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Distribution and usage of some of the Predominant Ethno-medicinal plants along an altitudinal gradient in Tehsil Dharamshala, District Kangra (Himachal Pradesh)

[1*]Sheetal, [1]Dhiraj S. Rawat and [2]Anjna D. Kharwal

[1]Department of Biosciences, Himachal Pradesh University, Shimla - 171005 (India)
[2]Department of Botany, Post Graduate College, Dharamshala - 176215 (India)
[1*]Email: sheetalkapoor212121@gmail.com

Abstract

Dharamshala region of district Kangra is a beautiful hill town situated in the lap of snowcapped Dhauladhar ranges of Himachal Pradesh. This region has a rich diversity of medicinal plants, which are widely used. The present study aimed to look into the diverseness of plant resources that are used by native people for relieving various diseases. Field visits and questionnaire surveys were programmed to collect information on the uses of different plants. A total of 65 predominant medicinal plant species belonging to 36 families and 57 genera are recorded to cure different ailments by the local people. The number of medicinal plant species decreased with increasing altitude. Herbs (49.23%) dominate the present study and leaves (28%) are mostly used as a medicinal plant part. A comprehensive account of plant part used, mode of preparation and usage of dose have been enumerated in this paper.

Key words : Ethnobotany, Medicinal plants, Dharamshala, Himachal Pradesh.

Ethnobotany is a multidisciplinary science which involves the exploration or research of interrelationship between man and his surrounding vegetation. The term ethnobotany was coined by John William Harshberger[3] to define plants which were used by the native people[4]. Herbs have been chosen and practiced provisionally as medicine around the world since the beginning of time and customarily, the actual herbs themselves have disseminate along simultaneously[15]. Ethnobotany focuses on how plants are anticipated, handled and accustomed in human cultures and includes plants used for medicine, prediction, food, dyeing, textiles, cosmetics, tools, clothing, building, social life, rituals and music. The association of human societies and plants is not restricted to the use of plants for shelter, clothing and food but also includes their use for health care, adornment and holy ceremonies.

Biodiversity epitomizes the resources upon which nations, communities, families and

future generation relies and thus it forms the foundation of human economic well-being and their existence[11]. The ethnic races and tribal people have developed their own religious rites, folklore, songs and customs across the world. The relationship between numerous cultivated and wild plants with different cultures has evolved over generations of practice, observation and experience as these herbs impersonate a very significant role in these cultures[10]. Medicinal plants have been delineated to have authentic relevance. These medicinal herbs comprise an effectual origin of both modern and traditional medicine and today according to World Health Organization (WHO), about 80% of the rural population confides on plants as primary health care, where herbs build the predominant constituent over other natural resources[1].

Academic, public and government concern in conventional medicines is increasing significantly due to the economic burden of the modern system of medicine and growing incidence of the adverse drug reactions[8]. In India, the enormous ethnobotanical knowledge prevails from the classical time. Herbs of curative ability are broadly accustomed both as traditional medicine in distinct indigenous systems of medicine like Ayurveda, Siddha and Unani and also used as refined product of pharmaceutical industry[2]. At present, ethnobotany has become progressively important and has been in great demand in the evolvement of preservation and wellness program in distinctive areas of the world. The traditional knowledge in the form of folklore is passed through generation to generation in certain constricted and distant abode. Ethnobotanical information therefore becomes instantly vital as it helps to investigate information and education and thus needed to conserve before this traditional mythology is vanished completely[4].

The present study is an attempt to investigate the utilization of some of the frequently used plant species of Dharamshala region (a beautiful hill town situated in the lap of snowcapped Dhauladhar mountain ranges of Himachal Pradesh), which are used traditionally by the local people for primary health care. Earlier, Dharamshala region of Kangra valley has not been surveyed; however some of the important contribution pertaining to the ethnobotany of Kangra are: Kapur[6], Singh & Kaushal[14], Sharma & Maheshwari[13], Uniyal *et al*.[17], Thakur *et al*.[16], Kumari *et al*.[9], Kohli *et al*.[7].

Study area :

The study area Dharamshala is one of the famous hill stations situated in the foothills of Himalayas in Kangra district of Himachal Pradesh, India. It lies between North latitudes 32° 10' 00" to 32° 17' 16.5" and East longitudes 76° 15' 15.5" to 76° 25' 21" and is about 18 km North-East of Kangra. Dharamshala with its grand view of majestic Dhauladhar mountain range at the backdrop and beautiful surroundings has always been one of the favourite places of tourists. The terrain is mostly mountainous, with forested slopes and cultivated valleys. It is surrounded by pine and deodars on west and north, whereas agriculture fields dominate the gradually sloping valleys of Kangra towards south and east, which adds more beauty to the scenes. The snow line is more easily accessible in Dharamshala than any other hill station in India.

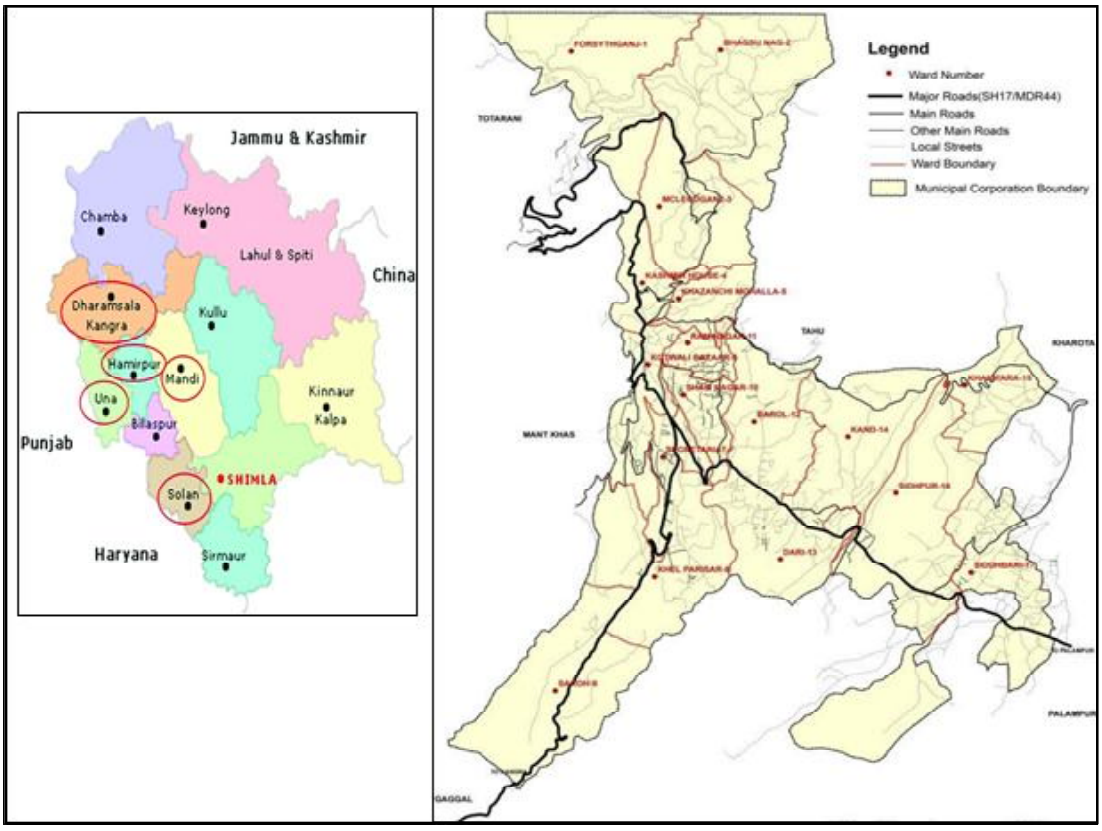

Figure 1: Map of the study area (Source: Municipal Corporation, Dharamshala)

Collection of Data :

Extensive field surveys were conducted to collect the ethnobotanical information from the local inhabitants of the villages of the study area. Initially, cooperative resource surveys with the help of local people were organized for establishing a trust connection with the local people. The information is based on open ended conversation with the help of semi-structured questionnaires. Selection of informants for group discussions and interviews was done randomly in targeted villages, which was based on their sound knowledge of medicinal plants used in the study area. Group discussion and interviews were held with the old people, family heads, healers, medicine-men and different local informants for getting a better understanding of local beliefs, habit and customs. Secondary data based on the research publications and government records were also analysed, so as to prepare a suitable qusationnaire and a detailed set of check-list[12]. The information gathered included data pertaining to habit, local names of the plant, folk uses, part used, mode of preparation, proper dose and administration (Table-2). For collection of plant species, their drying, mounting, preparation and preservation on herbarium sheets, standard methods were pursued, following Jain and Rao[5].

Table-1. Distribution of medicinal plant life form in the study area

S. No.	Life Form	Number of Species	Percen-tage
1.	Herb	32	49.23
2.	Shrub	17	26.15
3.	Tree	14	21.54
4.	Climber	2	3.08
	Total	**65**	**100**

In the present investigation, 65 species of the predominant ethnomedicinal plants representing 36 families which were mostly terrestrial were recorded from the study area. During the survey and group discussions, it was discovered that the knowledge of therapeutic plants and their uses was limited to the folks above the age of 45 only. The female informants were found to have a little bit more information on medicinal herbs and their utilization in comparison to the male informants. Although

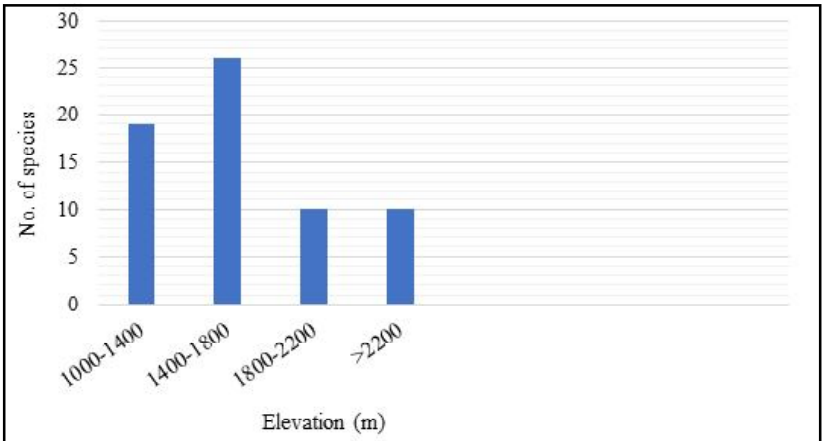

Figure 2: Bar graph showing the number of plant species present at different elevations.

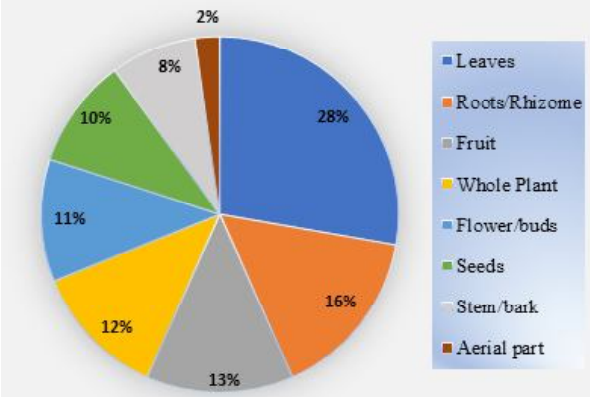

Figure 3: Percentage of plant parts used in herbal preparations

Table-2. Ethnomedicinal uses of some plants recorded along an altitudinal gradient in Dharamshala (H.P.).

1. Predominant Plant species documented at an altitudinal range of 1000-1400 m.

S. No.	Botanical name	Family	Vernacular name	Habit	Altitudinal range (m)	Part/s used	Mode	Ethno-medicinal uses
1.	*Achyranthes bidentata* Bl.	Amarant-haceae	Puthkanda	Herb	1200	Whole plant	Oral, Topical	• Plant is diuretic and astringent; used to heal bites of wasp, leech and poisonous insects. • Stem is used for the treatment of cold and cough and root juice is recommended to cure toothache.
2.	*Bidens pilosa* L.	Asteraceae	Lumb	Herb	1325	Whole plant	Oral	• Leaves (3-5) are chewed for the treatment of sore throat. • Juice of the plant (10-20 ml) used for eye and ear troubles, leprosy and other skin problems.
3.	*Calendula officinalis* L.	Asteraceae	Genda	Herb	1200	Flower, Leaves	Oral, Topical	• Decoction (30-35 ml) of flowers is given two times daily to curemeasles. • Leaf and flower juice is used in the treatment of wounds, cuts, scars and ulcers.
4.	*Capsella bursa-pastoris* (L.) Medik.	Brassicaceae	Dharsaag, Jangli sarsoo	Herb	1100	Aerial part	Oral	• Plant extract with hot water (10-15 ml) is used to treat menstrual problems and hemorrhages. • The crushed and powdered plant is administered on swellings or sores.
5.	*Citrus aurantium* L.	Rutaceae	Khatta, Galgal	Tree	1300	Fruit, Leaves	Oral	• The ripe fruit juice is useful in case of conclusive cough, cholera, gastric disorders and diarrhoea. • Infusion (15 ml) of dried flowers is used as a moderate nervous stimulant. • Paste of leaves is used externally for skin blemishes.

6.	*Citrus limon* L.	Rutaceae	Nimbu	Tree	1300	Fruit	Oral, Topical	• Lemon juice with honey in luke warm water is taken empty stomach in morning to cure obesity. • Amla (*Phyllanthus emblica*) powder is added in lemon juice to prevent hairfall and to remove dandruff. • Lemon juice in combination with rose water and cucumber juice (in equal amount) is applied on the face for 10-15 minutes for glowing skin, improving complexion and wrinkles.
7.	*Duranta erecta* L.	Verbenaceae	Neelkanta	Shrub	1200	Leaves	Topical	• Fresh leaves paste mixed with coconut oil is applied on the affected areas to cure wounds.
8.	*Gnaphalium affine* D. Don	Asteraceae	Gadua, Balraksha	Herb	1295	Whole plant	Oral, Topical	• Pulverized whole plant is given to children (orally) suffering from diarrhoea. • Paste of leaves is applied on cuts and burns.
9.	*Ipomoea nil* (L.) Roth	Convolv-ulaceae	Ghaudan	Shrub	1200	Seeds	Oral	• Dried seed powder (3-6 g) is used as purgative and to treat urinary disorders.
10.	*Mirabilis jalapa* L.	Nyctagi-naceae	Gulbansi, Gulal	Herb	1300	Whole plant	Oral, Topical	• Root powder (2-4 g) in water is recommended for adults as a laxative. • Whole plant decoction (15-35 ml) is taken orally to cure kidney infection, diarrhoea and abdominal disorders. • Fresh leaf juice is directly applied for relieving inflammation, rashes, wounds, earaches and headaches.
11.	*Nerium oleander* L.	Apocy-naceae	Ghaneera	Shrub	1245	Stem	Topical	• 2-3 drops of juice prepared from the stem bark boiled with sesame oil are

								poured into ear to cure earache. • Twigs used as a toothbrush to cure gum swelling.
12.	*Papaver rhoeas* L.	Papave-raceae	Gulla	Herb	1335	Aerial part	Oral	• An infusion (10-15 ml) prepared from the aerial parts of the plant is used in the treatment of bronchial complaints, cough and rheumatism. • The flowers are used to cure jaundice.
13.	*Phyllanthus emblica* L.	Phyllan-thaceae	Amla	Tree	1300	Fruits	Oral	• Fruit is palatable and considered as an astringent tonic. • The fruit powder (3- 10 g) along with neem leaves taken for one month regularly to cure leucoderma and leprosy. • Fresh juice (10-20 ml) made from fruit mixed with candied sugar and lemon juice is used to cure dysentery.
14.	*Pyrus pashia* Buch.-Ham. ex D. Don	Rosaceae	Kainth	Tree	1370	Fruits	Oral, Topical	• Fruits consumed raw to treat throat infection, cardiovascular and gastrointestinal problems. • Fruit paste is applied on the tongue to cure mouth sores.
15.	*Rosa brunonii* Lindl.	Rosaceae	Kubje, Kuje	Shrub	1300	Fruits, Flower	Oral	• Ripened fruits are consumed in case of constipation. • Dried petals are grinded and the powder (1teaspoon) is mixed with crystallized sugar and is taken orally two times a day to treat dysentery.
16.	*Rubus ellipticus* Sm.	Rosaceae	Aakhe	Shrub	1000	Roots, Fruits	Oral, Topical	• Paste prepared from roots grinded along with 2-3 seeds of kali mirch (*Piper nigrum*) in cow urine is applied on the affected areas to treat blisters or furuncles.

								• Fresh fruits are consumed to purify the blood.
17.	*Salvia coccinea* Juss. ex Murr.	Lamiaceae	Phultulsi	Herb	1300	Flower, Leaves	Oral, Topical	• Decoction (15-20 ml) prepared from the roots is used to cure cold and cough. • Leaves in form of poultice applied to the wounds.
18.	*Trifolium pratenese* L.	Fabaceae	Barseen	Herb	1200	Whole plant	Oral, Topical	• Tea made from flower extract is used to cure bronchial complaints, asthma and cough. • Leaf juice is used in case of sore eyes; also to treat burns and wounds.
19.	*Trifolium repens* L.	Fabaceae	Khunknu	Herb	1200	Whole plant	Oral	• Decoction of whole plant (15-20 ml) is good during menopause. • Suggested as a health drink for women.
	2. Predominant Plant species documented at an altitudinal range of 1400-1800 m.							
S. No.	Botanical name	Family	Verna-cular name	Habit	Altitu-dinal range (m)	Part/s used	Mode	Ethno-medicinal uses
1.	*Ageratina adenophora* (Spreng.) R.M.King & H.Rob.	Asteraceae	Kali basunti	Herb	1676	Leaves	Topical	• Leaf extract is used to stop bleeding of cuts and wounds and root extract is advised to treat fever. • Leaf juice (1-2 drops) is poured in the eyes to cure insomnia and is also used in the treatment of dysentery.
2.	*Artemisia absinthium* L.	Asteraceae	Charmara	Herb	1700	Leaves	Topical	• Pulverized fresh leaves are applied locally on cuts and wounds.
3.	*Barleria cristata* L.	Acanthaceae	Morni	Shrub	1775	Whole plant	Oral, Topical	• Paste of leaves and roots are used to treat inflammation, swellings and scorpion stings. • Root juice (one teaspoon) is given thrice a day during diarrhoea.

								• Dry leaf powder (4-5 g) is taken once daily to cure respiratory disorders until cured.
4.	*Barleria prionitis* L.	Acanthaceae	Vajradanti	Shrub	1500	Bark, Leaves and Roots	Oral, Topical	• Ash obtained from the whole plant or dried bark (5-7 g) mixed with honey is given in case of cough and bronchial asthma. • Leaves paste is applied in case of tooth troubled with dental caries to alleviate pain. • Leaf juices (20-25 ml) mixed with honey is given to children in fever; mixed with coconut oil is applied for pimples. • Root paste is applied over glandular swellings and blisters.
5.	*Berberis lycium* Royle	Berberi-daceae	Kashmal	Shrub	1600	Fruits, Roots	Oral, Topical	• Fruits are edible; used for the relief of pharyngitis and intestinal colic. • Pulverized root bark (5-10 g) mixed with mustard oil is used for massaging in case of broken bones. • Juice of the roots (4-5 drops) is taken orally to treat diabetes.
6.	*Clematis gouriana* Roxb. ex DC.	Ranuncu laceae	Baaker-Bel, Gudbel	Climber	1700	Roots	Oral	• Decoction of roots (about 15 ml) is consumed three times a day for 2-3 days to cure stomachache. • The fresh leaf juice is applied to blisters and in case of itching.
7.	*Euphorbia helioscopia* L.	Euphor-biaceae	Doodhli	Herb	1700	Whole plant	Oral, Topical	• Leaf juice (5-10 ml) mixed with honey is given for persistent cough. • Whole plant paste is applied to heal cuts and wounds.
8.	*Ficus carica* L.	Moraceae	Anjeer	Tree	1500	Fruit	Oral	• Fruit juice (10-20 ml) is used as a blood purifier and reported to be

								useful in the treatment of cancer. • Paste of fruits (5-10 g) is applied on the affected area in case of inflammation, measles and burning over the skin. • Also used to cure constipation and piles.
9.	*Ficus palmata* Forsk.	Moraceae	Dhooda	Tree	1500	Fruit, Bark	Oral	• Bark powder (3-5 g) is diuretic and astringent. • Fruit powder (20-30 g) is considered as a laxative and used to cure enlarged spleen and jaundice.
10.	*Ficus religiosa* L.	Moraceae	Peepal	Tree	1400	Bark, Fruits and Roots	Oral	• Root powder (3-5 g) is consumed along with honey in case of skin disorders and for quick wound healing. • Decoction (50-100 ml) of bark is useful in treating rheumatism, scabies and ulcers. • Dried fruit powder (3-5 g) is given to cure asthma.
11.	*Lathyrus aphaca* L.	Fabaceae	Khinnu	Herb	1600	Seeds	Oral	• Infusion made from seeds (10-15 ml) used in the treatment of leucorrhoea. • Seeds are taken orally to cure toothache.
12.	*Malva parviflora* L.	Malvaceae	Nasochal	Herb	1725	Whole plant	Oral	• Decoction prepared by boiling the whole plant in water (50-90 ml) is given regularly for some days for miscarriages.
13.	*Nasturtium officinale* R. Br.	Brassi-caceae	Jal mirch	Herb	1645	Flower, Leaves and Seeds	Oral	• Traditionally, this plant is consumed as a green leafy vegetable. • Fresh leaf juice (50-80 ml) of the plant is administered orally thrice a day to cure anemia, chest and kidney complaints.

14.	*Oxalis corniculata* L.	Oxali-daceae	Khatt malori	Herb	1625	Leaves	Oral, Topical	• Fresh leaves paste is used to treat burns, snake bites cuts and wounds. • Leaf extract (5- 10 ml) with candied sugar is consumed empty stomach early in the morning for 1 week to cure leucorrhea.
15.	*Plantago lanceolata* L.	Plantagi-naceae	Isabgol	Herb	1675	Leaves, Seeds	Oral, Topical	• Water soaked seeds are given orally two times a day for 2-3 days to treat diarrhoea and dysentery. • Paste of leaves mixed in cow's urine along with butter is applied to the affected areas of skin to cure skin disorders.
16.	*Prinsepia utilis* Royle	Rosaceae	Bhekhal	Shrub	1775	Seeds	Topical	• The eradicated seed oil is warmed and applied on the affected areas at night to cure arthritis.
17.	*Prunus persica* (L.) Batsch.	Rosaceae	Aadu	Tree	1700	Leaves	Oral	• Decoction of lea ves (40-50 ml) is prescribed two times a day to cure stomachache.
18.	*Punica granatum* L.	Punicaceae	Dadu	Shrub	1525	Fruits, Seeds	Oral	• Seed powder (1-3 g) is consumed along with pudina (*Mentha spicata*) for 2-3 times a day in case of vomiting and for 3-5 days to cure indigestion and bile problem. • Fruit rind juice (10-20 ml) is consumed two times a day for 5-6 days to cure intestinal worms, dysentery and diarrhoea.
19.	*Ranunculus muricatus* L.	Ranun-culaceae	Jaldhar, Changer	Herb	1645	Rhizome	Oral	• Pulverized rhizome (1-3 g) mixed with dalda ghee and wheat flour is used as an anthelmintic drug in cattle.
20.	*Ranunculus scleratus* L.	Ranun culaceae	Jaldhania	Herb	1625	Root, Leaves	Oral	• Powdered form of roots and leaves (1-3 g) is consumed regularly with

								water for some days for skin diseases and urinary disorders.
21.	*Rumex hastatus* D. Don	Polygo-naceae	Malori	Herb	1700	Leaves	Topical	• Paste of fresh leaves (2-3 g) is used in the treatment of constipation and against nettle sting.
22.	*Rumex nepalensis* Spreng	Polygo-naceae	Jangli-Palak	Herb	1710	Leaves, Roots	Oral, Topical	• Fresh leaves are consumed as vegetable to cure constipation. • Paste of roots made in cow urine is applied to treat boils.
23.	*Solanum viarum* Dunal	Solan-aceae	Kandayai	Shrub	1600	Fruit, Seed	Oral	• Plant extract (10-15 ml) mixed with black pepper (*Piper nigrum*) used in case of asthma and to check fever. • Seed and fruit powder (2-5 g) used as contraceptives, useful in case of wounds and menstrual complaints.
24.	*Tecoma stans* (L.) Juss. ex Kunth	Bignon-iaceae	Sonapatti, Pila Kaner	Tree	1500	Leaves, Roots	Oral	• Decoction made of leaves (50-100 ml) is used in the treatment of digestive problems and diabetes. • A mixture of grinded roots with lemon juice is taken internally in trivial amount as a remedy for rat and snake bites.
25.	*Thymus linearis* Benth.	Lami-aceae	Banajwain	Herb	1675	Leaves, Flower	Oral	• Decoction (20-25 ml) prepared from flowers and leaves is used to cure fever and common cold.
26.	*Toona ciliata* M. Roem.	Meliaceae	Toon, Tooni	Tree	1500	Leaves, Bark	Oral	• Decoction of bark (25-30 ml) is taken internally to treat constipation and to cure diarrhoea in childrten. • Paste of bark or leaf is applied over cuts and wounds for fast healing. • A mixture of leaf powder with water and salt is used in the treatment of skin diseases and diabetes.

3. Predominant Plant species documented at an altitudinal range of 1800-2200 m.

S. No.	Botanical name	Family	Vernacular name	Habit	Altitudinal range (m)	Part/s used	Mode	Ethno-medicinal uses
1.	*Albizzia lebbeck* Benth.	Fabaceae	Siris, Shrinh	Tree	1800	Bark, Seeds	Oral, Topical	• Seed powder (3-6 g) is given for treating inflammatory skin conditions and blood disorders. • Decoction of bark (100 ml) is used as gargle in case of dental problems.
2.	*Alternanthera sessilis* (L.) R. Br. ex DC.	Amaranthaceae	Rubadi-Khubadi	Herb	1810	Whole plant	Oral	• Decoction of leaves (20-25 ml) with a pinch of salt is consumed two times a day in case of fever, nausea and vomiting. • Whole plant (2-5 g) powder is also used for the treatment of piles and dysuria.
3.	*Bacopa monnieri* (L.) Pennell	Plantaginaceae	Brahmi	Herb	1900	Whole plant	Oral	• Plant powder (1-3 g) or plant juice (8 ml) is taken up once a day to cure nervous tiredness and to increase memory power.
4.	*Buddleja crispa* Benth.	Scrophulariaceae	Neemda, Newarpati	Shrub	2082	Leaves	Topical	• Fresh leaves paste is used to treat skin diseases.
5.	*Gerbera gossypina* Royle Beauv.	Asteraceae	Bujlu	Herb	2125	Leaves	Topical	• The fresh leaves are grinded and the juice is applied directly on the troubled area to treat measles.
6.	*Jasminum dispermum* Wall.	Oleaceae	Chameli	Shrub	1890	Leaves, Flower	Oral	• Leaves and flower powder (3-5 g) is given twice a day for 2-3 days to treat gastro-intestinal disorders.
7.	*Nicotiana tabacum* L.	Solanaceae	Tambaku, Tamaku	Herb	1875	Leaves	Topical	• Paste of fresh leaves is used in the treatment of blisters or boils. • Powder of dried leaf (1-2 g) is used

								to relieve the pain in case of teeth affected with dental caries.
8.	*Quercus oblongata* D. Don	Fagaceae	Ban	Tree	2100	Bark, Kernels	Oral	• Bark decoction (50-80 ml) prepared by adding sugar and milk is consumed orally for a week twice a day in case of rheumatism. • Powder of crushed kernels and fresh leaves (3-6 g) is taken to treat dysentery.
9.	*Ricinus communis* L.	Euphor-biaceae	Arand	Shrub	1800	Leaves, Roots and Seeds	Oral, Topical	• An infusion (10-20 ml) made of leaves is used to cure stomachache. • Latex of the plant with desi ghee (luke warm) is applied on the joints for the treatment of rheumatic pains. • Decoction made of 20-30 g of roots boiled in water is taken thrice a day to cure intestinal worms.
10.	*Valeriana jatamansi* Jones	Caprifo-liaceae	Mushkbala	Herb	2100	Rhizome, Root	Oral	• Rhizome and root powder (1-3 g) is used to treat menstrual cramps, joint and muscle pain.
4. Predominant Plant species documented at an altitudinal range above 2200 m.								
S. No.	Botanical name	Family	Verna-cular name	Habit	Altitu-dinal range (m)	Part/s used	Mode	Ethno-medicinal uses
1.	*Ainsliaea aptera* DC.	Asteraceae	Kandyari	Herb	2400	Root, Flower	Oral	• Pulverized root (1-5 g) mixed with jaggery and is taken orally with one glass of lukewarm water once a day to treat stomachache. • Flower decoction (10-15 ml) is taken twice a day to cure cold and cough.

2.	*Androsace rotundifolia* Hardw.	Primu-laceae	Nirodhak butti	Herb	2200	Leaves	Oral	• Leaves are eaten with ghee and jaggery to avoid miscarriages and to correct menstrual flow.
3.	*Bauhinia variegata* L.	Fabaceae	Karale	Tree	2310	Roots, Buds	Oral	• Dried buds powder (4-5 g) mixed with candied sugar (in equal amount) is consumed with butter twice or thrice a day to cure bleeding piles. • Bark in the form of decoction (35-70 ml) is used to treat snake poisoning, wound healing, leprosy. • Decoction (10-20 ml) of roots is given twice a day to cure dyspepsia. • Flowers and buds are consumed in form of vegetable by local people.
4.	*Bergenia ciliata* (Haw.) Sternb.	Saxifrag-aceae	Sapdotri	Herb	2800	Roots	Oral	• A teaspoon of root powder and honey with a galss of cow's milk is taken empty stomach (3-4 days) for excessive and irregular bleeding during menstruation. • Dry root powder (3-6 g) dissolved in hot water is taken to cure common cold.
5.	*Celastrus paniculatus* Willd.	Celaste-raceae	Sankheeran	Shrub	2310	Seed	Oral, Topical	• Decoction (20-30 ml) of whole plant is used as a blood purifier. • The fresh oil is applied topically in case of arthralgia and the older oil is used to treat paralysis. • Seed powder (1-2 g) or seed oil (upto 5-15 drops) is taken with milk as a memory tonic.
6.	*Cotoneaster*	Rosaceae	Jhwarwa,	Shrub	2310	Fruit	Topical	• The paste made from fruits is mixed

	microphyllus Wall. ex Lindl.		Kadhor					with sarson (Brassica campestris) oil and is applied on the skin to cure skin diseases.
7.	*Parthenocissus quinquefolia* (L.) Planch.	Vitaceae	Amru bail	Climber	2445	Roots, Leaves	Oral, Topical	• Decoction (20-30 ml) made from the roots is used in the treatment of diarrhoea and gonorrhoea. • Paste of the leaves and roots is applied on the affected area for setting the dislocated bones and to treat lockjaw.
8.	*Rhododendron arboreum* Sm.	Ericaceae	Braah	Tree	2300	Flower	Oral, Topical	• Flower paste is applied on the forehead to stop nose bleeding. • Flower juice is useful against heat exhaustion.
9.	*Rubus macilentus* Camb.	Rosaceae	Aakhe	Shrub	2225	Leaves, Fruits	Oral, Topical	• Fruits are edible and are used as a blood purifier. • Paste of leaves is applied to treat boils.
10.	*Viola canescens* Wall	Violaceae	Banaksha	Herb	2200	Flowers, Whole plant	Oral	• Infusion (30-60 ml) is prepared by boiling the fresh flowers in water which is used as a tea to cure fever, cold and cough. • Dried leaves and flower powder (8-10 g) is taken with warm water early in the morning for treating dysentry. • Poultice of fresh leaves is applied on burns.

the younger generation was familiar with the medicinal plants of the study area, they did not make use of local medicinal plant resources, as the majority of them were dependent on market-based products. Among the documented medicinal plant species, 19 species were recorded from 1000-1400 m, 26 species in 1400-1800 m, 10 species in 1800-2200 m and 10 species in above 2200 m altitudinal zones (figure 2). Medicinal plants and their ethnomedicinal uses are enumerated in the Table 2 given below. The most representative families in the highlands were Asteraceae (7 species), Rosaceae (7species), Fabaceae (5 species), Ranunculaceae (3 species) and Rutaceae (2 species), whereas in the lowlands were Moraceae (3 species), Lamiaceae, Polygonaceae and Solanaceae (2 species each). It was documented that among these gathered 65 medicinal plant species, 32 (49.23%) were herbs, 17 (26.15) were shrubs, 14 (21.53%) were trees and 2 medicinal plants (3.07%) were climbers (Table-1). Also, medicinal herbs occurred more often than expected at lower elevations and less often than expected at higher elevations. In contrast, medicinal shrubs, trees and climbers occurred less often than expected at lower elevations and more often than expected at higher elevations. On the basis of plant parts used, the collected medicinal plant species were divided into eight groups, such as, medicinal roots, leaves, fruits, stem/bark, whole plant, flower/buds, aerial parts and seeds. Leaves (28%) were the most frequently used plant part followed by roots (16%), fruits (13%), whole plant (12%), flowers (11%), seeds (10%), stem/bark (8%) and aerial parts (2%) as shown in figure 3.

The present study revealed that the majority of medicinal plants grow at lower altitudes, or more specifically, close to densely populated areas. In this way further risks to conservation are anticipated in the lowlands to medicinal plants, not just because the plants are directly harvested,but also due to additional human-induced activities such as the destruction of habitat for agriculture and settlement, grazing, forest fires and deforestation. Knowledge of the distribution of medicinal plants in the study area can help to identify regions that are rich in medicinal plants and help in approaching conservation strategies for these species.

With increasing altitude, the abundance of medicinal plants was declining, but the percentage of use of plants as medicine consistently increased with increasing altitude. This was due to poverty, a combination of having no substitute choices and faith in the cogency of traditional herbal remedies. Also in high altitude areas the preferences are given much more to the folklore herbal remedies. Herbal drugs are the symbols of safety and purity rather than modern synthetic drugs, that may have detrimental effects sometimes and become fatal. Thus, it is very crucial to come back to nature by intensifying our traditional knowledge.

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References :

1. Abd El-Ghani, M. M. (2016). *Agriculture and Biology Journal of North America*, *7*(5): 220-247.
2. Bamola, N., P. Verma and C. Negi (2018). *International Journal of Life-Sciences Scientific Research*, *4*(1): 1550-1556.
3. Harshberger, J.W. (1996). *Botanical Gazette 21*(3): 146-154.
4. Jain, S.K. (2004). A Manual of Ethnobotany. 2nd ed. Jodhpur : Scientific Publishers.
5. Jain, S.K. and R.R. Rao (1977). A Handbook of Field and Harbarium Methods. New Delhi: Today & Tomorrow's Printers And Publishers.
6. Kapur, S.K. (1993). *J. Econ. Tax. Bot. 17*(2): 395-408.
7. Kohli, M., K. Thakur, M. Devi, V. K. Santavan and A. K. Bhatt (2023). India. *Journal of Research: THE BEDE ATHENAEUM*, *14*(1): 6-16.
8. Kumar, R., and N. Bhagat, (2012). *International journal of medicinal and aromatic plants*, *2*(4): 603-611.
9. Kumari, N., M. Kumar, M. Mekhemar, J. M. Lorenzo, A. Pundir, K. B. Devi, and Andrade-Cetto, A. (2022). *South African Journal of Botany*, *148:* 415-436.
10. Lone, P. A., A. K. Bhardwaj, K. W. Shah, and S. Tabasum, (2014). *J Med Plant Res*, *8*(47): 1362-73.
11. Sahoo, H., and G. Mahalik, (2020). *International Journal of Biosciences*, *16*(5): 284-292.
12. Saklani, A., and S. K. Jain, (1989). *International Journal of Crude Drug Research*, *27*(2): 65-73.
13. Sharma, B., and S. Maheshwari, (2005). *Indian Journal of Traditional Knowledge*, *4*(2): 169-172.
14. Singh, K. K., and K. Kaushal, (2000). *Ethnobotany*, *12:* 42-44.
15. Taylor, J. L. S., T. Rabe, L. J. McGaw, A. K. Jäger, and J. Van Staden, (2001). *Plant growth regulation*, *34:* 23-37.
16. Thakur, M., R. K. Asrani, S. Thakur, P.K. Sharma, R.D. Patil, B. Lal and O. Parkash (2016). *Journal of ethnopharmacology*, *191:* 280-300.
17. Uniyal, S. K., V. Sharma, and P. Jamwal, (2011). *Human Ecology*, *39:* 479-488.