



Ethnomedicinal Plants Used By Local Inhabitants Of Kedarnath Valley, Garhwal Himalaya

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Abstract: Ethnobotany is the scientific discipline that studies the dynamic relationships between people and plants. The Indian Himalaya is a source of plant based indigenous medicinal knowledge based on local plant diversity. A rapid rural survey in more than 45 villages of Kedarnath valley of Rudraprayag district of Uttarakhand were conducted with altitudinal variation ranges from 1000 to 2500 masl. A total of 57 (19 trees, 6 shrubs, 4 climbers and 28 herbs) most highly effective medicinal plant species were recorded, that are used by local inhabitants for traditional local health care system. The local communities use these ethnobotanically important plants for curing fever, stomachache and gastric problem, cancer, diarrhea, dysentery, jaundice, diabetes, snake bite, tuberculosis, paralysis, rheumatic pain, liver ailments, asthma, cough, skin diseases, toothache, wounds and cuts etc. The present study provides valuable information about ethnomedicinal plants of Kedarnath Valley of Rudraprayag district of Uttarakhand.

Key Words: Ethnomedicinal plants • traditional health care • Kedarnath valley • Rudraprayag • Uttarakhand

Introduction

Ethnobotany is the scientific discipline that studies the dynamic relationships between people and plants. Ethnobotany is not only referred to the use and management of the plants, but also incorporates the socio-cultural and economic context, as well as people's perception, conceptualization, values and views etc. (Alcorn 1995, Balick and Cox 1996). During recent times, a major focus of the ethnosciences is on the integration of indigenous knowledge (Rist and Guebas 2006). Medicinal use of Himalayan plants is known since the ancient period, references of that are available in Indian mythology and records. In Charaka and Sushruta Samhitas, there are several references to Himalayan plants. People of remote areas are entirely depending on the forest resources for

maintaining their day-to-day needs, including, healthcare and medicine. They have developed their own health care system based on locally available plants. At present, the pharmaceutical sector in India is making use of 280 medicinal plant species, of which 175 are found in the Indian Himalayan region (Dhar et al. 2000). In India, about 65% of population depends on the traditional system of medicine (Timmermans, 2003). The healers residing in the rural areas of the Himalaya play a vital role in knowing the medicinal properties of the various plant species hence, their knowledge must be considered as an essential component for the development of the rural areas (Semwal et al. 2010). Failure to document indigenous knowledge would represent a tremendous economic and scientific loss of mankind (Uniyal et al. 2002, Uniyal and



Vandana Shiva 2005). Samant and Pant (2003) studied the diversity, distribution and traditional knowledge of sacred plants of the IHR. Semwal et al. (2010) studied medicinal plants used by local Vaidyas in Ukhimath block, Uttarakhand, India. Singh et al. (2017) studied ethnomedicinal plants used by local inhabitants of Jakholi block, Rudraprayag district, Western Himalaya, India. The people in remote villages and tribal areas of Kedarnath Valley are directly dependent on forest resources for food, fodder, medicine (folk medicines) and timber (Prasad et al. 2021). The present communication pertains to the traditional knowledge on some ethnomedicinal plants used for the treatment of various diseases.

Materials And Methods

The study was conducted at catchment area of Mandakini River that includes adjoining villages of Guptkashi, Fata, Rampur, Sitapur, Sonprayag, Kalimath valley, Triyuginarayan and Ukhimath, situated in Kedarnath valley of Rudraprayag district of Uttarakhand. Geographically, it is located at the north of Garhwal Himalaya between 30°25'–38°41' N, 78° 55'–79° 22' E,. The maximum average temperature was found to range between 10°C (January) and 27°C (June) whereas the minimum average temperature was recorded within the range of -7°C (February) to 19°C (June). The field study was carried out during the season from July 2020 to October 2022 Fig 1)

A rapid rural survey in the target villages located in Kedarnath valley was carried out for the study along with altitudinal variation from 1000 to 2500 masl. Since the area is heavily depended upon the traditional health-care system. The methodology adopted for the study was based on interviews of local people having knowledge of medicinal plants of this area. The basic information was collected in view of medicinal value of plants to cure a wide range of diseases. Group discussion among people of different age

groups was also taken into consideration for generating the information. The information was gathered about each medicinal plant from local respondents. Each species was identified with the help of existing flora (Nathani, 1985, Gaur, 1999) and consultation with herbaria of BSI and FRI, Dehradun. The specific information of plants were collected, processed, documented and finally deposited in the herbarium of the department Botany, Govt. P.G. College Agastyamuni as reference material.

Results

In the present study, a total of 57 (19 trees, 6 shrubs, 4 climbers and 28 herbs) ethnomedicinal plants species were recorded after conducting the survey and having discussion with villagers of Kedarnath valley. During the survey, it was found that most of the villagers used ethnomedicinal plants for various therapeutic purposes in their day-to-day's life for primary health care. A large number of remote area's villages respondent were illiterate and they were keen to provide the information and transferring the indigenous knowledge of ethnomedicinal plants from one-generation to another generation. List of the ethnomedicinal plants reveals that the local people still depend on a number of plants for their daily needs specially in medicines. Among 57 identified ethnomedicinal plants most of them are commonly found near villages surrounding wasteland and forest area. The local communities use plant species of surrounding area, that is chiefly used for curing fever, stomach-ache and gastric problems, cancer, diarrhea, dysentery, jaundice, diabetes, snake bite, tuberculosis, paralysis, rheumatic pain, liver ailments, asthma, cough, skin diseases, toothache, wounds and cuts etc. Plants used by the respondent are tabulated with local name, botanical name and their uses in Table 1. Euphorbiaceae was noted as the dominant



family with 4 species, followed by Rosaceae with 3 species, whereas the rest of families was

represented by 2 and one species (Fig: 2).

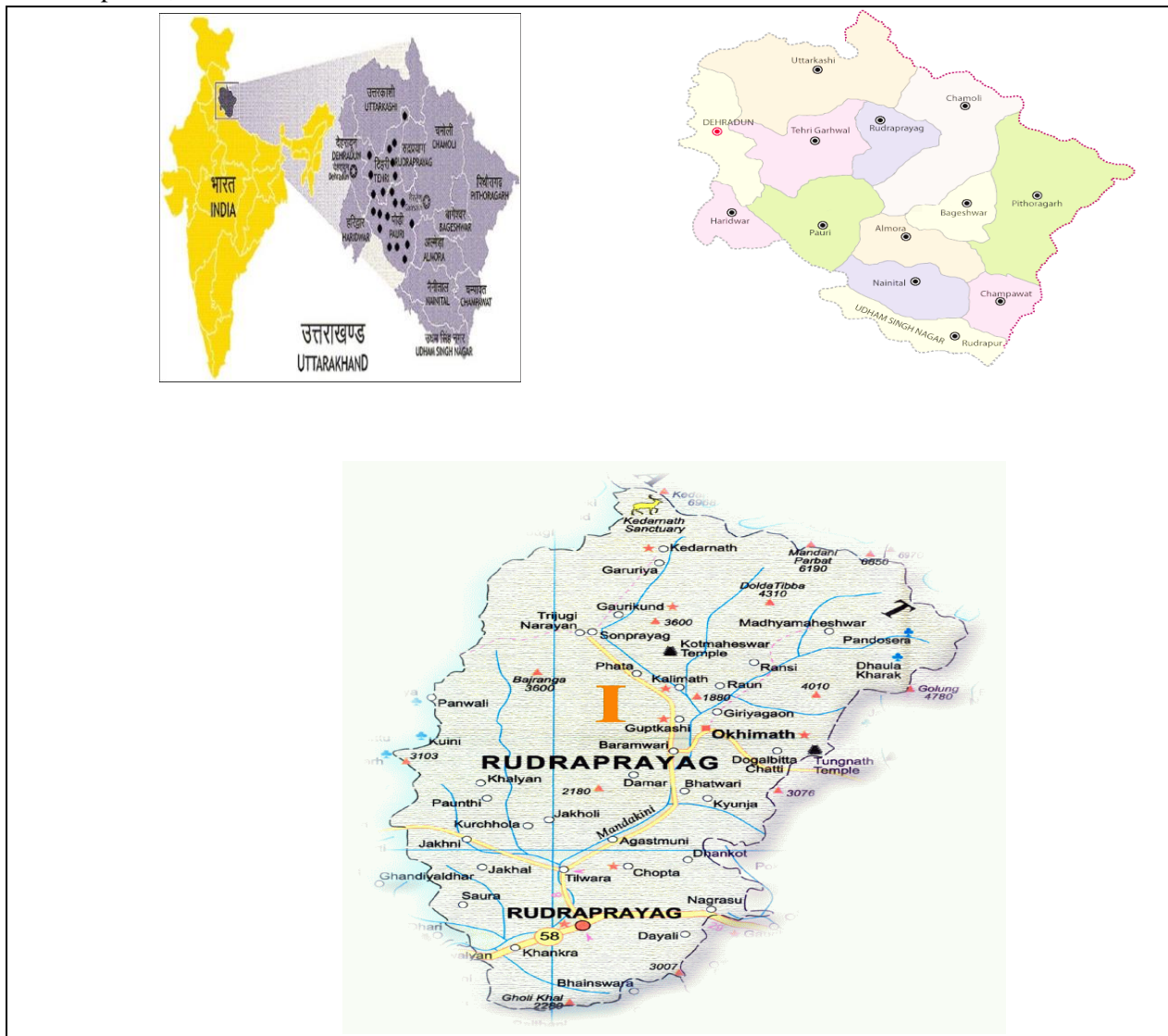


Figure 1. Location map of study area



Table 1. List of Ethnomedicinal plants found in the Kedarnath valley

S N	LOCAL NAME	BOTANICAL NAME	FAMILY	HERBS/ SHRUBS / TREES	ALTITUDE (Meter)	PLANTS PART USED	USES
1.	Atis	<i>Aconitum heterophyllum</i> Wall. ex Royle	Ranunculaceae	Herb	2000-2700	Root	Root is useful for high fever and other stomach problem.
2.	Chora	<i>Angelica glauca</i> Edgew	Apiaceae	Herb	2000-2500	Root	Root is used in toothache, stomach-ache and gastric problem.
3.	Kut	<i>Bistorta affinis</i> (D. Don) Greene	Polygonaceae	Herb	2000-2500	Root	Root paste is applied on fore-head to control fever. Root stock is used in stomach-ache.
4.	Dhandura	<i>Paeonia emodi</i> Wall. ex Royle	Paeoniaceae	Herb	1800-2500	Leaf	Leaf as vegetable is used for high fever.
5.	Bjardanti	<i>Potentilla fulgens</i> Wall. ex Hook.	Rosaceae	Herb	1600-2500	Leaf	Leaf paste is used in mouth ulcer.
6.	Ilaru	<i>Trichosanthes tricuspidata</i> Lour.	Cucurbitaceae	Climber	1000-2000	Fruit	Fruit pulp is boiled in brassica oil and applied on head to cure head ache, also applied on ulcers, wounds and boils.
7.	Thuner	<i>Taxus baccata</i> Linn.	Taxaceae	Tree	2000-2500	Leaves	Used in arthritis, snake bites, blood clots, breast cancer, lung cancer.
8.	Bhojpatra	<i>Betula utilis</i> D. Don	Betulaceae	Tree	2000-2500	Bark	The bark is used in bone fracture. It is useful in hysteria, bacterial infections, wounds, diarrhea, dysentery, jaundice and skin cancer.
9.	Kutki	<i>Picrorhiza kurroa</i> Royle ex Benth.	Plantaginaceae	Herb	2000-2500	Stolons, roots	Roots are used in treating mainly chronic fever, skin disorders and diabetes.
10.	Satwa	<i>Paris polyphylla</i> Smith	Melanthiaceae	Herb	2000-2700	Rhizome, roots	A decoction of the roots in the treatment of poisonous snake bites, boils and ulcers.
11.	Sumaya	<i>Valeriana jatamansi</i> Jones ex Roxb.	Valerianaceae	Herb	1800-2500	Root, leaves	Root extract is given in nervous disorder and fits. Leaf juice is useful for stomach ache.
12.	Jhirna	<i>Asparagus officinalis</i> Linn.	Asparagaceae	Herb	1000-1500	Shoot	Shoot is used for cancers, including bone, breast, lung and colon cancers.



13.	Silphodi	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Herb	1700-2500	Root	Root extract is used for the treatment of kidney stone, diabetes and heart problem.
14.	Jangali Haldi	<i>Hedychium spicatum</i> Sm.in A.Reess	Zingiberaceae	Herb	1600-2500	Rhizome	Rhizome is used in blood purification and rheumatic pain
15.	Bankakdi	<i>Sinopodophyllum hexandrum</i> (Royle) T.S.Ying	Berberidaceae	Herb	2000-2500	Fruit	It is used for jaundice, liver ailments, fever, syphilis, hearing loss and cancer.
16.	Dhatura	<i>Datura stramonium</i> Linn.	Solanaceae	Herb	700-1000	Leaves, seeds and flower	Leaves, seeds and flowers are used for the treatment of bronchitis, asthma and cough. Seed paste with hot leaf is applied to control body swelling.
17.	Bhaang	<i>Cannabis sativa</i> Linn.	Cannabaceae	Herb	700-2000	Leaf	Leaf paste is used for cuts, skin ulcer and insect bite.
18.	Kachnar	<i>Bauhinia variegata</i> (L.) Benth.	Fabaceae	Tree	1000-2000	Bark	Used in skin diseases, dysentery and ulcers. The juice of the bark is used in the treatment of amoebic dysentery, diarrhea and other stomach disorders.
19.	Panger	<i>Aesculus indica</i> (Wall. ex Cambess.) Hook.	Sapindaceae	Tree	2000-2500	Bark	Bark paste is used in bone fracture.
20.	Kundju	<i>Artemisia vulgaris</i> Linn.	Asteraceae	Herb	700-1500	Leaf	Leaf paste is useful for skin infection, ringworm and wound.
21.	Brahmi	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	700-1000	Plant	Plant paste and juice are used in mental weakness and skin diseases.
22.	Tejapatta, Khikra	<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & C.H.Eberm.	Lauraceae	Tree	700-1200	Leaf	Leaf is used in blood pressure and digestion.
23.	Akash Bail	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Climber	1000-1500	Plant	Plant juice is used in skin diseases.
24.	Genthi	<i>Dioscorea bulbifera</i> Linn.	Dioscoreaceae	Climber	700-1000	Tuber	Tuber is used as tonic for diabetes, skin diseases and burns.
25.	Amla	<i>Phyllanthus emblica</i> Linn.	Phyllanthaceae	Tree	700-1500	Fruit	Fruits are useful for digestive system, cough, high blood pressure and asthma.
26.	Dhond	<i>Girardinia</i>	Urticaceae	Herb	2000-	Root,	Root and leaf paste is



	kandali	<i>diversifolia</i> (Link) Friis			2500	leaves	applied on ulcers.
27.	Ratidana	<i>Abrus precatorius</i> Linn.	Fabaceae	Herb	800-1200	Root	Root used to cure ulcer and rheumatic pain.
28.	Jangali Akhrot	<i>Juglans regia</i> Linn.	Juglandaceae	Tree	2000-2500	Root, Fruit	Root bark and branches are used for cleaning of teeth. Fruit peel is useful for the treatment of ringworm.
29.	Ruenau	<i>Mallotus philippensis</i> (Lam.) Muell.Arg.	Euphorbiaceae	Tree	700-1200	Fruit	The red outer layer of fruits is used for the treatment of intestinal worms and parasitic skin diseases.
30.	Currypatta	<i>Murraya koenigii</i> Linn.	Rutaceae	Herb	700-1000	Leaves	Leaves are used as condiment in high blood pressure and diabetes.
31.	Chir	<i>Pinus roxburghii</i> Sarg.	Pinaceae	Tree	700-1800	Resin	Resin is used as crack cream.
32.	Bach	<i>Acorus calamus</i> Linn.	Acoraceae	Herb	700-1000	Root	The root of the plant is used to treat bronchitis. It is also believed to remedy arthritis, cancer, diarrhea, etc.
33.	Giloye	<i>Tinospora cordifolia</i> (Thunb.) Miers	Menispermaceae	Climber	700-1000	Root	Root powder is eaten for high blood pressure, fever and weakness. Root powder mixed with honey is prescribed in cough.
34.	Kandali	<i>Urtica dioica</i> Linn.	Urticaceae	Herb	700-1000	Leaf	Leaf is used for menstrual disorders paralysis, diabetes and arthritis.
35.	Hamaku	<i>Verbascum thapsus</i> Linn.	Scrophulariaceae	Herb	1000-1500	Leaf	Leaf paste is applied on ulcer.
36.	Timru	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Shrub	2000-2500	Bark, fruits and branches.	Bark, fruits and branches are used for toothache. Branches are used as toothbrush and in gum troubles.
37.	Arandi	<i>Ricinus communis</i> Linn.	Euphorbiaceae	Shrub	700-1000	Seeds, leaf	Castor is used very effectively in the treatment of rheumatic and skin disorders. The leaf is used for pain.
38.	Rudraksha	<i>Elaeocarpus ganitrus</i> Gaertn.	Elaeocarpaceae	Tree	1000-1500	Fruit	The pulp of fruit is used for the treatment of asthma.
39.	Buransh	<i>Rhododendron arboreum</i> Sm.	Ericaceae	Tree	2000-2500	Flower, leaves	The flower juice is used for high blood pressure. The paste of young leaves are



							applied on the forehead in the treatment of coughs, diarrhea and dysentery.
40.	Jiwai, Makoi	<i>Solanum nigrum</i> Linn.	Solanaceae	Shrub	1000-1500	Leaf, Branches	Leaf paste and branches are used in jaundice and high fever.
41.	Surae	<i>Euphorbia royleana</i> Boiss.	Euphorbiaceae	Shrub	1000-1500	Latex	Latex is used for earache.
42.	Chiraita	<i>Swertia chirayita</i> Linn.	Gentianaceae	Herb	1000-1500	Leaves, roots	Leaves and roots are used for fever, upset stomach, intestinal worms, skin diseases and cancer.
43.	Kingod	<i>Berberis aristata</i> DC.	Berberidaceae	Shrub	700-1000	Root	Root stock is used as antiseptic blood purifier in conjunctivitis and urinogenital disorders.
44.	Deodar	<i>Cedrus deodara</i> (Roxb.) G. Don	Pinaceae	Tree	1000-2000	Leaves	It extremely useful in neurological disorders, asthma, fever infected wounds. Its oils is used in arthritis, headache etc
45.	Bedu	<i>Ficus palmata</i> Forssk.	Moraceae	Tree	1000-1500	Latex	Latex is used to control bleeding wounds.
46.	Khaina	<i>Ficus semicordata</i> Buch.-Ham. ex Sm.	Moraceae	Tree	1000-1500	Fruit	Ripe fruits are useful in fever.
47.	Lankaber	<i>Jatropha curcas</i> Linn.	Euphorbiaceae	Shrub	700-1000	Seed	Seeds are used to check vomiting.
48.	Aiyaar	<i>Lyonia ovalifolia</i> (Wall.) Drude	Ericaceae	Tree	1000-1800	Leaf	Leaf paste is applied in allergy and fungal infection.
49.	Dainkan	<i>Melia azedarach</i> Linn.	Meliaceae	Tree	700-1000	Leaf, seed, Bark, roots	Leaf, seeds, bark and root boiled in oil are applied for treating skin disease.
50.	Ban pudina	<i>Mentha longifolia</i> (L.) Huds.	Lamiaceae	Herb	700-1000	Leaves	Leaves are used in indigestion, vomiting, cough and cold
51.	Khatibuti, Bhirmora	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Herb	1000-1500	Leaf	Leaf paste is applied on skin ulcer and wound.
52.	Bhang-zeera	<i>Perilla frutescens</i> (L.) Britton	Lamiaceae	Herb	1000-1500	Leaf	Leaf juice is used in earache.
53.	Choole	<i>Prunus armeniaca</i> Linn.	Rosaceae	Tree	1000-1500	Seeds	Seeds paste mixed with water is given to children in stomachache.
54.	Hatajadi	<i>Dactylorhiza hatagirea</i> (D. Don) Soo	Orchidaceae	Herb	2200-3000	Tuber/Rhizome	The juice extracted from tuber is used for fever and pyorrhea
55.	Almoda	<i>Rumex dentatus</i>	Polygonaceae	Herb	1000-	Leaf	Leaf paste is applied for



		Linn.	ae		1500		infection.
56	Kaphal	<i>Myrica esculenta</i> Buch. -Ham. ex D.Don	Myricaceae	Tree	1200-2100	Leaf, fruit	Fruit juice taken is orally, paste is applied externally on skin
57	Painya	<i>Prunus cerasoides</i> D.Don	Rosaceae	Tree	1000-1500	Bark	Boiled bark in water is useful for Swelling.

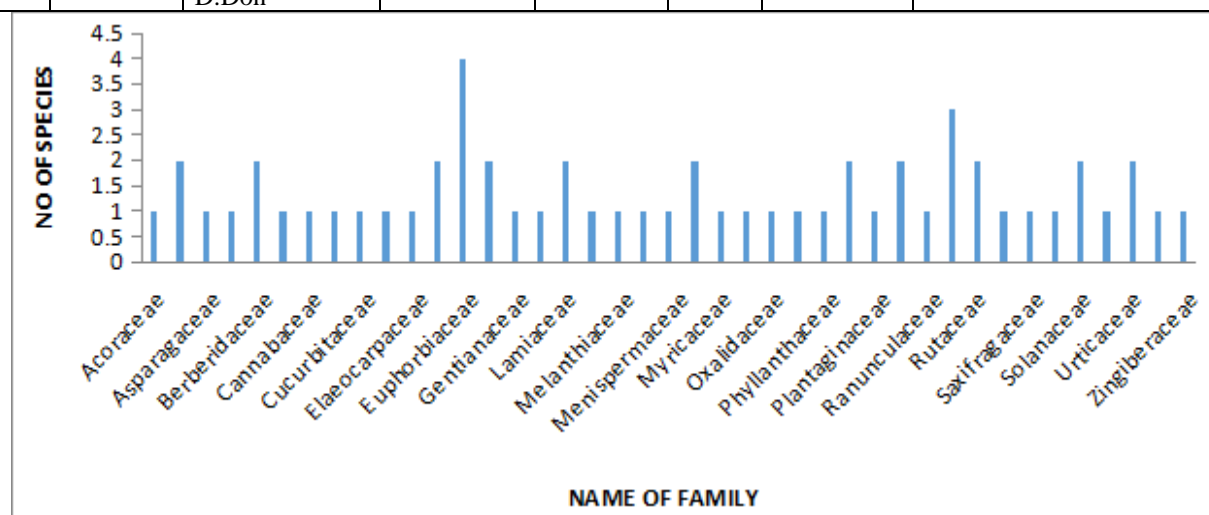


Figure 2. Important ethnomedicinal families observed in the Kedarnath valley.

Discussion

A total of 57 ethnomedicinal plant species belonging to 21 families were reported for curing various ailments like fever, cough, cold, digestive disorders, constipation, stomach-pain, tooth-ache, diabetes, diarrhea, etc. It was also found that a single plant may be used for curing many ailments e.g. Thuner (*Taxus baccata* Linn.), Chiraita (*Swertia chirayita* Linn.), Kutki (*Picrorhiza kurroa* Royle ex Benth.) and Kingor (*Berberis aristata* DC.) etc and also reported by Gajendra Singh and G. S. Rawat (2011). In present study it was found that most of the villagers used ethnomedicinal plants for various therapeutic purposes in their day- to -day's life for primary health care. Uttarakhand Himalayan people have a close relationship with nature. They are fully dependent upon forest for food, fodder and medicinal plants for their healthcare (Samant et al. 1998, Ram Prakash, 2014). Some

of the medicinal plant species and formulation are frequently used by the local people as well as Viadyas for curing ailments (Semwal et al. 2010). Local people of higher region of Kedarnath valley, especially older aged people, tribal people and women, heavily use these traditionally available medicinal plants for health and believe that these are easily available, less expensive and have no side effects as compared to modern medicine (Bhatt and Vashishtha, 2008, Ram Prakash, 2010 and Chamoli and Sharan, 2019). The present situation of traditional knowledge regarding to medicinal plants everywhere is an issue of deep anxiety as the traditional knowledge is gradually declining and disappearing from the countryside.

Conclusion

The present study provides valuable information about ethnomedicinal plants and their uses in



traditional medicinal system by local inhabitants of high altitudinal regions of Rudraprayag district. Local traditional knowledge and the practice of plant-based medicine are still widespread in rural areas of this region and these play an important role in primary health care. Documentation and share knowledge of local herbal healers (Vaidyas) and train young generation to promote their profession. Study of ethnomedicinal knowledge helps identify the important species of the region for pharmacological importance, ecological sustainability and conservation of traditional knowledge.

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