata*     | 44 | 0.59| 47 | 0.63| 0.25  | 0.25  | 50  |
| *Berberis lycium*       | 60 | 0.81| 67 | 0.9 | 0.25  | 0.38  | 31.5|
| *Bidens biternata*       | 53 | 0.71| 61 | 0.82| 0.17  | 0.25  | 12.65|
| *Callicarpa myrophylla*  | 39 | 0.52| 43 | 0.58| 0.42  | 0.5   | 46  |
| *Cannabis sativa*        | 58 | 0.78| 60 | 0.81| 0.33  | 0.5   | 41.5|
| *Capsella bursa-pastoris*| 25 | 0.33| 44 | 0.59| 0.33  | 0.38  | 35.5|
| *Carissa opaca*          | 32 | 0.43| 38 | 0.51| 0.33  | 0.38  | 35.5|
| *Cirsium vulgare*        | 32 | 0.43| 41 | 0.55| 0.25  | 0.38  | 31.5|
| *Chenopodium album*      | 19 | 0.25| 19 | 0.25| 0.08  | 0.13  | 10.5|
| *Chrysopogon serrulatus* | 4  | 0.05| 4  | 0.05| 0.08  | 0.13  | 10.5|
| *Clematis grata*         | 2  | 0.027| 2 | 0.027| 0.17  | 0.25  | 21  |
| *Commelina benghalensis* | 5  | 0.06| 5  | 0.08| 0.13  |       | 10.5|
| *Convulvulus arvensis*   | 52 | 0.7 | 58 | 0.78| 0.58  | 0.63  | 60.5|
| *Conyza canadensis*      | 40 | 0.54| 47 | 0.63| 0.58  | 0.5   | 54  |
| *Cornus macrophylla*     | 8  | 0.1 | 12 | 0.16| 0.08  | 0.13  | 10.5|
| *Cotoneaster racemiflora*| 2  | 0.02| 2  | 0.02| 0.17  | 0.25  | 21  |
| *Crepis multicaulis*     | 10 | 0.13| 10 | 0.13| 0.08  | 0.13  | 10.5|
| Plant Name                      | Value 1 | Value 2 | Value 3 | Value 4 | Value 5 | Value 6 |
|--------------------------------|---------|---------|---------|---------|---------|---------|
| Crotalaria juncea              | 2       | 0.02    | 4       | 0.05    | 0.33    | 0.5     | 41.5    |
| Cuscuta reflexa                | 57      | 0.77    | 60      | 0.81    | 0.17    | 0.25    | 21      |
| Cynodon dactylon               | 60      | 0.81    | 64      | 0.86    | 0.08    | 0.13    | 10.5    |
| Cynoglossum lanceolatum        | 69      | 0.93    | 70      | 0.94    | 0.08    | 0.13    | 10.5    |
| Cyperus rotundus               | 4       | 0.05    | 9       | 0.12    | 0.25    | 0.13    | 19      |
| Dactylis glomerata             | 6       | 0.08    | 19      | 0.25    | 0.42    | 0.63    | 52.5    |
| Dalbergia sissoo               | 60      | 0.81    | 62      | 0.83    | 0.5     | 0.63    | 56.5    |
| Debregeasia salicifolia        | 33      | 0.44    | 38      | 0.51    | 0.17    | 0.25    | 21      |
| Desmodium elegans              | 26      | 0.35    | 26      | 0.35    | 0.17    | 0.25    | 21      |
| Dichanthium annulalum          | 10      | 0.13    | 10      | 0.13    | 0.17    | 0.25    | 21      |
| Dictyophora bupleuroides       | 10      | 0.13    | 20      | 0.27    | 0.25    | 0.38    | 31.5    |
| Digitalis ciliata              | 8       | 0.1     | 16      | 0.21    | 0.25    | 0.38    | 31.5    |
| Dodonaea viscosa               | 60      | 0.81    | 60      | 0.81    | 0.25    | 0.38    | 31      |
| Dryopteris filix-mas           | 60      | 0.81    | 60      | 0.81    | 0.08    | 0.13    | 10.5    |
| Duchesnea indica               | 30      | 0.4     | 38      | 0.51    | 0.17    | 0.25    | 21      |
| Echinocloa colona              | 2       | 0.02    | 4       | 0.05    | 0.17    | 0.25    | 21      |
| Elaeagnus umbellata            | 42      | 0.56    | 54      | 0.72    | 0.33    | 0.38    | 35.5    |
| Eleusine indica                | 9       | 0.12    | 14      | 0.18    | 0.42    | 0.63    | 52.5    |
| Eriobotrya japonica            | 61      | 0.82    | 63      | 0.85    | 0.33    | 0.5     | 41.5    |
| Eucalyptus camaldulensis       | 43      | 0.58    | 46      | 0.62    | 0.08    | 0.13    | 6.33    |
| Euphorbia helioscopia          | 64      | 0.86    | 68      | 0.91    | 0.25    | 0.25    | 25      |
| Ficus carica                   | 61      | 0.82    | 63      | 0.85    | 0.33    | 0.38    | 19.08   |
| Ficus palmata                  | 50      | 0.67    | 70      | 0.94    | 0.42    | 0.5     | 25.42   |
| Fragaria nubicola              | 46      | 0.62    | 48      | 0.64    | 1.00    | 0.63    | 81.5    |
| Galium aparine                 | 54      | 0.72    | 56      | 0.75    | 0.92    | 1.00    | 96.0    |
| Geranium rotundifolium         | 46      | 0.62    | 49      | 0.66    | 0.25    | 0.38    | 31.5    |
| Gerbera gossypina              | 38      | 0.51    | 40      | 0.54    | 0.42    | 0.38    | 40.0    |
| Hedera nepalensis              | 20      | 0.27    | 35      | 0.47    | 0.25    | 0.38    | 31.5    |
| Helianthus annuus              | 50      | 0.67    | 61      | 0.82    | 0.58    | 0.63    | 60.5    |
| Heteropogon contortus          | 10      | 0.13    | 14      | 0.18    | 0.17    | 0.25    | 21.0    |
| Impatiens edgeworthii          | 14      | 0.18    | 25      | 0.33    | 0.25    | 0.38    | 31.5    |
| Imperata cylindrica            | 7       | 0.09    | 24      | 0.32    | 0.42    | 0.5     | 46      |
| Indigofera linifolia           | 24      | 0.32    | 28      | 0.37    | 0.08    | 0.13    | 10.5    |
| Ipomoea purpurea               | 49      | 0.66    | 52      | 0.7     | 0.33    | 0.5     | 41.5    |
| Jasminum officinale            | 54      | 0.72    | 59      | 0.79    | 0.33    | 0.5     | 25.33   |
| Juglans regia                  | 58      | 0.78    | 66      | 0.89    | 0.17    | 0.25    | 21      |
| Justicia adhatoda              | 40      | 0.54    | 53      | 0.71    | 0.33    | 0.25    | 29      |
| Lathyrus aphaca                | 15      | 0.2     | 17      | 0.22    | 0.08    | 0.13    | 0.5     |
| Launaea procumbens             | 15      | 0.2     | 27      | 0.36    | 0.17    | 0.25    | 21      |
| Species                          | X | Y  | X  | Y  | X  | Y  | X  | Y  |
|--------------------------------|---|-----|-----|-----|-----|-----|-----|-----|
| Lespedeza juncea               | 5 | 0.06| 8   | 0.1 | 0.17| 0.13| 15  |
| Lolium temulentum              | 2 | 0.02| 3   | 0.04| 0.08| 0.13| 10.5|
| Lotus corniculatus             | 5 | 0.06| 7   | 0.09| 0.5 | 0.75| 62.7|
| Malva parviflora              | 65| 0.87| 65  | 0.87| 0.08| 0.13| 0.5 |
| Malvastrum coromandelianum     | 42| 0.56| 48  | 0.64| 0.17| 0.13| 5   |
| Maytenus nemorosa             | 4 | 0.05| 7   | 0.09| 0.17| 0.25| 21  |
| Medicago polymorpha           | 44| 0.59| 49  | 0.66| 0.17| 0.13| 15  |
| Melia azadrachta              | 65| 0.87| 69  | 0.93| 0.58| 0.88| 73  |
| Mentha spicata                | 55| 0.74| 57  | 0.77| 0.17| 0.25| 21  |
| Mentha longifolia             | 64| 0.86| 78  | 1.05| 0.5 | 0.38| 44  |
| Micromeria biflora            | 33| 0.44| 53  | 0.71| 0.17| 0.13| 15  |
| Mimosa pudica                 | 3 | 0.04| 5   | 0.06| 0.83| 0.1 | 91.5|
| Morus alba                    | 61| 0.82| 66  | 0.89| 0.33| 0.38| 35.5|
| Morus nigra                   | 44| 0.59| 60  | 0.81| 0.25| 0.25| 50  |
| Nerium oleander               | 50| 0.67| 54  | 0.72| 0.5 | 0.63| 56.5|
| Ocimum sanctum                | 55| 0.74| 57  | 0.77| 0.17| 0.25| 21  |
| Oenothera rosea               | 15| 0.2 | 20  | 0.27| 0.17| 0.25| 35.5|
| Olea ferruginea               | 64| 0.86| 76  | 1.02| 0.58| 0.75| 38.08|
| Onychium japonicum            | 17| 0.22| 24  | 0.32| 0.17| 0.13| 15  |
| Origanum vulgare              | 16| 0.21| 28  | 0.37| 0.25| 0.25| 50  |
| Otostegia limbata             | 3 | 0.04| 8   | 0.1 | 0.17| 0.13| 15  |
| Oxalis corniculata            | 60| 0.81| 65  | 0.87| 0.5 | 0.5 | 50  |
| Persicaria maculosa           | 7 | 0.09| 15  | 0.2 | 0.42| 0.38| 40  |
| Phlomis bracteosa             | 8 | 0.1 | 11  | 0.14| 0.25| 0.25| 50  |
| Pinus roxburghii              | 60| 0.81| 64  | 0.86| 0.25| 0.25| 50  |
| Plantago lanceolata           | 30| 0.4 | 36  | 0.48| 0.25| 0.25| 50  |
| Polygala abyssinica           | 2 | 0.02| 2   | 0.02| 0.08| 0.13| 10.5|
| Polygonatum geminiflorum      | 6 | 0.08| 11  | 0.16| 0.58| 0.5 | 54  |
| Polygonum ramosissimum        | 5 | 0.06| 5   | 0.06| 0.08| 0.13| 10.5|
| Populus nigra                 | 53| 0.71| 56  | 0.75| 0.08| 0.13| 10.5|
| Potentilla reptans            | 4 | 0.05| 6   | 0.08| 0.17| 0.13| 15  |
| Prunella vulgaris             | 31| 0.41| 48  | 0.64| 0.25| 0.38| 31.5|
| Prunus armeniaca             | 35| 0.47| 38  | 0.51| 0.25| 0.38| 31.5|
| Prunus domestica              | 39| 0.52| 42  | 0.56| 0.33| 0.25| 29  |
| Prunus persica                | 43| 0.58| 49  | 0.66| 0.42| 0.5 | 46  |
| Pteris vittata                | 21| 0.28| 27  | 0.36| 0.08| 0.13| 10.5|
| Punica granatum              | 68| 0.91| 72  | 0.97| 0.42| 0.38| 40  |
| Pyrus malus                   | 46| 0.62| 51  | 0.68| 0.5 | 0.5 | 50  |
| Pyrus pashia                  | 38| 0.51| 38  | 0.51| 0.33| 0.25| 29  |
| Species                        | FC | RFC | Ui | UV | Rel. PH | Rel. BS | RI  |
|-------------------------------|----|-----|----|----|---------|---------|-----|
| Ranunculus arvensis           | 29 | 0.39| 29 | 0.39| 0.08    | 0.13    | 10.5|
| Rauanculus muricatus          | 20 | 0.27| 20 | 0.27| 0.08    | 0.13    | 1050 |
| Ricinus communis              | 28 | 0.37| 51 | 0.68| 0.5     | 0.5     | 50  |
| Rosa brunoni                  | 50 | 0.67| 52 | 0.7  | 0.25    | 0.38    | 31.5|
| Rosa indica                   | 69 | 0.93| 71 | 0.95| 0.08    | 0.13    | 0.5 |
| Rubus ellipticus              | 58 | 0.78| 60 | 0.81| 0.42    | 0.5     | 46  |
| Rubus niveus                  | 55 | 0.74| 59 | 0.79| 0.67    | 0.63    | 65  |
| Rumex hastatus                | 51 | 0.68| 55 | 0.74| 0.17    | 0.25    | 21  |
| Salvia lanata                 | 18 | 0.24| 28 | 0.37| 0.25    | 0.25    | 50  |
| Sarcococca saligna            | 2  | 0.02| 6  | 0.08| 0.25    | 0.38    | 31.5|
| Setaria pumila                | 6  | 0.08| 13 | 0.17| 0.25    | 0.38    | 31.5|
| Sillybum marianum             | 25 | 0.33| 53 | 0.71| 0.67    | 0.63    | 65  |
| Solanum villosum              | 66 | 0.89| 69 | 0.93| 0.17    | 0.25    | 21  |
| Sonchus oleraceus             | 52 | 0.7 | 52 | 0.7 | 0.08    | 0.13    | 10.5|
| Spiraea canescens             | 14 | 0.18| 17 | 0.22| 0.17    | 0.25    | 21  |
| Swertia cordata               | 3  | 0.04| 9  | 0.12| 0.33    | 0.25    | 29  |
| Tagetes minuta                | 14 | 0.2 | 25 | 0.35| 0.09    | 0.41    | 115 |
| Taraxacum officinale          | 54 | 0.72| 59 | 0.79| 0.25    | 0.38    | 31.5|
| Thalictrum revolutum          | 11 | 0.14| 16 | 0.21| 0.17    | 0.25    | 21  |
| Themeda anthera               | 16 | 0.21| 18 | 0.24| 0.17    | 0.25    | 21  |
| Thymus linearis               | 22 | 0.29| 39 | 0.52| 0.25    | 0.25    | 50  |
| Torilis japonica              | 14 | 0.18| 19 | 0.25| 0.5     | 0.63    | 32  |
| Trichodesma indicum           | 14 | 0.18| 19 | 0.24| 0.25    | 0.38    | 31.5|
| Trifolium resupinatum         | 20 | 0.27| 27 | 0.36| 0.08    | 0.13    | 10.5|
| Urtica dioica                 | 44 | 0.59| 47 | 0.63| 0.17    | 0.25    | 21  |
| Valeraina jatamansi           | 26 | 0.35| 30 | 0.4  | 0.25    | 0.25    | 25  |
| Verbascum thapsus             | 10 | 0.13| 12 | 0.16| 0.83    | 0.75    | 79  |
| Verbena officinalis           | 25 | 0.33| 27 | 0.36| 0.75    | 0.88    | 81  |
| Veronica laxa                 | 9  | 0.12| 13 | 0.17| 0.83    | 0.75    | 79  |
| Viburnum grandiflorum         | 53 | 0.71| 57 | 0.77| 0.17    | 0.25    | 21  |
| Vicia sativa                  | 44 | 0.59| 51 | 0.68| 0.83    | 0.88    | 85.5|
| Vincetoxicum hirundinaria     | 15 | 0.2 | 28 | 0.37| 0.17    | 0.13    | 15  |
| Viola odorata                 | 62 | 0.83| 65 | 0.87| 0.25    | 0.25    | 25  |
| Vitex agnus-castus            | 54 | 0.72| 58 | 0.78| 0.5     | 0.5     | 50  |
| Xanthium strumarium           | 62 | 0.83| 128| 1.72| 0.33    | 0.38    | 35.5|
| Zanthoxylum armatum           | 68 | 0.91| 75 | 1.01| 0.42    | 0.5     | 46  |

771 FC, Frequency of Citation. RFC, Relative frequency of citation. Ui, Use reports cited by each
772 respondent for given species. UV, Use value. Rel. PH, Relative number of pharmacological
773 properties attributed to a single plant. Rel. BS, Relative number of body systems treated by a
774 single species. RI, Relative Importance.
Table 4. Jaccard index comparing the present study with previous articles

| Area                                      | SY  | NRP | NPSU | NPDU | TSCBA | SEAA | SESA | PPSU | PPDU | JI   | C   |
|-------------------------------------------|-----|-----|------|------|-------|------|------|------|------|------|-----|
| **Comparison with article from Azad Jammu & Kashmir** |     |     |      |      |       |      |      |      |      |      |     |
| Toil peer (AJK), Pakistan                 | 2017| 121 | 27   | 18   | 45    | 76   | 105  | 22.3 | 14.8 | 33.08| [46]|
| Perl valley (AJK), Pakistan               | 2017| 136 | 29   | 21   | 50    | 86   | 100  | 21.3 | 15.4 | 36.7 | [23]|
| Neelum Valley (AJK), Pakistan             | 2011| 40  | 2    | 7    | 9     | 31   | 141  | 5    | 17.5 | 5.2  | [111]|
| Kotli, AJK, Pakistan                      | 2017| 202 | 21   | 19   | 40    | 162  | 110  | 10.3 | 9.4  | 17.2 | [114]|
| Bhimber (AJK), Pakistan                   | 2011| 38  | 3    | 8    | 11    | 27   | 139  | 7.8  | 21.05| 7.09 | [117]|
| Kakhuta (AJK), Pakistan                   | 2013| 45  | 5    | 9    | 14    | 31   | 136  | 11.1 | 20   | 9.15 | [113]|
| Muzaffarabad (AJK), Pakistan              | 2014| 52  | 5    | 13   | 18    | 34   | 132  | 9.61 | 25   | 12.1 | [119]|
| Kotli (AJK), Pakistan                     | 2019| 80  | 11   | 24   | 35    | 45   | 105  | 13.7 | 30   | 30.4 | [45] |
| Sharda, Neelum Valley (AJK),              | 2012| 39  | 2    | 9    | 11    | 28   | 139  | 5.1  | 23   | 7.05 | [37] |
| **Comparison with article from KPK and Northern area** |     |     |      |      |       |      |      |      |      |      |     |
| Kabal valley (KPK), Pakistan              | 2015| 45  | 2    | 10   | 12    | 33   | 138  | 4.4  | 22.2 | 7.54 | [112]|
| Skardu valley, Karakoram-                 | 2014| 50  | 1    | 4    | 5     | 45   | 145  | 2    | 8    | 2.7  | [44] |
| Ayubia National Park,                     | 2006| 21  | 3    | 4    | 7     | 14   | 143  | 14.2 | 19.04| 4.66 | [115]|
| Torkmik valley, Baltistan,                | 2015| 63  | 0    | 3    | 3     | 60   | 147  | 0    | 4.76 | 1.47 | [120]|
| Northern Pakistani Afghan                 | 2018| 92  | 2    | 18   | 20    | 72   | 148  | 2.17 | 19.5 | 10   | [121]|
| Malakand KPK, Pakistan                    | 2018| 25  | 2    | 7    | 9     | 16   | 141  | 8    | 28   | 6.08 | [122]|
| Mohmand Agency (FATA),                    | 2018| 64  | 1    | 14   | 15    | 49   | 135  | 1.56 | 21.8 | 8.87 | [31] |
| **Comparison with article from other areas of Pakistan** |     |     |      |      |       |      |      |      |      |      |     |
| Wazirabad, Punjab, Pakistan               | 2018| 31  | 0    | 4    | 4     | 27   | 146  | 0    | 12.9 | 2.36 | [123]|
| Chenab, Punjab, Pakistan                  | 2019| 129 | 3    | 24   | 27    | 102  | 123  | 2.32 | 18.6 | 13.6 | [91] |
| Dera Ghazi Khan, Punjab,                  | 2012| 66  | 7    | 9    | 16    | 50   | 134  | 10.6 | 13.6 | 9.52 | [116]|
| **Comparison with article from rest of world** |     |     |      |      |       |      |      |      |      |      |     |
| Sikles area, Nepal                        | 2015| 42  | 2    | 5    | 7     | 35   | 143  | 4.76 | 11.9 | 4.09 | [118]|
| Sangli, Maharashtra, India                | 2015| 21  | 0    | 3    | 3     | 18   | 147  | 0    | 14.2 | 1.85 | [109]|
| Kunama ethnic group in                    | 2015| 115 | 1    | 3    | 4     | 111  | 146  | 0.86 | 2.6  | 1.58 | [110]|
SY. Study year, Number of reported plant species, NPSU. Number of plants with similar uses, NPDU. Number of plants with different uses, TSCBA. Total species common in both area, SEAA. Species enlisted in aligned areas, SESA. Species enlisted only in study area, PPSU. Percentage of plant with similar uses, PPDU. Percentage of plant with different uses, JI. Jaccard index, C. citation
**Figure legends**

Fig. 1 Map of the study area
Fig. 2 Precipitation and temperature of the study area
Fig. 3 Life form distribution pattern of the reported plant species in the study area
Fig. 4 Family contribution of medicinal flora in the study area
Fig. 5 Plant parts used in herbal recipes
Fig. 6 Method of preparation of herbal recipes
Fig. 7 Informant consensus factor of diseases with use reports and total number of species used.

Ntax, total species used by all the informants for group of ailments; UR, total number of use reports in each group of disease; ICF, informant consensus factor; MTD, Mouth-Throat Diseases; EED, Eye and Ear Diseases; D, Diabetes; RD, Respiratory diseases; MJD, Muscular and Joint Diseases; DLS, Digestive system and Liver diseases; SD, Skin diseases; CSD, Circulatory system diseases; URD, Urinary and Reproductive system diseases; F, Fever; C, Cancer; HP, Hair problems; NSD, Nervous System Disorders; BLSD, Blood and Lymphatic system diseases; A, Antidotes; O, Others

Fig. 8 Top ranked plant species with above 80% fidelity
Fig. 1 Map of the study area
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| Disease categories | Ntax | Nur | ICF |
|-------------------|------|-----|-----|
| MTD               |      |     |     |
| EED               |      |     |     |
| D                 |      |     |     |
| RD                |      |     |     |
| MJD               |      |     |     |
| DLS               |      |     |     |
| SD                |      |     |     |
| CSD               |      |     |     |
| URD               |      |     |     |
| F                 |      |     |     |
| C                 |      |     |     |
| HP                |      |     |     |
| NSD               |      |     |     |
| BLSD              |      |     |     |
| A                 |      |     |     |
| O                 |      |     |     |

Fig. 7 Informant consensus factor of diseases with use reports and total number of species used.

Key: Ntax, total species used by all the informants for group of ailments; UR, total number of use reports in each group of disease; ICF, informant consensus factor; MTD, Mouth-Throat Diseases; EED, Eye and Ear Diseases; D, Diabetes; RD, Respiratory diseases; MJD, Muscular and Joint Diseases; DLS, Digestive system and Liver diseases; SD, Skin diseases; CSD, Circulatory system diseases; URD, Urinary and Reproductive system diseases; F, Fever; C, Cancer; HP, Hair problem; NSD, Nervous System Disorder; BLSD, Blood and Lymphatic system diseases; A, Antidotes; O, Others
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