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Sustainability Issues in Conservation of Traditional Medicinal Herbs and Their Associated Knowledge: A Case Study of District Lahore, Punjab, Pakistan

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Abstract: Due to modernization and urbanization, traditional medicinal herbs and their associated knoweldge are under peril of being lost. The current study not only aimed to document the trend of herbal medicinal plant uitlization in District Lahore, Punjab, Pakistan, but also raised alarming concerns about the conservation of these medicinal herbs and traditional knowledge linked to them. The data were collected from local people, herbalists, and gardeners by using standard ethnobotanical methods, i.e., questionnaires and interviews. Results reported that a lower number of informants possessed medicinal herb knowledge and reported only 50 medicinal herbs from the study area. This is probably due to the impact of speedy industrilaization and alterations in human life patterns in the study area. Not only the traditional knowledge is under threat but also the medicinal herbs themselves. Most of the reported medicinal herbs were rare (45.10%), while only few (9.80%) were ranked as abundant in the study area. The herbs with more medicinal importance are mostly rare. This is because of their over usage by the local people. Both conservation approaches (in situ and ex situ conservation and cultivation practices) and resource management (good agricultural practices and sustainable use solutions) should be adequately taken into account for the sustainable use of medicinal plant resources.

Keywords: impact of modernization and urbanization; traditional knowledge; rare herbs; abundant herbs; medicinal herbs

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1. Introduction

About 75–80% of the population of the world is still using herbal medicines for treating different diseases [1]. As per the World Health Organization, 74% of 119 current plant-based pharmaceutical drugs are utilized in approaches that directly correlated with their conventional uses [2]. This is due to the fact that herbal drugs and preparations of traditional herbal medicine have been used for thousands of years because they are locally available, have a natural origin, and are cheap and without any side effects [3,4]. Medicinal herbs consist of numerous biologically vital elements. A vast variety of medicinally effective herbs are used in herbal drug treatments, and they are as effective or efficient as modern allopathic drugs [5]. Pakistan is the seventh highest producer of medicinal plants. In Pakistan, approximately 600 species are utilized as conventional medicine, and most

of the population, above 75%,depend upon the curative herbs for their wellness. The medicinally important flora is widely used in the production of drugs, edibles, beauty products, and food supplements [6]. "Pansar" is a regional market network in Pakistan that particularly handles medicinally vital herbs, including their import and export [7]. Around 50,000 Ayurvedic experts, tabibs, and numerous unregistered health specialists are working in rural and urban areas and commonly utilize approximately 200 species in natural medication. Universities, botanical gardens, and the National Council for Tibb, Hamdard, and Qarshi industries aid in establishing and maintaining the herbal industry in Pakistan. Around 4000 registered herbal products are available in Pakistan [8].

Because of the increasing demand for herbal drugs, natural health products, and secondary metabolites of medicinal plants, the utilization of medicinal plants is growing rapidly throughout the world [9,10]. This exerts a certain pressure on the conservation of these natural resources. According to an estimate, 90% of these medicinal plants are harvested from wild resources in Europe, and only small numbers are sustainably cultivated [11]. Another estimate states that Earth is losing at least 1 potential major drug every 2 years, which is 100 and 1000 times higher than the expected natural extinction rate [12]. The International Union for Conservation of Nature and the World Wildlife Fund stated that, among 50,000 to 80,000 flowering medicinal plant species, about 15,000 species are threatened with extinction from overharvesting and habitat destruction [13] and 20% of their wild resources have already been nearly exhausted with the increasing human population and plant consumption [14]. Other contributing factors of this biodiversity loss are climate change [15] and urbanization or industrialization in the modern era [16]. Rapid urbanization has profoundly affected agricultural production activities [8] and caused dramatic changes in land use [17,18]. Especially in metropolitan areas, the amount of farmland and production capacity has continued to decline [19]. Since the beginning of this century, the wave of urbanization has further swept through developing countries [20]. Although this threat has been known for decades, the accelerated loss of species and habitat destruction worldwide has increased the risk of extinction of medicinal plants, especially in China [10,21], India [15,22], Kenya [22], Nepal [22], Tanzania [23], and Uganda [23].

The current study was focused on the medicinal plant conservation issues inhabiting District Lahore, Pakistan. We hypothesized that medicinal herbs and their associated traditional knowledge in this region are under threat of being lost. Therefore, the specific objective was (1) to identify medicinal herbs and their relevant traditional knowledge in the study area and (2) to estimate their relative abundance with relation to conservation status. The findings of the current study will contribute to identifying potential risks to the herbal flora of the study area and can contribute to mitigation strategies in future research.

2. Materials and Methods

2.1. Study Area

Lahore is the capital of province Punjab and considered as the second largest city of Pakistan. It lies between 31°15′–31°45′ N and 74°01′–74°39′ E and is surrounded on the north and west by the Sheikhupura district, Kasur district, and Wagha (Figure 1). River Ravi flows in its northern side. Its total area is around 1014 km^2. Here, the climate is hot and semi-arid with extremely hot summer seasons. Sometimes, the temperature exceeds 50 °C during summer. In May and June, the humidity is about 50%. For the collection of data about ethnomedicinal herbs, six different sites (Jallo Park (n = 37), Jinnah Garden (n = 26), Punjab University botanical garden (n = 6), Government College botanic garden (n = 9), Lahore College botanic garden (n = 4), and Race Course Park (n = 13)) were selected. Population sample size varied from location to location, depending upon the number of professionals and knowledgeable inhabitants from that area. These sites were selected because of their thick vegetation and availability of diverse wild and cultivated herb flora.

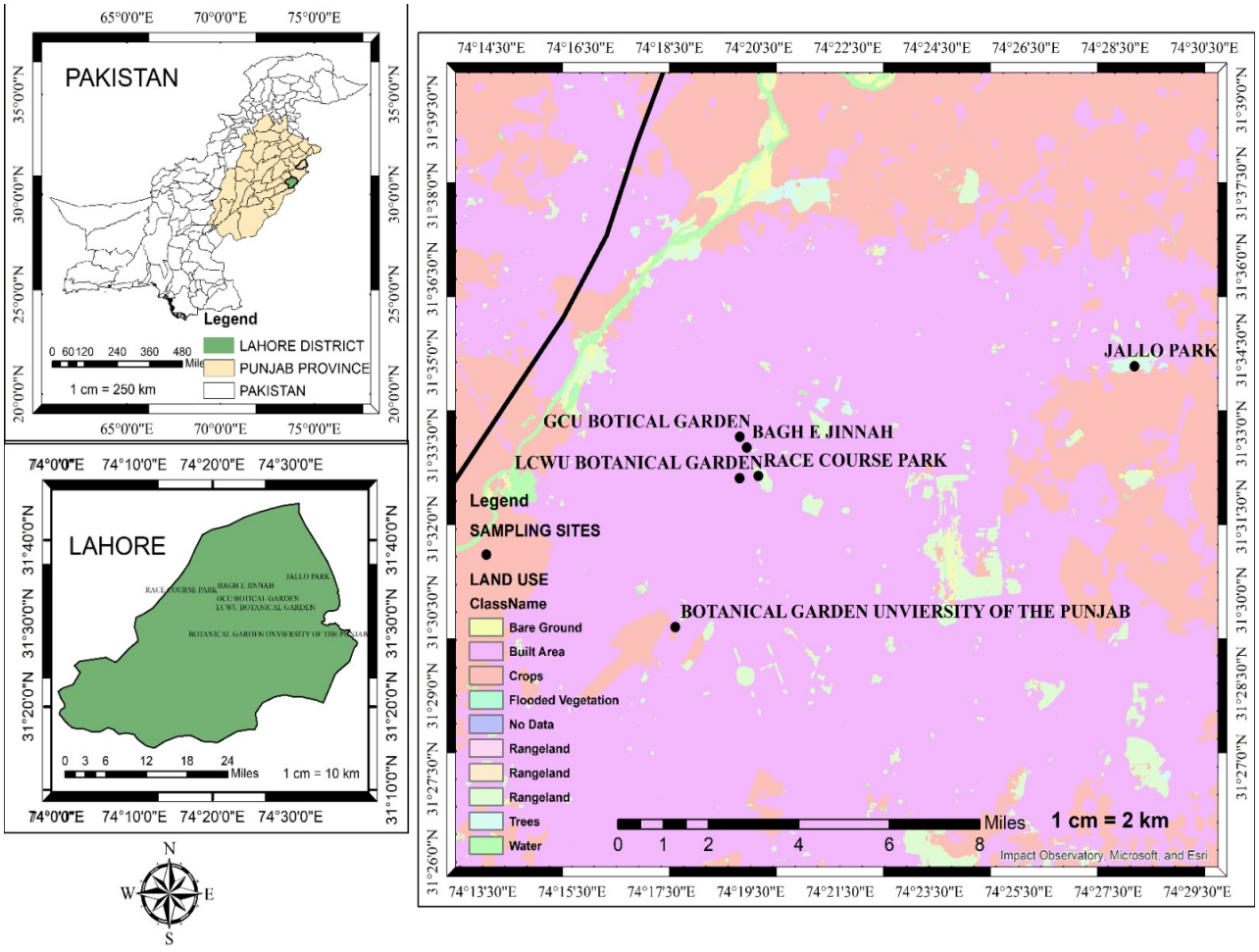

Figure 1. Map of Lahore showing the selected sites of data collection.

2.2. Ethnobotanical Inventory and Specimen Identification

During the first phase of our survey, data were collected from gardeners about growing season, habitat, flowering type, and leaf structure of herbs. During the second phase, data about medicinal importance of herbs were collected from herbalists and common people. However, prior to this data collection, formal written ethical consent was obtained from the local government authorities (Parks and Horticulture authority). Ethical guidelines of the International Society of Ethnobiology (http://www.ethnobiology.net, accessed on 31 May 2020) were strictly followed. The ethical review committee of Lahore College for Women University also provided ethical approval to the study (Permit # ERC. LCWU#125). In addition, individual consent from each informant was also taken to assure their willingness to participate. All data were collected between the months of June and September 2020 from selected cites of Lahore. Informants were selected by using a snowball sampling technique. In this method, one skillful and knowledgeable informant identifies the other informant, and so on. This method is advantageous, as it avoids wastage of time from interviewing less knowledgeable persons. A semi-structured interviewing technique was used to collect data according to the method proposed by Cotton [24] and Martin [25]. The questionnaire used in the survey was prepared following the study of Pardo-de-Santayana [26], with a few modifications. The following questions were included in the questionnaire: (1) List names of local herbs that are found to be medicinally important. (2) What are the certain ethnomedicinal uses of the listed herbs? (3) Which part of the plant is ethnomedicinally significant? (4) List any other economical uses of the documented herbs.

During the data collection, plant specimens were also collected with the permission of local chief officers of the visited gardens. Formal identification of each herb specimen was

made by well-known taxonomist Prof. Dr. Mushtaq Ahmad and Muhammad Zafar from Quaid i Azam University, Islamabad. However, for authentication, later, these specimens were also morphologically compared with the available specimens in the herbariums of Quaid i Azam University, Islamabad and Lahore College for Women University, Lahore. In addition to these two herbaria, some plant databases available online, such as flora of Pakistan (http://www.efloras.org/index.aspx, accessed on 31 December 2020) and flora of India (https://sites.google.com/site/efloraofindia/, accessed on 31 December 2020), and some other herbal flora identification keys [27,28] were consulted for identification of certain species. After identification, specimens were allotted their voucher numbers and then submitted to the botany herbarium of Lahore College for Women University (LCWU).

2.3. Relative Abundance

The most generally utilized strategy of visual appraisal was utilized for measuring the relative abundance (RA) of ethnobotanically enrolled grass species in the contemplated region [29]. In this technique, numbers of plots haphazardly were chosen in the contemplated region, and the presence of each recorded species was checked and recorded. A short time later, rate relative abundance was computed by utilizing the accompanying equation:

$$\text{RA of species} = (\text{total percentage cover of species in all plots})/(\text{number of estimated plots}) \times 100$$

The species were then grouped into different categories, i.e., abundant, common, frequent, occasional, and rare (ACFOR), by using relevant scales of abundance (Table 1).

Table 1. Abundance categories and scale of reported grasses.

Abundance Scale	Abundance Categories	Coverage of Grass Species
+	Rare (R)	<5%
1	Occasional (O)	5–20%
2	Frequent (F)	20–50%
3	Common (C)	50–90%
4	Abundant (A)	90–100%

2.4. Data Analysis

The entirety of the enlisted data were examined by using some parameters such plant species, plant part, families, and way of utilization; however, documented ethnobotanical uses were analyzed with the use of quantitative ethnobotanical inventories such as the following.

2.4.1. Relative Frequency of Citation (RFC)

RFC calculates the relative importance of every species of plant on the basis of informants' number for each species and the number of total informants interviewed in the whole study. RFC can be calculated by dividing "FC" by the total number of informants in the study (N), as proposed by Yaseen et al. [30] and Vitalini et al. [31].

$$RFC = FC/N$$

FC is the number of citations and indicates the informant number, which was interviewed for a certain species. This index ranges from 0 (zero), if no one reported the plant species useful, to 1 (one) in the condition that there are a maximum number of informants that found the plant species useful [8].

2.4.2. Use Value (UV)

UV indicates the relative importance of each species based on recorded uses of them. It was calculated by the formula used by Logan [32].

$$UV = U/n$$

"U" stands for the number of uses of each species and "n" is referred to as the informant number who documented the plant species.

2.4.3. Relative Importance (RI)

RI is the importance of every plant species depending on the number of uses of each plant species and body organ systems that can be treaded through them. It was calculated by the formula used by Bennett and Prance [33].

$$RI = (R.Ph + R.BS) \times 100/2$$

"R.Ph" is the relative pharmacological properties and "R.BS" stands for relative body systems treated. The "R.Ph" was calculated through dividing the number of uses by the maximum number of use reports in the entire study. The "R.BS" was calculated though dividing the total body systems that were treated by a plant by the total number of body systems in the entire study.

2.4.4. Fidelity Level (FL)

FL is the priority of a plant species over other species and its specific use. It determines the specificity of treated disease by plant species. It was determined by using the formula used by Khan et al. [34].

$$FL = (Ip/Iu \times 100)$$

Here, the informants' number is denoted by "Ip", and "Iu" represents the total number of informants who shared their knowledge about all uses of a given plant species.

2.4.5. Informant Consensus Factor (ICF)

ICF determines the consensus of all informants about the use of a certain plant in treating different diseases [35]. It was calculated by using the formula mentioned below;

$$ICF = Nur - Nt \div Nur - 1$$

"Nur" represents the total number of use reports of a certain disease that can be treated by a plant species and "Nt" determines the total number of taxa of plants used in treating different diseases [10].

2.4.6. Cluster Analysis and Descriptive Statistics

For the purpose of preparing high- and low-priority groups of medicinally important herbs, SPSS 22 software was used to apply "Hierarchical Cluster Analysis" on RFC value. Descriptive statistical analysis was also used to find out different parametric associations of the survey.

2.4.7. Graphical Illustrations

For the graphical illustration of data, Microsoft Excel was used.

3. Results

3.1. Demography of Local Inhabitants

A total 95 informants were interviewed during the study. It was observed that most of the informants were males (78%) and only 22% were females. All informants of the study were divided into three groups on the basis of age, i.e., young-, middle-, and old-aged (Table 2). Among the reported informants, the highest numbers of informants were regarded as old-aged (52%), followed by middle- (27%) and young-aged informants (21%). The maximum number of informants was herbalist (11% female, 31% males), followed by common people (8% females and 25% males) and gardeners (3% females, 22% males). Concerning informants' education, a high literacy rate was reported (Figure 2). Most of the informants had at least matriculation.

Table 2. Demography of informants of all the study areas.

Type of Informant	Young-Aged 25–35 Years	Middle-Aged 36–50 Years	Old-Aged 51 Years and Above	Total	Percentage %
Herbalist (female)	2	4	4	10	11
Herbalist (male)	5	13	11	29	31
Common people (female)	1	3	4	8	8
Common people (male)	9	6	9	24	25
Gardener (female)	0	1	2	3	3
Gardener (male)	0	2	19	21	22
Total informants	20	26	49	95	
Percentage %	21	27	52		

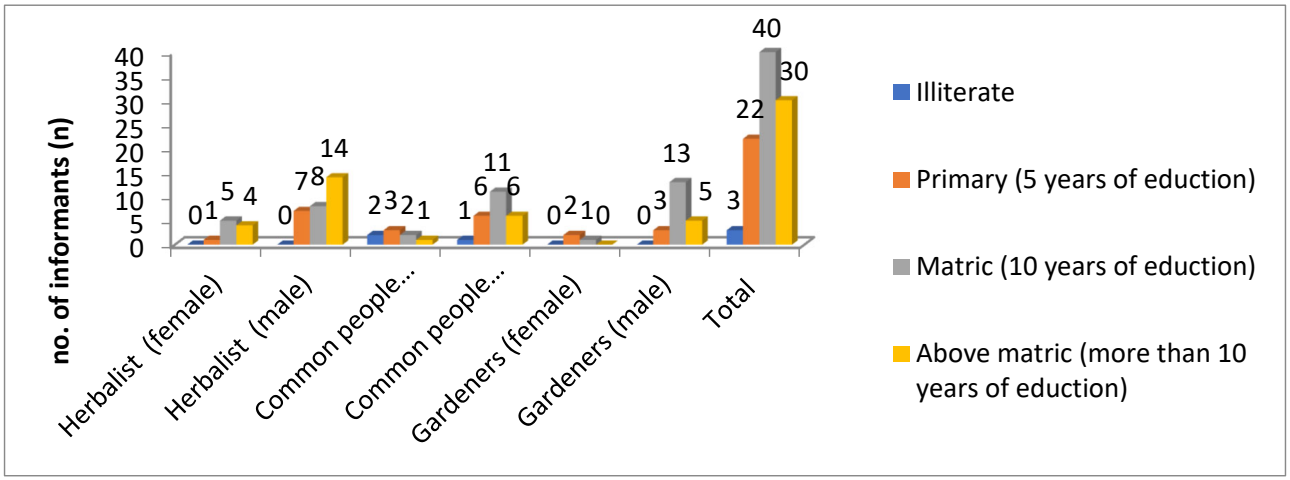

Figure 2. Education dynamics of informants.

3.2. Ethnobotanical Data on Medicinal Herb Diversity

A total of 50 plant species belonging to 27 families collected from different sites were reported as having ethnomedicinal uses (Table 3a) (Figure 3). Asteraceae had the maximum number of herb species (5) followed by Solanaceae (4) and Fabaceae (3) (Figure 4). In our study, 26 plant species showed high versatility in their uses. The plant species having more than six uses are *Achyranthus asper*, *Aloe vera*, *Anagallis arvensis*, *Asparagus racemosus*, *Calendula arvensis*, *Cannabis sativa*, *Conyza bonariensis*, *Coriandrum sativum*, *Cyperus rotundus*, *Datura inoxia*, *Dysphania ambrosioides*, *Elletaria cardamom*, *Euphorbia hirta*, *Lactuca sativa*, *Mamordica charantia*, *Mentha piperita*, *Mimosa pudica*, *Ocimum basilicum*, *Rumex dentatus*, *Solanum melongena*, *Solanum xanthocarpum*, *Sonchus asper*, *Utrica dioica*, and *Zingiber officinale*. These commonly used species are gastronomic herbs. In our study, gastrointestinal diseases were the most commonly treated disorders (57 reports), followed by urogenital disorders (44 reports) and cardiovascular disorder (26 reports).

3.3. Relative Abundance of all Listed Herb Species

According to the results, most of the reported herb species are rare in all the study areas (45.10%), while the abundant species are less in number (9.80%) (Figure 5). The species with more medicinal importance are mostly rare. This is because of their over usage by the local people.

Table 3. (**a**) Ethnobotanical inventory of medicinal herbs. (**b**) Quantitative analysis of ethnomedicinal data.

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Amaranthaceae	LCWU-0824	*Achyranthus asper*	Putkhanda, Devil's Horsewhip	This plant is used in the treatment of amenorrhea, abortion, hemorrhage, post-partial body aches, fever, labor pain, fever, and dysmenorrhea. It can also be used as a laxative and for vomiting, fever, treatment of piles, stomach pain, carminative purposes, and heart disease	Not reported	Rare
Asteraceae	LCWU-0825	*Agerantum conyzoides*	Goats weed, chick weed	Can be used in the treatment of diarrhea and cough	Not reported	Rare
Malvaceae	LCWU-0826	*Alcea rosea*	Hollyhock	It is a laxative used to control inflammation. It can be used to treat a sore throat and respiratory diseases. In herbalism, this plant can be used as an emollient	Used for ornamental purposes and as mouthwash	Rare
Liliaceae	LCWU-0827	*Aloe vera*	Aloe	Aloe vera is used for treating diabetes, arthritis, piles, stomach disorders, urinary infections, liver disorders, asthma ulcers, and wound healing and also has the ability to fight against cancer	Aloe vera is added to other ingredients to make soaps and masks	Rare
Amaranthaceae	LCWU-0828	*Amaranthus viridus*	Green amaranth	Its leaves are purgative and used to treat different kinds of orchitis	Not reported	Abundant
Primulaceae	LCWU-0829	*Anagallis arvensis*	Red chickweed	It has wound healing properties. It helps in dealing with diseases of the brain, respiratory disorders, gastrointestinal complaints, liver disorder, acne, eczema, and fever. It can be used as a diuretic, diaphoretic, and expectorant. The leaves of this plant are used in the treatment of epilepsy, and the juice of this plant has been shown to help with obstruction of liver and spleen	Not reported	Occasional
Myrsinaceae	LCWU-0830	*Anagallis foemina*	Poorman's Weatherglass	Can be used in cases of high blood pressure, digestive disorders, and the treatment of wounds	Not reported	Occasional
Asparagaceae	LCWU-0831	*Asparagus densi-florussprengera*	Asparagus fern	Can be used ethnomedicinally for treating several disorders related to the kidney and liver, and it can also be utilized in the treatment of urinary infections	Not reported	Occasional

Table 3. *Cont.*

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Asparagaceae	LCWU-0832	*Asparagus racemosus*	Shatavari	This plant helps in relieving pain. It lowers the rate of anxiety and can be used for different stomach disorders. It stimulates the breast milk, and it may be more effective for uterine bleeding and also in premenstrual syndrome. It helps in the treatment of gastric ulcers. The root of *Asparagus racemosus* in Ayurveda has been used for curing of dysentery and diarrhea	Not reported	Rare
Urticaceae	LCWU-0833	*Boehmera nivea*	China grass	This plant may be recommended in threat of abortion and in swelling pains	Not reported	Rare
Asteraceae	LCWU-0834	*Calendula arvensis*	Field marigold	This plant can be used for acne problems. It reduces inflammation. It gives soothing effects to the irritated tissues. It can also be used in cases of constipation and stomach ulcers. It can also be used as an eye wash and for diaper rashes. Its cream can be used for the treatment of piles. In herbalism, *Calendula* tincture is used for the treatment of acne	Not reported	Rare
Cannabaceae	LCWU-0835	*Cannabis sativa*	Marijuana	This plant can be used for female reproductive disorders, malaria, constipation, and chronic pain	Not reported	Abundant
Apocynaceae	LCWU-0836	*Catharanthus roseus*	Periwinkle	This plant is used for diabetes, stomach problems, asthma, and cancer. The extracts from this plant are used against many diseases, including malaria and Hodgkin's lymphoma, as well as treating dysentery	Not reported	Rare
Convolvulaceae	LCWU-0837	*Convolvulus arvensis*	Field bindweed	This herb is used to increase the appetite, curing constipation. It is used in medicine as a diuretic	Not reported	Common
Asteraceae	LCWU-0838	*Conyza bonariensis*	Hairy horseweed	Helps in the treatment of gastrointestinal disorder, dysentery, and diarrhea. It is helpful in the treatment of bleeding hemorrhoids. It is used for the treatment of inflamed tonsils and inflammation of the throat. It can also be used for fever and muscular pains or muscular weakness. It contains antioxidant, antimicrobial, antiviral, and anti-inflammatory activity	Not reported	Rare
Apiaceae	LCWU-0839	*Coriandrum sativum*	Dhania	It is effective for headaches, skin diseases, eyes disorders, loss of memory, fits, convulsions, diarrhea, loss of appetite, indigestion, and abdominal pain. It is most effective for cough, respiratory disorders, and colds. *Coriandrum sativum* is a traditional medicine that is used for the treatment of diabetes	Not reported	Rare

Table 3. *Cont.*

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Brassicaceae	LCWU-0840	*Coronopus didymus*	Lesser swinecress	This herb is antipyretic and hepatoprotective	Not reported	Common
Cyperaceae	LCWU-0841	*Cyperusrotundus*	Nut grass	This herb is used for the treatment of diarrhea, fever, stomach aches, digestive disorders, and stomach pain. This herb may also be used for treating wounds, inflammation, and nausea.	Not reported	Occasional
Solanaceae	LCWU-0842	*Datura inoxia*	Thorn-apple	It may be used for broken joints. It may also be very helpful for treating diarrhea, toothaches, or asthma. All parts of the *Datura inoxia* mill are antispasmodic, anodyne, hypnotic hallucinogenic, hypnotic, and narcotic. It has also been used in the past as a pain killer and in the treatment of mental illness, fevers with catarrh, and skin disease	Not reported	Rare
Apiaceae	LCWU-0843	*Daucus carota*	Wild carrot	This is used in bladder problems, ulcers, liver disorders, cancer, bad wounds, itching, and colic. It may also be used for stomach complaints. This plant can be used in cardiac disease, diabetes, and renal disease	Not reported	Rare
Chenopodiaceae	LCWU-0844	*Dysphania ambrosioides*	Wormseed	This plant is used for the treatment of malaria, asthma, and catarrh. It is used to treat wounds and sores. It cleans the womb after childbirth and is used to benefit the pancreas. This plant shows antimicrobial activity as well	Not reported	Occasional
Zingiberaceae	LCWU-0845	*Elletaria cardamom*	Chotielaichi	Use of this herb improves the appetite and gives soothing effects to the mucous membrane. It may also be used for digestive ailments. It may help in treating sore throat and influenza, cough, asthma, and fever. *cardamom* is a renowned herb for the relief of nausea, particularly morning illness in pregnancy	Not reported	Rare
Euphorbiaceae	LCWU-0846	*Euphorbia hirta*	Basridudhi	It helps in treating asthma, fever, malaria, diarrhea, and swelling. It may remove skin diseases and gives a relaxant effect on respiration. *Euphorbia hirta* is also used traditionally for female diseases, respiratory ailments (coryza, asthma, cough, bronchitis), worm infestations in children, dysentery, jaundice, pimples, gonorrhea, digestive problems, and tumors	Not reported	Occasional
Euphorbiaceae	LCWU-0847	*Euphorbia helioscopia*	Sun spurge	This plant has anti-cancerous properties. It may help in treating cholera	Not reported	Common

Table 3. *Cont.*

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Euphorbiaceae	LCWU-0848	*Euphorbia prostrate*	Prostrate sandmat	It helps in treating bleeding piles. It is used as an anti-inflammatory agent	Not reported	Common
Papaveraceae	LCWU-0849	*Fumaria indica*	Dhukure	This herb is used for pains, diarrhea, liver disorders, and skin diseases	Not reported	Abundant
Papaveraceae	LCWU-0850	*Fumaria parviflora*	Fine leaf fumitory	It is an effective drug for fever. It may also help in treating skin diseases, diarrhea, and urinary disorders. It helps in purifying blood and in stomach treatment	Not reported	Rare
Asteraceae	LCWU-0851	*Lactuca sativa*	Lettuce	It is useful for chronic bronchitis and used for relieving inflammation, the treatment of cough, and relieving painful ulcers. It is helpful in the treatment of fever and typhoid. This plant is also used in the treatment of diabetes, cardiac disease, and renal disease	Not reported	Common
Malvaceae	LCWU-0852	*Malvestrum tricuspidatum*	Balu	It is used for sores and in dysentery. It helps in relieving swelling	This herb is used for cleaning wounds	Abundant
Cucurbitaceae	LCWU-0853	*Mamordica charantia*	Karela	It is used in wound healing and skin-related problems, it normalizes the digestive tract, and it suppresses women's infestation. It helps in regulating the urinary tract. It helps in maintaining the sugar level of the body and is used in cases of diabetes	Not reported	Rare
Scrophulariaceae	LCWU-0854	*Mazus japonicas*	Japanese mazus	It is used as a laxative. It reduces fever	Not reported	Common
Fabaceae	LCWU-0855	*Medicagodenticulata*	Bur clover	It is used as a laxative. It controls the excessive growth of organs	This plant can be used as fodder, firewood, medicine, and handicrafts, as well as for other purposes	Abundant
Fabaceae	LCWU-0856	*Melilotus alba*	Bokhara clover	It is used to treat inflammation, either internal or external. It may help in treating stomach disorders such as ulcers	This plant can be used as fodder	Common
Lamiaceae	LCWU-0857	*Mentha longifolia*	Chittaponda	It is antiseptic, a stimulant, and anti-inflammatory. It is used in stomach disorders	Not reported	Rare
Lamiaceae	LCWU-0858	*Mentha piperita*	Peppermint	It is used in the treatment of digestive disorders, nausea, colic, and vomiting. It reduces chronic joint pain. It can be used for toothaches. It is effective for bronchitis, constipation, diarrhea, mumps virus, and heart burn	Essential oil of peppermint is used in fragrances and pharmaceuticals	Rare

Table 3. *Cont.*

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Fabaceae	LCWU-0859	*Mimosa pudica*	Touch me not	It is used in the treatment of dysentery, uterine complaints, inflammation, asthma, burning sensation, and blood diseases. It may also be used in treating piles, fever, and jaundice. In China, *Mimosa pudica* is used to relieve pain	Not reported	Occasional
Lamiaceae	LCWU-0860	*Ocimumbasilicum*	Niazboo	It is used for cough, vomiting, and nausea. It helps in the treatment of earaches and dullness of hearing. It is used for ulcers and in rheumatic pain. It may also be used in the treatment of eye diseases and constipation. It is used in the treatment of piles, diarrhea, and dysentery	Not reported	Common
Oxalidaceae	LCWU-0861	*Oxalis corniculata*	Khatmit	It can be used for treating diarrhea, swelling, and abdominal diseases. It is effective for fever, headache, ulcers, piles, and skin diseases	The foliage of wood sorrel is quite suitable for eating	Occasional
Asteraceae	LCWU-0862	*Parthenium hysterophorus*	Star weed	It may be helpful in treating several skin disorders. This plant contains a large group of compounds with anti-inflammatory properties that relieves gastrointestinal distress	Not reported	Occasional
Asteraceae	LCWU-0863	*Picrise chioides*	Bristly oxtongue	This Picrisechioides may be used for healing wounds, burns, and boils	Not reported	Rare
Polygonaceae	LCWU-0864	*Rumex dentatus*	Jangalipalak	It has anti-bacterial activity. It is a diuretic and demulcent. It gives soothing effects on the irritated parts of the skin. *Rumex dentatus* L. (Plygonaceae) extracts were estimated for antifungal, cytotoxic, antibacterial, allopathic, and antitumor potential	Not reported	Frequent
Brassicaceae	LCWU-0865	*Sisymbrium irio*	London rocket	It is used to treat asthma and measles. It may be used for cleaning eyes. It may help in treating different disorders related to the throat and chest. This plant is also used as an antipyretic	Not reported	Occasional
Solanaceae	LCWU-0866	*Solanum melongena*	Eggplant	It gives a cooling effect to eyes and is used for curing cholera, diabetes, bronchitis, dysentery, toothache, skin infections, and hemorrhoids. It may also be used for asthma and anti-rheumatic purposes. It is used as a symbol of protection, good health, and female fertility	Not reported	Rare
Solanaceae	LCWU-0867	*Solanum nigram*	Mako	It is used for fever, skin problems, and tumors. Rubbing the seeds on the cheeks can remove freckles. Its fruit has been used in diabetes. It is also helpful in healing wounds and cancerous sores	*S. nigrum* has been extensively used as a foodstuff	Occasional

Table 3. *Cont.*

(**a**)

Family	Voucher No.	Botanical Name	Common Names	Ethnomedicinal Uses	Other Uses	Abundance
Solanaceae	LCWU-0868	*Solanum xanthocarpum*	Yellow-berried nightshade	It may be used for different skin diseases, inflammations, and fever. It may be effective for asthma, cough, back pain, piles, and kidney stones. In Ayurveda, this plant is used for treating asthma, bronchitis, heart disease, thirst, lumbago, and piles	*S. nigrum* has been extensively used as a foodstuff	Rare
Asteraceae	LCWU-0869	*Sonchus asper*	Prickly sow	It is used in the treatment of wounds, asthma, bronchitis, infections, and malarial disease. It may also be used for gastrointestinal infections. It can also be used for the detection of anti-microbial activities. Its extract shows anti-fungal and anti-bacterial activity. This plant is used for curing skin diseases	Not reported	Rare
Commelinaceae	LCWU-0870	*Tradescantia pallida*	Purple queen	It has several uses including the treatment of several diseases such as asthma and bronchitis	Not reported	Occasional
Urticaceae	LCWU-0871	*Utrica dioica*	Stinging nettle	It may be used for the treatment of piles, gout, anemia, and different skin complaints and allergies. It is also very effective for arthritis, insect bites, inflammation, and curing different hair problems. *Urtica dioica* herbs have been used for the treatment of disorders of the kidneys and urinary tract, the locomotor system, skin, the gastrointestinal tract, hemorrhage, the cardio-vascular system, flu, rheumatism, and gout	This herb is also used in shampoo to control dandruff and make hair more glossy	Occasional
Fabaceae	LCWU-0872	*Viciaf aba*	Bell beans	It may be used in the treatment of obesity. It may be used as a tonic. It may be used as a diuretic and in fever, cough, vomiting, and sore throat. This herb is also used for culinary purposes	This herb is also used in shampoo to control dandruff and make hair more glossy	Rare
Zingiberacae	LCWU-0873	*Zingiber officinale*	Adarak	It may be used for fever, cold, constipation, nausea, inflammation, joint and muscle pain, heart burn, and arthritis. It may be used for menstrual disorder. It may be effective for vomiting and asthma attacks	It may be used as a tonic	Rare

(**b**)

Family	Voucher No	Botanical Name	Abundance	FC	RFC	UV	RI
Amaranthaceae	LCWU-0824	*Achyranthus asper*	Rare	31	0.32	0.61	24.4
Asteraceae	LCWU-0825	*Agerantum conyzoides*	Rare	29	0.3	0.06	11.45

Table 3. *Cont.*

(**b**)

Family	Voucher No	Botanical Name	Abundance	FC	RFC	UV	RI
Malvaceae	LCWU-0826	*Alcea rosea*	Rare	13	0.2	0.46	17.35
Liliaceae	LCWU-0827	*Aloe vera*	Rare	15	0.36	0.6	23.25
Amaranthaceae	LCWU-0828	*Amaranthus viridus*	Abundant	33	0.34	0.06	11.8
Primulaceae	LCWU-0829	*Anagallis arvensis*	Occasional	21	0.28	0.61	23.71
Myrsinaceae	LCWU-0830	*Anagallis foemina*	Occasional	33	0.34	0.09	22.87
Asparagaceae	LCWU-0831	*Asparagus densiflorussprengera*	Occasional	21	0.22	0.14	11.68
Asparagaceae	LCWU-0832	*Asparagus racemosus*	Rare	18	0.31	0.5	34.36
Urticaceae	LCWU-0833	*Boehmera nivea*	Rare	22	0.23	0.13	17.34
Asteraceae	LCWU-0834	*Calendula arvensis*	Rare	19	0.26	0.52	12.26
Cannabaceae	LCWU-0835	*Cannabis sativa*	Abundant	34	0.35	0.11	17.7
Apocynaceae	LCWU-0836	*Catharanthus roseus*	Rare	18	0.19	0.5	17.7
Convolvulaceae	LCWU-0837	*Convolvulus arvensis*	Common	34	0.35	0.08	11.11
Asteraceae	LCWU-0838	*Conyza bonariensis*	Rare	17	0.18	0.82	23.83
Apiaceae	LCWU-0839	*Coriandrum sativum*	Rare	25	0.37	0.52	29.38
Brassicaceae	LCWU-0840	*Coronopus didymus*	Common	39	0.41	0.05	11.57
Cyperaceae	LCWU-0841	*Cyperus rotundus*	Occasional	21	0.27	0.52	12.49
Solanaceae	LCWU-0842	*Datura inoxia*	Rare	17	0.18	0.9	18.5
Apiaceae	LCWU-0843	*Daucus carota*	Rare	21	0.32	0.47	17.81
Chenopodiaceae	LCWU-0844	*Dysphania ambrosioides*	Occasional	12	0.12	0.67	17.58
Zingiberaceae	LCWU-0845	*Elletaria cardamom*	Rare	27	0.33	0.48	23.71
Euphorbiaceae	LCWU-0846	*Euphorbia hirta*	Occasional	36	0.37	0.69	25.1
Euphorbiaceae	LCWU-0847	*Euphorbia helioscopia*	Common	13	0.14	0.3	6.01
Euphorbiaceae	LCWU-0848	*Euphorbia prostrate*	Common	18	0.19	0.11	11.34
Papaveraceae	LCWU-0849	*Fumaria indica*	Abundant	38	0.4	0.07	11.91

Table 3. *Cont.*

(**b**)

Family	Voucher No	Botanical Name	Abundance	FC	RFC	UV	RI
Papaveraceae	LCWU-0850	*Fumaria parviflora*	Rare	18	0.25	0.45	23.14
Asteraceae	LCWU-0851	*Lactuca sativa*	Common	15	0.16	0.4	22.91
Malvaceae	LCWU-0852	*Malvestrum tricuspidatum*	Abundant	40	0.42	0.08	11.91
Cucurbitaceae	LCWU-0853	*Mamordica charantia*	Rare	14	0.19	0.5	28.58
Scrophulariaceae	LCWU-0854	*Mazus japonicas*	Common	29	0.31	0.06	17.35
Fabaceae	LCWU-0855	*Medicagodenticulata*	Abundant	43	0.45	0.04	6.01
Fabaceae	LCWU-0856	*Melilotus alba*	Common	27	0.28	0.07	11.686
Lamiaceae	LCWU-0857	*Mentha longifolia*	Rare	41	0.43	0.09	17.58
Lamiaceae	LCWU-0858	*Mentha piperita*	Rare	18	0.37	0.61	12.36
Fabaceae	LCWU-0859	*Mimosa pudica*	Occasional	20	0.27	0.5	17.81
Lamiaceae	LCWU-0860	*Ocimum basilicum*	Common	25	0.43	0.52	23.71
Oxalidaceae	LCWU-0861	*Oxalis corniculata*	Occasional	15	0.16	0.6	23.25
Asteraceae	LCWU-0862	*Parthenium hysterophorus*	Occasional	21	0.22	0.71	12.836
Asteraceae	LCWU-0863	*Picrise chioides*	Rare	3	0.03	0.46	6.47
Polygonaceae	LCWU-0864	*Rumex dentatus*	Frequent	16	0.17	0.5	11.91
Brassicaceae	LCWU-0865	*Sisymbrium irio*	Occasional	46	0.47	0.57	11.57
Solanaceae	LCWU-0866	*Solanum melongena*	Rare	31	0.4	0.41	12.14
Solanaceae	LCWU-0867	*Solanum nigram*	Occasional	21	0.22	0.36	18.27
Solanaceae	LCWU-0868	*Solanum xanthocarpum*	Rare	34	0.46	0.44	24.17
Asteraceae	LCWU-0869	*Sonchus asper*	Rare	26	0.4	0.46	12.26
Commelinaceae	LCWU-0870	*Tradescantia pallida*	Occasional	47	0.49	0.42	5.78
Urticaceae	LCWU-0871	*Utrica dioica*	Occasional	29	0.3	0.62	29.73
Fabaceae	LCWU-0872	*Viciaf aba*	Rare	13	0.14	0.61	12.03
Zingiberacae	LCWU-0873	*Zingiber officinale*	Rare	16	0.06	0.68	23.48

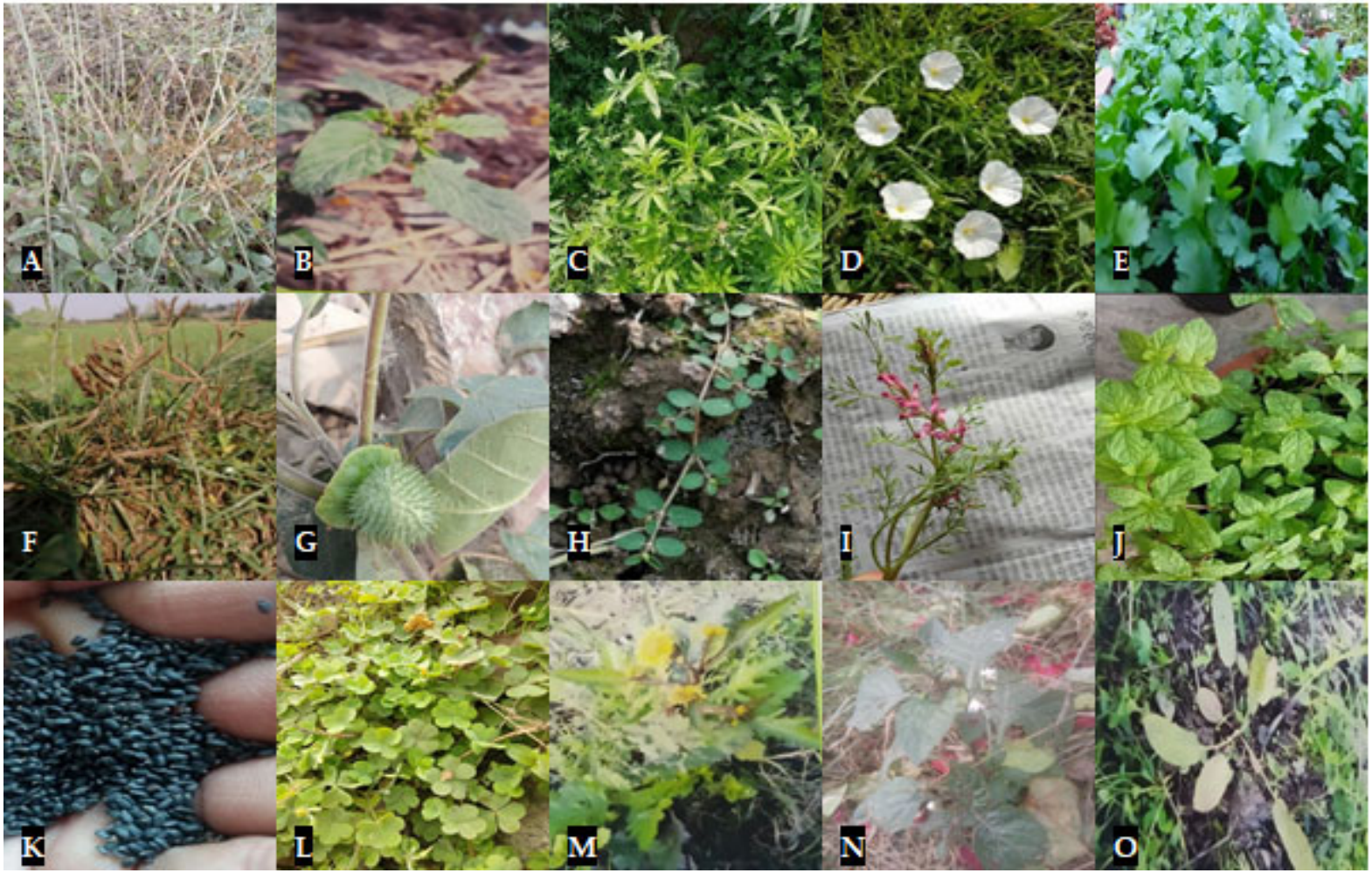

Figure 3. (**A**) Achyranthus asper; (**B**) Amaranthus viridus; (**C**) Cannabis sativa; (**D**) Convolvulus arvensis; (**E**) Coriandrum sativum; (**F**) Cyperus rotundus; (**G**) Datura inoxia; (**H**) Euphorbia prostrate; (**I**) Fumaria indica; (**J**) Mentha longifoli; (**K**) Ocimum basilicum; (**L**) Oxalis corniculata; (**M**) Rumex dentatus; (**N**) Sisymbrium irio; (**O**) Solanum nigram.

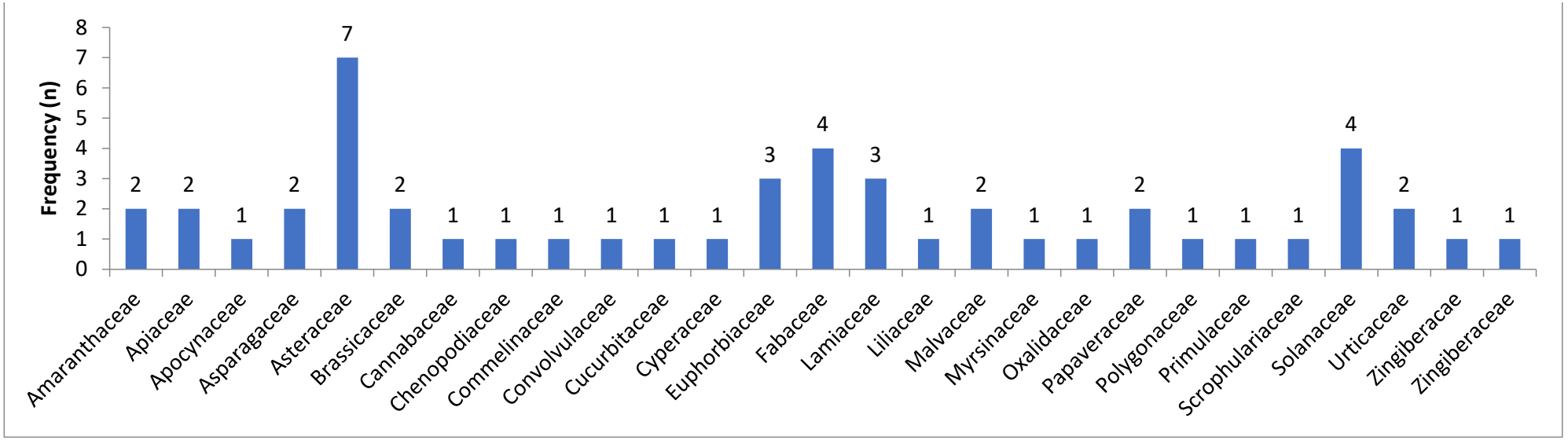

Figure 4. Representing the dominant families of reported medicinal.

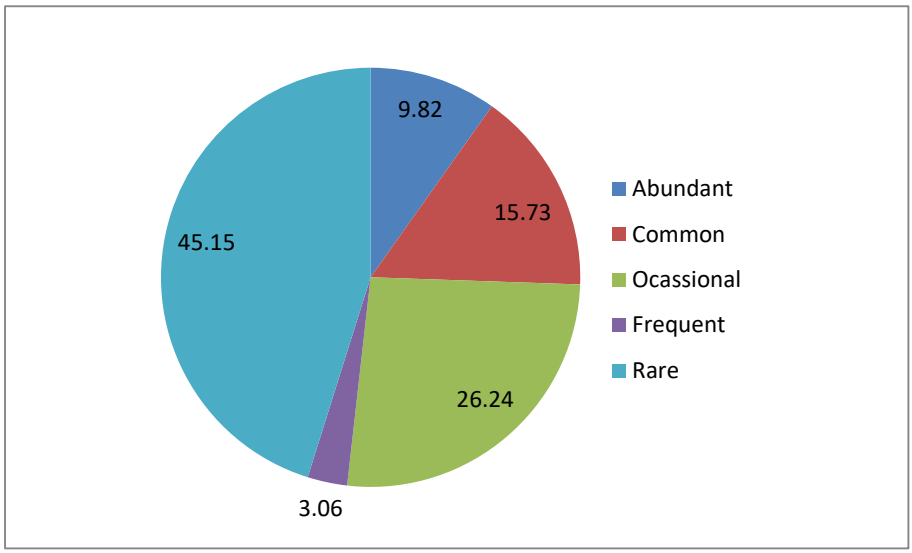

Figure 5. Relative abundance of reported medicinal herbs.

3.4. Quantitative Indices

3.4.1. Relative Frequency Citation (RFC) and Use Value (UV)

The RFC and UV indicate the relative importance of a plant species depending upon the number of informants who give information about a species and the total number of uses for each species. In our study, the RFC ranged from 0.03 to 0.49. The highest RFC was found for *Tradescantia pallida*, while the lowest value was found for *Picrise chioides*. The reason for their maximum RFC values may be because of their popularity as traditional herbal medicines. The UV varied from 0.9 to 0.04. The highest value of UV was found for *Datura inoxia*. Other species such as *Conyza bonariensis*, *Parthenium hysterophorus*, *Dysphania ambrosioides*, *Euphorbia hirta*, *Utrica dioica*, *Vicia faba*, and *Zingiber officinale* were also reported for their diversified medicinal uses (Table 3b).

3.4.2. Relative Importance (RI) and Fidelity Level (FL)

The RI depends upon the number of treated diseases and the number of treated body systems by a plant species. In our study, the RI ranged from 5.78 to 34. The highest RI was recorded for *Asparagus racemosus*, while the lowest was found for *Tradescantia pallida*. It was concluded that species with high RI values, such as *Utrica dioica*, *Coriandrum sativum*, *Mamordica charantia*, *Euphorbia hirta*, *Achyranthus asper*, and *Solanum xanthocarpum*, showed versatility for the treatment of many diseases (Table 3b).

Fidelity level showed that a certain plant species can be used to treat certain diseases. In our study, the FL ranged from 27% to 85%. Above 80% FL was recorded for *Vicia faba*, *Catharanthus roseus*, *Mamordica charantia*, *Aloe vera*, *Datura inoxia*, and *Mentha piperita* for the diseases of obesity, diabetes, skin infections, broken joints, and mumps, respectively (Table 4).

Table 4. Fidelity level (FL) of all herb species.

Botanical Name	Ethnomedicinal Uses	Ip	Iu	FL
Achyranthus asper	Stomach pain	14	31	45
Agerantum conyzoides	Constipation	16	29	55
Alcea rosea	Respiratory diseases	11	19	57
Aloe vera	Skin infections	29	35	82
Amaranthus viridus	Inflammation	14	33	42
Anagallis arvensis	Respiratory disorders	21	27	78

Table 4. *Cont.*

Botanical Name	Ethnomedicinal Uses	Ip	Iu	FL
Anagallis foemina	Digestive disorders	18	33	54
Asparagus densiflorussprengera	Urinary infections and arthritis	10	21	48
Asparagus racemosus	Dysentery and diarrhea	18	30	60
Boehmeria nivea	Threat of abortion	15	22	68
Calendula arvensis	Stomach ulcer	17	25	68
Cannabis sativa	Malaria	13	34	38
Catharanthus roseus	Diabetes	15	18	83
Convolvulus arvensis	Constipation	16	34	47
Conyza bonariensis	Muscular weakness	9	17	53
Coriandrum sativum	Abdominal pain	14	36	39
Coronopus didymus	Liver disorders	21	39	54
Cyperus rotundus	Digestive disorder	7	26	27
Datura inoxia	Broken joints	14	17	82
Daucus carota	Cancer	21	31	68
Dysphania ambrosioides	Asthma	7	12	58
Elletaria cardamom	Influenza	14	32	44
Euphorbia hirta	Female diseases	17	36	47
Euphorbia helioscopia	Cholera	10	13	77
Euphorbia prostrate	Bleeding piles	13	18	72
Fumaria indica	Diarrhea	19	38	50
Fumaria parviflora	Skin diseases	16	24	67
Lactuca sativa	Typhoid	10	15	67
Malvestrum tricuspidatum	Dysentery	22	40	55
Mamordica charantia	Diabetes	15	18	83
Mazus japonicas	Fever	12	29	41
Medicago denticulata	Excessive growth of organs	22	43	51
Melilotus alba	Ulcer	13	27	48
Mentha longifolia	Liver disorder	25	41	61
Mentha piperita	Mumps	29	36	81
Mimosa pudica	Jaundice	20	26	77
Ocimum basilicum	Piles	13	41	31
Oxalis corniculata	Ulcer	6	15	40
Parthenium hysterophorus	Gastrointestinal stress	10	21	48
Picrise chioides	Burns and boils	1	3	34
Rumex dentatus	Irritated skin	9	16	56
Sisymbrium irio	Measles	16	46	35
Solanum melongena	Toothache	21	38	55
Solanum nigram	Tumors	12	21	57
Solanum xanthocarpum	Heart disease	17	44	39
Sonchus asper	Gastrointestinal infections	16	38	42
Tradescantia pallida	Asthma	28	47	60
Utrica dioica	Kidney and urinary disorders	17	29	59
Vicia faba	Obesity	11	13	85
Zingiber officinale	Muscles pain	2	6	33

3.5. Informant Consensus Factor (ICF)

The ICF represents the consensus between plants and informants regarding the treatment of diseases (Table 5). In this study, the ICF ranged from 0 to 0.44, where the cardiovascular disorders and infectious diseases had the highest, with 26 use reports. It showed the best consensus between a plant species and treated disease. The second highest ICF was found for fever, cold, and influenza disorders (0.38), followed by infectious diseases (0.36) (Table 5).

Table 5. Informant consensus factor (ICF) for the categorized ailments mentioned by the informants.

Category of Diseases	No. of Use Reports	% Age of Use Reports	No. of Taxa Used	% Age of Taxa	ICF
Respiratory problems	21	6.086	17	4.802	0.15
Musculoskeletal disorders	18	5.217	14	5.511	0.23
Brain and nervous disorders	23	6.667	19	7.48	0.18
Cardiovascular disorders	26	7.536	15	5.905	0.44
Urogenital diseases	44	12.753	31	12.204	0.3
Gastrointestinal tract diseases	57	16.52	43	16.929	0.25
Nail, skin, andhair disorders	21	6.086	16	6.299	0.25
General pain	16	4.637	13	5.118	0.2
Ear, nose, and throat (ENT) diseases	12	3.478	9	3.543	0.27
Infectious diseases	19	5.507	11	4.33	0.44
Glandular disorders	12	3.478	8	3.149	0.36
Fever, cold, and influenza disorders	27	7.826	17	6.692	0.38
Wound healing	9	2.608	9	3.543	0
Gynecological disorders	22	6.376	18	7.086	0.19
Dental pain	6	1.739	6	2.362	0
Cancer	8	2.31	8	3.149	0

3.6. Statistical Interpretations

These total 50 medicinal herbs were categorized into 2 clusters based on the utility value (UV) (Figure 6). The highest number of species (n = 27) was in cluster 2, exhibiting the species with the least utility value, whereas only 23 species were in cluster 1, showing high utility value. These clusters were cross-tabulated with the estimated data of relative abundance (Table 6). Cross-tabulation showed that herbs with great utility value (cluster 1) are the least abundant (n = 0) and even rare (n = 20) in the study area. Pearson correlation analysis showed a negative correlation between UV and RFC (Figure 7) and a positive correlation between UV and RI (Figure 8).

Table 6. Abundance * groups cross-tabulation.

Count		Groups		Total
		1.0	2.0	
Abundance	Abundant	0	5	5
	Common	2	6	8
	Frequent	1	0	1
	Occasional	11	2	13
	Rare	20	3	23
Total		34	16	50

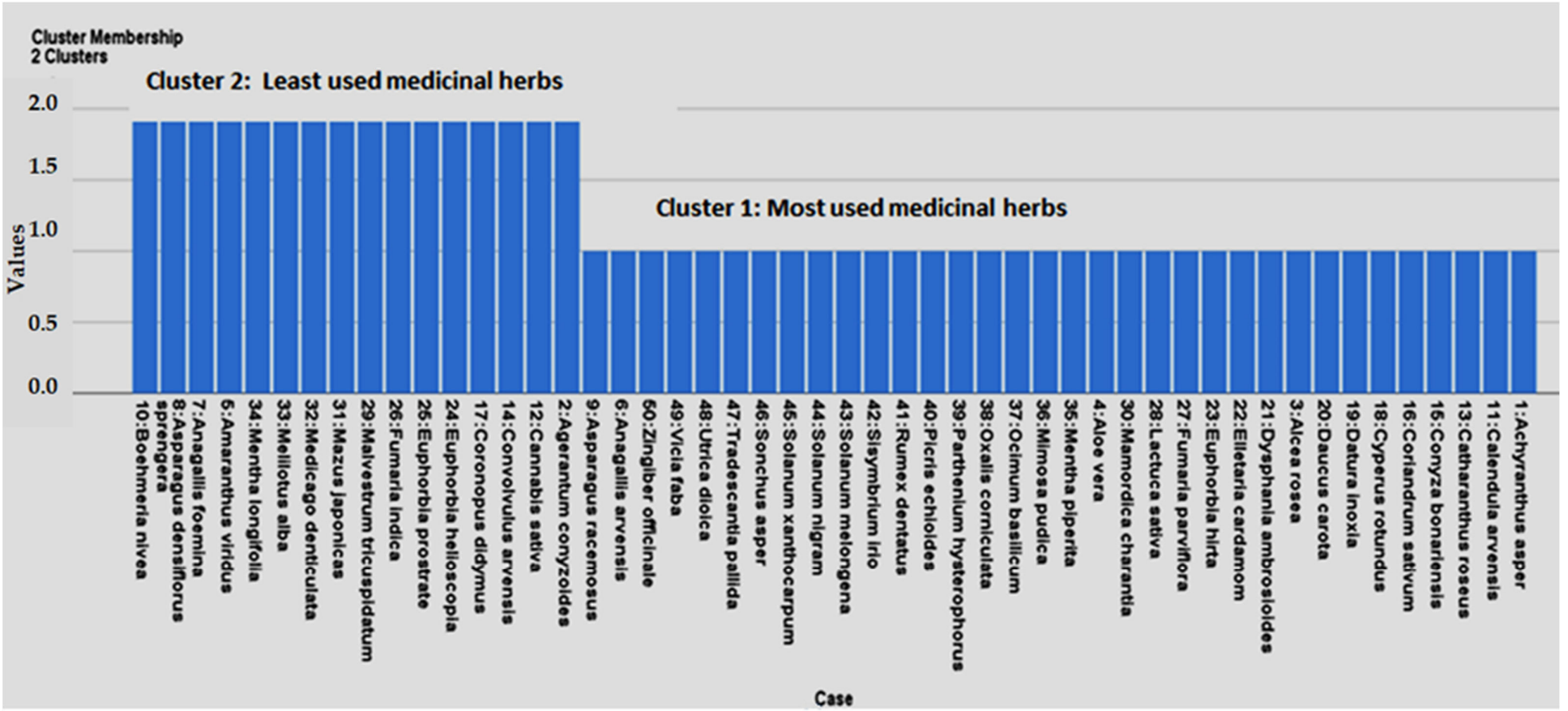

Figure 6. Cluster analysis showing most used medicinal herbs in cluster 2 and least used medicinal herbs in cluster 1 based on UV results. Case= medicinal herbs names, Values= Cluster numbers n = 1, 2, 3.

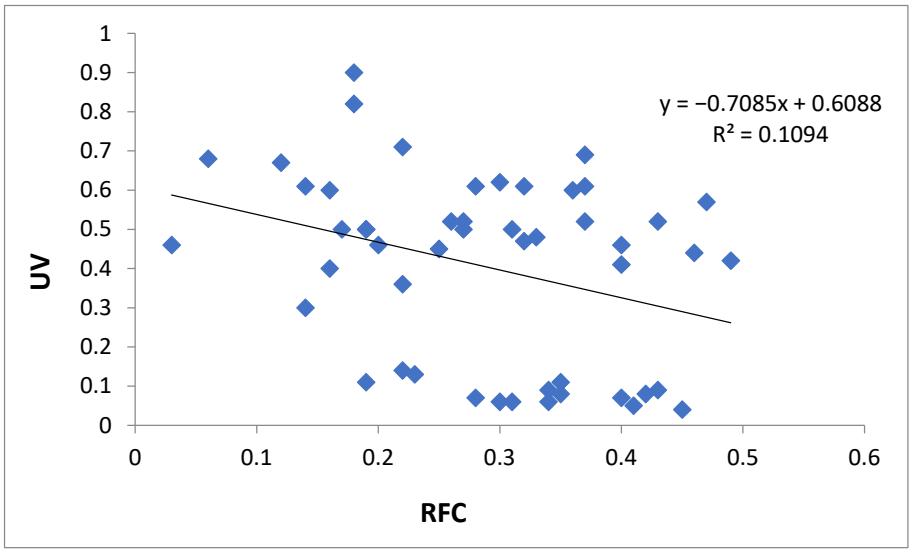

Figure 7. Showing the negative correlation between UV and RFC.

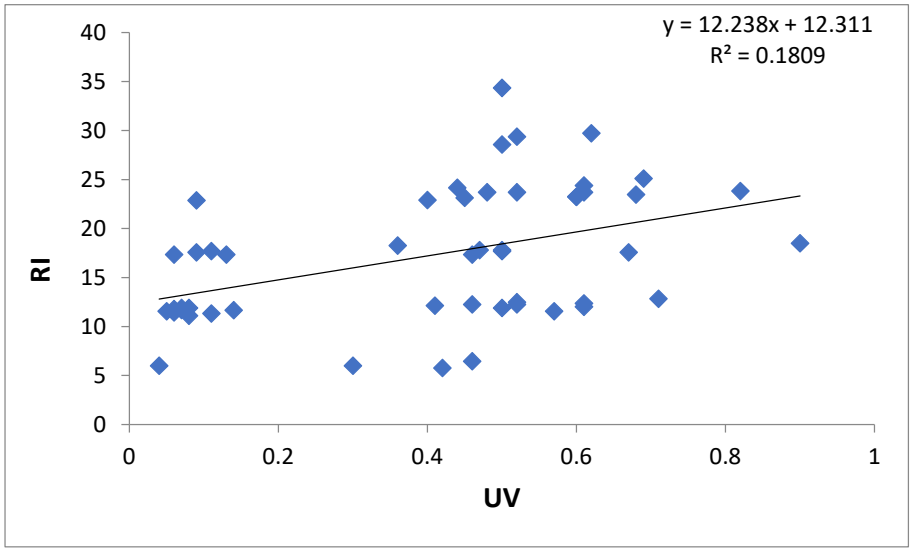

Figure 8. Showing the positive correlation between UV and RI.

4. Discussion

The study showed that people of Lahore are not much dependent on herbal drugs. This is probably due to certain reasons, i.e., high literacy rate and better financial status. Negrelle et al. [36] stated that common traditional knowledge about herbs is found among people having low levels of education. Both of these factors (high literacy rate and better financial status) brought modernization and urbanization in the study area, which ultimately affects the utilization trust of these herbal drugs. However, gender-wise, males were more educated than females, and profession-wise, herbalists were more qualified than other informants. It can be argued that, in general, male informants were more in number as well as with better social and education status in comparison to female informants. This shows the sociodynamics of the study area. As documented in previous studies, in Pakistan, females are still under-privileged [37,38]. During the data collection, it was also observed that ethnobotanical knowledge is becoming restricted only to the elder people (52% were above 50 years) and Hakeems (42%) (Table 2). The young generation is totally ignorant of this traditional wealth. Advancement in science and technology has now changed social setup; therefore, the young generation is leaving traditions and culture [39].

In our study, it was observed that members of Asteraceae and Solanaceae are well known for their therapeutic properties. The popularity these families had reflected the informants' trust in this family for medicinal purposes. This is because of the presence of a large variety of phytochemical compounds in the species of this family. Verpoorte et al. [40] stated that a single compound may not be responsible for the medicinal property. The wide range of phytochemicals including secondary metabolites is responsible for the medicinal properties. Other ethnomedicinal studies also supported the therapeutic value of both of these families [41–44]. Most of these herbs are being used in the form of decoction. Some studies determined that activity of phytochemicals increase when we boil the plant material in water or in any solvent [44]. However, some other studies contradict this and state that boiling of soft parts of plants can change the structure of phytochemicals found in plants [19]. Bitu et al. [45] stated in a study that there may be much large variation in phytochemical and biological activities of herbal plants as compared to dried plant material.

It was observed during the study that the herbalists and local people use these herbs mostly for cardiovascular and infectious diseases. Similar kinds of results were observed in the previous ethnomedicinal literature around the country [46,47]. This is due to the fact that, usually, people consider infectious diseases as minor health problems and avoid spending money on allopathic consultation and medicines. In addition, cardiovascular consultancy is quite expensive, and, to save money, people tried to cure these problems with home remedies or herbal drugs unless the problem became severe.

Quantitative indices supported the identification of homogeneity in the traditional knowledge [38]. Plants with higher RFCs showed their popularity and trust among the local people of the study area [48]. In the current study, RFC ranged to a maximum of 0.49, which is comparatively less than from other ethnobotanical studies. Lower RFC values indicate that the retention and transmission of traditional knowledge among local people is not smooth [49]. Similarly, plants with higher UVs reflected their diverse utilization [50]. However, a negative correlation was observed between these two indices, which showed that these two indices are almost independent of each other with concern to the ethnobotanical knowledge of the Lahore natives [38]. RFC is actually a reflection of the popularity of certain plants in the study area, irrespective of their range of utilization. A positive correlation between UV and RI indicated somewhat of a relationship between these two indices. Both of these indices depict the utilization value and relative importance of certain species. The fidelity level (FL) is the percentage of informants claiming the use of a particular plant species for the same major purposes or requirements, and this was also determined for the most frequently reported diseases or ailments. The plant species with highest FL value showed treatment potential against mentioned disease [51]. Kadir et al. [51] stated that plants with maximum FL should be recommended for further study regarding clinical practice. The highest ICF represents the common occurrence of reported diseases that were treated by specific plants. Chaves and Barros [47] stated that the diseases with high ICF values should be further assessed to find the reasons for their common occurrence. The lowest ICF value was found for cancer and dental pain. The lowest value of ICF does not mean that plants are less important for those categories. The lowest ICF may be due to less availability of information in study participants. Cross-tabulation between two clusters and relative abundance (RA) reported that the relative abundance of plants declines with the increase of their UVs. It can be said that the higher the utilization aspect, the lower the relative abundance in a particular study area. It can be observed that, among the 23 plants of cluster 1 (with uppermost UVs), none of the plants were reported as abundant in the study area. However, in cluster 2, five (5) were reported as abundant in the study area. As the utilization of plants lowered, the probability of their abundance increased simultaneously. By considering the importance of plants, large numbers of commercially important medicinal plant species are over exploited by the people involved in their trade. The main reasons of this over exploitation could be lack of sustainable harvesting methods, inadequate knowledge about forest management, and lack of financial resources. Indiscriminate collection and over exploitation of some

commercially valuable species and the populations of valuable species is declining day by day. The probable threat to these medicinal plants is ecosystem degradation. The problem becomes severe when market demand-driven harvesting occurs without any concern for representation and conservation. During this, the valuable regenerative parts (such as roots, tubers, fruits, seeds, flowers, and bark) of medicinal herbs are ruthlessly collected, which leads to degradation, depletion, and even extinction of these natural resources. Due to this brutal exploitation, many important medicinal plant species are becoming rare, and some of them are critically endangered. Other reasons could be habitat degradation due exponential geometric growth of human population and man's technological capacity to exploit natural resources in an unsustainable way [52].

In the past few years, various medicinal plant conservation strategies and approaches have been developed, such as providing both in situ and ex situ conservation [53,54]. The typical examples are natural reserves and wild nurseries in order to retain the medical efficacy of plants in their natural habitats, while botanical gardens and seed banks are also important paradigms for ex situ conservation and future reforestation [55,56]. The geographic distribution and biological physiognomies of medicinal plants must be known to guide conservation activities, e.g., to assess whether species conservation should take place in nature or in a nursery.

5. Conclusions

Overall, through this study, it can be concluded that natives of any community possessed a great wealth of traditional ethnomedicinal knowledge. However, the knowledge is facing threat of being lost, as it was found that young generations were less interested in these orthodox methods of treatments. Hence, there was a dire need to document this treasure. In addition, it was found that a number of herbs became rare in the study area due to their over exploitation and lack of cultivation practices. This can cause conservation pressures to certain medicinal plants. Rare species can become endangered or threatened in the near future. Therefore, to face this environmental crisis, we need to act with responsibility. Development of sustainable management procedures along with supply chain legislation, support of green technologies, and potential conservation polices is required to keep safe these natural resources. A system can be developed to harmonize Western and traditional medicines. Availability of herbal plant remedies and their effectiveness can be combined with diagnostic approaches and facilities of Western medicine. Governments should incorporate useful aspects of traditional medicines into the health care system at a national level. If this experimented approach shows success, then the changing lifestyles and traditional practices of the current generation of most inhabitants may not have a fundamental effect on the current loss of use and knowledge of traditionally used medicine. Western medicine can greatly benefit from indigenous knowledge of locally accessible ethnomedicinal resources. The potential for development of new plant-based drugs can equally endorse the in situ conservation of medicinal plants. Furthermore, since a number of people in the community depend on medicinal plants, they must be conserved. It is possible that an effective method of stimulating conservation is encouraging the use of medicinal plants and thus increasing their apparent value. To enhance the conservation of medicinal plant resources in the ranch and mitigate their perceived decline, appropriate conservation procedures, monitoring, and harvesting approaches by the community are strongly recommended [57].

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