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A comprehensive study on ethnomedicinal plants used by tribal communities of Ramhal forest division Kupwara

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Abstract

Introduction: Medicinal plants have a history of thousands of years and are highly regarded worldwide as a rich source of therapeutic agents for preventing diseases. The importance of herbal medicine in the treatment of diseases is beyond doubt. The ethnomedicinal potential of the Ramhal forest range has not been investigated. So, an endeavor has been made with the assistance of nearby people including herbalists, shepherds and the elder knowledgeable individuals to archive the ethno botanical data of medicinal plants of Ramhal forest range.

Material and methods: The data was quantitatively analyzed using use-value (UV), informant consensus factor (ICF).

Results: A total of 65 medicinal plants belonging to 40 families have been collected from the study area. Most of them belong to Asteraceae and Lamiaceae (9 species each) followed by Apiaceae (3 species) while the remaining families contribute only one are two species each. The medicinal plants were mainly herbs followed by Leaves, whole plant, seed, areal part, fruits and stem latex. The important species on the basis of UV were *Acorus calamus* (0.62), *Aconitum heterophyllum* (0.66), *Artemisia absinthium* (0.67), *Saussurea costa* (0.65), *Rheum webbianum* (0.63) and the lowest ICF is recorded for *Stipa sibirica.* The values ICF ranged between 0.89 to 0.96.

Conclusion: The contribution of plant part used is dominated by roots, collection of roots leads to decrease in the population of parent plant and may be extreme danger for survival of the frequently uncommon and gradual reproducing medicinal plants. The plants collected by these strategies require maintainable utilization and conservation strategies. Native population still believe medicinal plants for his/her primary healthcare, however at the same time are afraid about the loss of flora in the wild.

Key words: Ramhal forest range, Medicinal Plants, Kupwara, Ethnomedicinal, Traditional knowledge**.**

Introduction

Medicinal plants have a history of thousands of years and are highly regarded worldwide as a rich source of therapeutic agents for preventing diseases. The importance of herbal medicine in the treatment of diseases is beyond doubt. Even today, many local communities in developing countries still rely on plant-based medicine, and modern healthcare systems rely on plant-based ingredients. Since humans learned to survive on the planet, plants have been an important part of human civilization. Since prehistoric times, humans have used plants to meet all the main needs for his survival. About 70% of the identified medicinal plants of Indian Himalayan are exposed to distractive harvesting (Dhar et al. 2000) Even today 80% of the world's population relies on tradition medicinal plants (Dar et al. 2001). Herbal medicine even today plays an important role in rural areas and many locally produced International drugs are still being used as household remedies for various diseases especially in these areas for different ailments (Aadil Abdullah & Syed Aasif Hussain Andrabi 2021).

Kashmir Himalayas in our country harbors a treasure house of the medicinal plants (Singh J S 2002). Forests play an important role in the viability and survival of indigenous households in India, by virtue of their importance in social, cultural and economic survival (Phondani et al. 2010). Human behavior has a direct impact on the plant communities with which they interact and these interactions are the objectives and targets of ethno botany and ethno medicine. Ethno botanical surveys investigate how these plants resources are utilized as medicine, fuel wood, food, shelter, agriculture, timber, furniture, fodder and religious ceremonies (Khan et al. 2003). Rural communities in Himalayan region, particularly those dwelling near the wood land ranges have higher reliance on the forest asset utilization and Kashmir is no exception. It is estimated that in India about 800 plant species are consumed as food and medicinal plants, chiefly by the tribal inhabitants (Med 2017). Kashmir Himalaya from time to time by various workers (Ara and Naqshi, 1992; Kaul, 1997; Kapahi et al., 1999; Khan et al., 2004; Wani et al., 2006; Tantray et al., 2009; Malik et al., 2011; Bhat et al., 2012; Baig et al., 2013; Jeelani et al., 2013; Lone et al., 2013, 2014; Hassan et al., 2013).

Kashmir Himalaya, one of the biotic provinces of the Himalayas, and a part of biodiversity hotspot, supports a rich and unique floristic diversity including a rich repository of medicinal plants and the traditional knowledge

associated with these plants (Dar et al., 2002). Ethno medicinal plants have made a tremendous contribution in the discovery of new drugs against different diseases including cancer. More recently, investigations on natural products have regained prominence for their biological significance and function of their structural diversity (Schmidt et al., 2008). Forest resources are the source of income, employment, lodging, shelter, food, fodder, fuel, timber, vegetable, medicine, fertilizers, etc within the tribal areas of Kashmir. Forest resources are the common thread in all aspects of life including birth, marriage, livelihood, or death (Islam et al. 2015).

The ethnomedicinal potential of the Ramhal forest range has not been investigated. So, an endeavor has been made with the assistance of nearby people including herbalists, shepherds and the elder knowledgeable individuals to archive the ethno botanical data of medicinal plants of Ramhal forest range.

Materials and methods

Study area

Ramhal forest range is located between 34°28'25"N 74°3'52"E coverings an area of 321.12 sq.km. its situated about 15 km towards northern side of the district headquarters of Kupwara. It's one of the four ranges of Kehmil forest division Kupwara (Figure 1). The study area is rich in biodiversity, with temperate to alpine climate, severely cold in winter (nearly 4-5 months), followed by spring monsoon and summer season. The area is mostly mountainous, supporting a wide variety of potential medicinal plants. The vegetation is dominant by high altitude coniferous forests; the forests understory compresses a luxuriant vegetation of shrubs and herbs. The forest tree species are *Cedrus deodara, Abies pindrow, Pinus wallichiana, Picea smithiana* and the dominant shrub species as *Viburnum grandiflorum, Berberis lycium* and *Indigofera heterantha*. The temperature ranges between -4˚ C minimum in winter and up to 32˚C maximum in summers (Aadil *et al*. 2021).

The study area is inhabited by the local tribes (Gujjars, Bakarwals), who migrate to high altitude areas during summer along with their livestock of different pasture lands, such as Rashanpora Dutt, Bungus valley, Sadnatop, Tee-pee, Budnamal. The ethnic groups such as Gujjars, Bakarwals, Pharis and Kashmiri are living in the study area. Out of these Bakarwals are the important tribes concentrated in the upper parts of study area. They also possess rich knowledge of important high altitude medicinal plants.

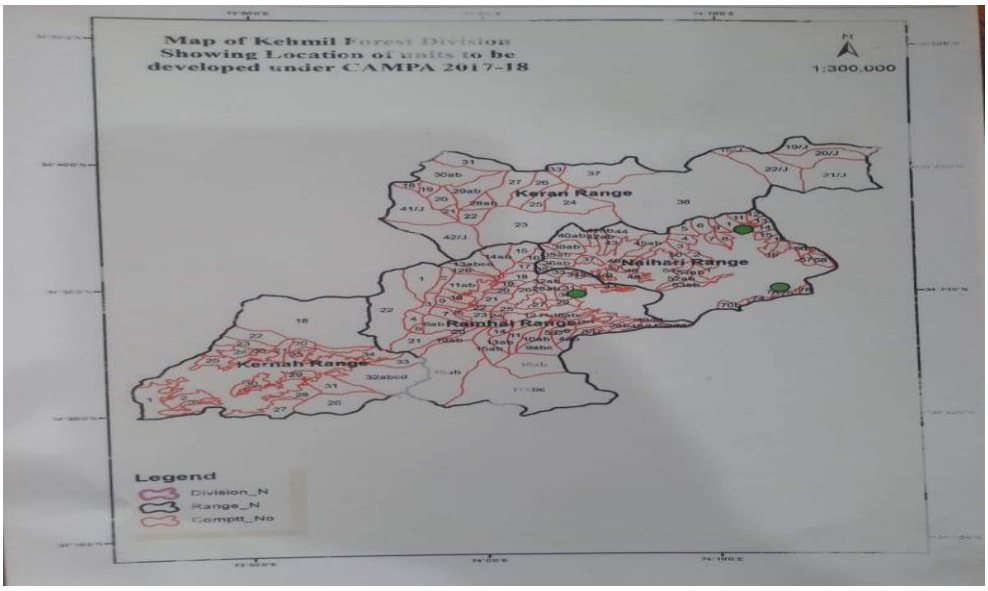


Figure 1: Map of study area.

Data collection:

For collection of the data, the following procedure was used to collect the information about medicinal plants, field surveys, ethnobatanical knowledge discovered from informants, photography and inventory, preservation and taxonomic verification of specimens, botanical identification and quantitative ethnobatanical analysis. The traditional knowledge on the medicinal plants of Ramhal forest range was

collected from informants from May 2020 to August 2021. A total of 68 informants were interviewed (46 male and 22 females). Personal interviews, questionnaires and field discussions were conducted to record the traditional knowledge of local people about medicinal plants. The usages, plant part used, disease treated, preparation and mode of administration of medicinal plants were recorded from the informants. Regular field surveys were carried out during the flowering season of most of the medicinal plants to ascertain the identification, obtain maximum information and to cross-check the information provided by the local informants during early field visits.

Through multiple visits and interviews with the informants, the reliability of the information collected was confirmed. All the collected plant specimens were collected from different locations during the field visits. Additional identification was performed by matching the voucher specimens with previously identified specimens, which were deposited in Herbarium University of Kashmir, Srinagar (Acronym KASH). The botanical names of the plant species have been updated according to The Plant list (www.theplantlist.org).

Data analysis:

The data collected during interviews of the informants was analyzed using two different quantitative indicators, namely the use value (UV) and the informant consensus factor (ICF). The relative importance was calculated employing the use-value (Phillips et al., 1994), the use value is a quantitative measure of the relative importance of locally known species.

$$UV = \Sigma U/n$$

Where 'U' is the number of total-reports cited by each informant for a given plant species and 'n' refers to the total number of informants. Use value is greater when there are many use reports for a plant, indicating that the plant species is important, and comes near to zero when there are few reports related to its use. The use value, however, does not distinguish whether a plant is used for single or multiple purposes (Bhatia et al. 2014).

To test uniformity of knowledge regarding the medicinal plants, the Informant consensus factor (ICF) was used (Heinrich et al., 1998). Before performing the analysis, all the ailments were broadly classified into various categories (Heinrich et al. 1998) and (Bhatia et al. (2014). This approach was utilized to find and highlight informant's data on a specific type of disease category. The ICF was calculated as:

$$ICF = Nur - Nt / Nur - 1$$

Where 'Nur' refers to the number of use reports of a particular disease category by all the informants and 'Nt' is the total number of species used by informants. ICF values are low (near 0) if plants are chosen randomly or if there is no exchange of information about their use among the informants, and comes near to one (1) when there is a well-defined selection criterion in the community and/or if information is exchanged between informants (Gazzaneo et al., 2005; Sharma et al., 2012).

Results & discussion

Informants:

The informants were mainly the local residents of Ramhal forest division. A total of 68 informants were interviewed during field visits. Most of the informants were males (67.65) whereas the female informants are (32.35). Most of the informants were illiterate (41.18), males are the most important in sharing the knowledge about medicinal plants as compared to females. Most of the informants belong to Gujjars community, shepherds are the dominant informants who have great knowledge about medicinal plants and counts about (36.76), most of the informants are old age people (47.06) (Table 1). Out of 65 medicinal plants which are collected only 15 species have single medicinal use while the remaining species have at least two to three medicinal uses. All the selected informants belong to only one religion I, e Islam; the major languages spoken in the study area are dominated by Kashmiri followed by Gujjars and Phari. The cutting edge era is slanted towards the utilization of allopathic solutions and appears that conventional information of plant utilize is extreme threat of being misplaced.

Demographic features	Number of people	Percentage (%)
Administrative Region	68	100
Education		
Illiterate	28	41.18
Primary education	18	26.47
Secondary education	13	19.12
Higher education	9	13.23
Age range		
Young (19-27 Years)	12	17.65
Middle (28-55 Years)	24	35.29
Old (56-75+ Years)	32	47.06
Profession		
Shepherds	25	36.76
Herbalists	11	16.17
Daily laborers	19	27.94
Housewives	13	19.13
Ethnic Groups & Language		
Bakarwals	30	44.17
Gujjars	22	32.31
Kashmiri	16	23.52
Gender		
Male	46	67.65
Female	22	32.35
Religion		
Islam	68	100

Table 1: Demographic description of the informants.

Floristic characteristics of medicinal plan:

A total of 65 medicinal plants belonging to 40 families have been collected from the study area. Most of them belong to Asteraceae and Lamiaceae (9 species each) followed by Apiaceae (3 species) while the remaining families contribute only one are two species each. The reason behind the dominance of the family Asteraceae is that members of this family are well known for aromatic quality and are easily available in nature or might be due to its herbaceous life form, extensive distribution, and richness in the study area (Tariq et al. 2018; Shedayi and Bibi 2012). Owing to widespread ecological amplitude, the members of the family Asteraceae acclimatize easily and adapt to arid dry habitats rapidly (Haq et al. 2021).

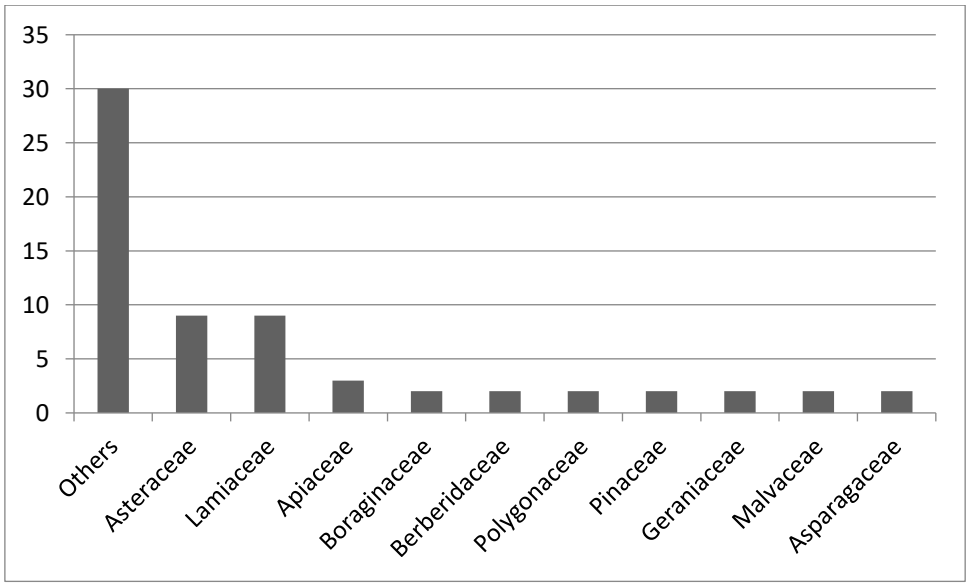


Figure 2. Contribution of different families to ethnomedicinal flora in the study area.

In the current study the dominant life form of medicinal plants is herbs (52 species) followed by Trees (5 species), (Shrubs 4 species), Ferns (2 species) and fungi (1 species) (figure 3). The plants collected from the study area were used in different ways; they are used either orally or externally on infected body portion depending upon the disease treated. The higher use of herbs for medicinal purposes in the study area may be due to their ease of collection, greater abundance and high effectiveness in the treatment of ailments in comparison to other life-forms (Singh and Shanpru 2010; Adnan et al. 2012).

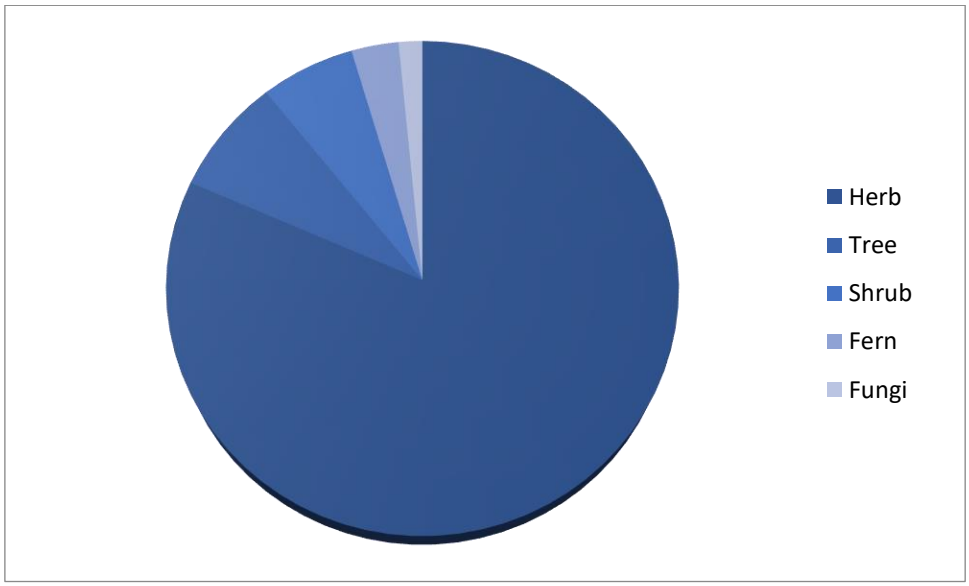


Figure 3. Percentage contribution of various life-forms of ethnomedicinal plants.

Roots (27 species) are the most common choice of the locals for preparation of medicinal recipes followed by leaves (17 species), whole plant (9 species) while as the remaining fruits, areal part, seeds, stem latex, resins, young frond, flowers and fruiting body contributes (3,2,1 species each) (figure 4). Drying the live plants and are crushed into powder or used raw which is used to make tea, extract juice, paste, infusion, decoction, vegetable are the most common ways of preparation methods for the utilization of medicinal plants. Grinding or crushing and boiling are the most common and effective methods of active ingredient extraction in a major part of the world where herbs are used as medicines (Singh et al. 2019), and the most common method among the local people of the study area.

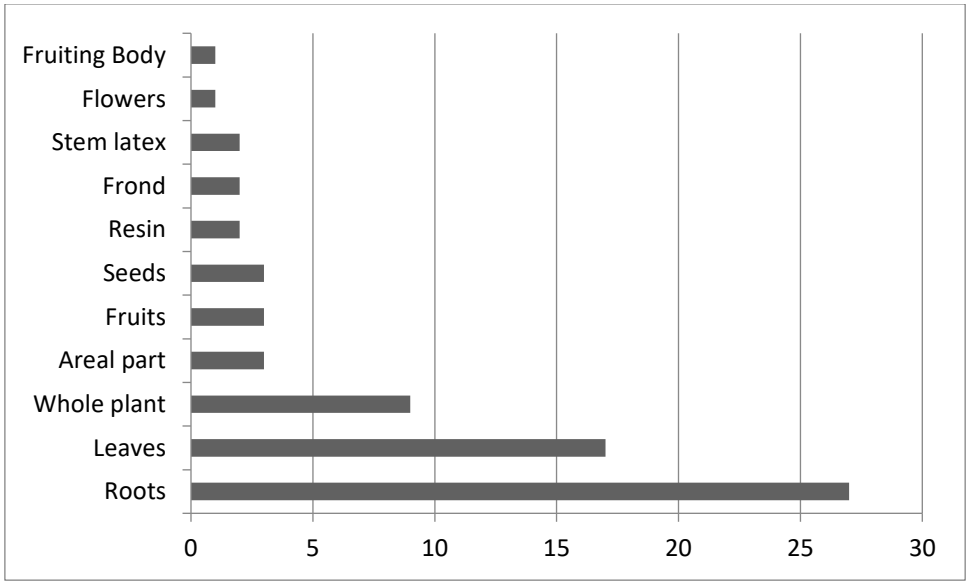


Figure 4. Percentage contribution of various plant parts used in the ethnomedicinal preparations.

The common sicknesses within the considered range are fever, cold, stomach ache, back pain; intestinal worms are the commonly present in the study area. The usages of medicinal plants are on the decay since chosen present day drugs are accessible in the study area, which give speedy alleviations. But within the remote regions nearby individuals incline towards to treat me chosen afflictions utilizing therapeutic plants such as *Aconitum heterophyllum*, *Artemisia absinthium, Bergenia ciliate, Ficus carica*, *Jurinea dolomiaea* etc which are used to treat different types of diseases. The reported diseases were categorized into 8 broad categories: gastrointestinal problems (15 diseases), Dermatological diseases (6 diseases), Muscular-Skeletal problems (4 diseases), Respiratory problems (8 diseases), Urological problems (5 diseases), Urological problems (4 diseases), and other diseases (8 diseases), liver diseases (2 diseases). Most of the plant species have been reported to treat gastrointestinal problems followed by dermatological diseases (figure 5). In the study area local people have given preference to the live stock also few medicinal plants has been used to treat diseases of livestock also like *Stipa sibirica*, *Angelica glauca, Cedrus deodara,* and diseases like Bloat, lice killing, foot and mouth disease of cattle are used to treat.

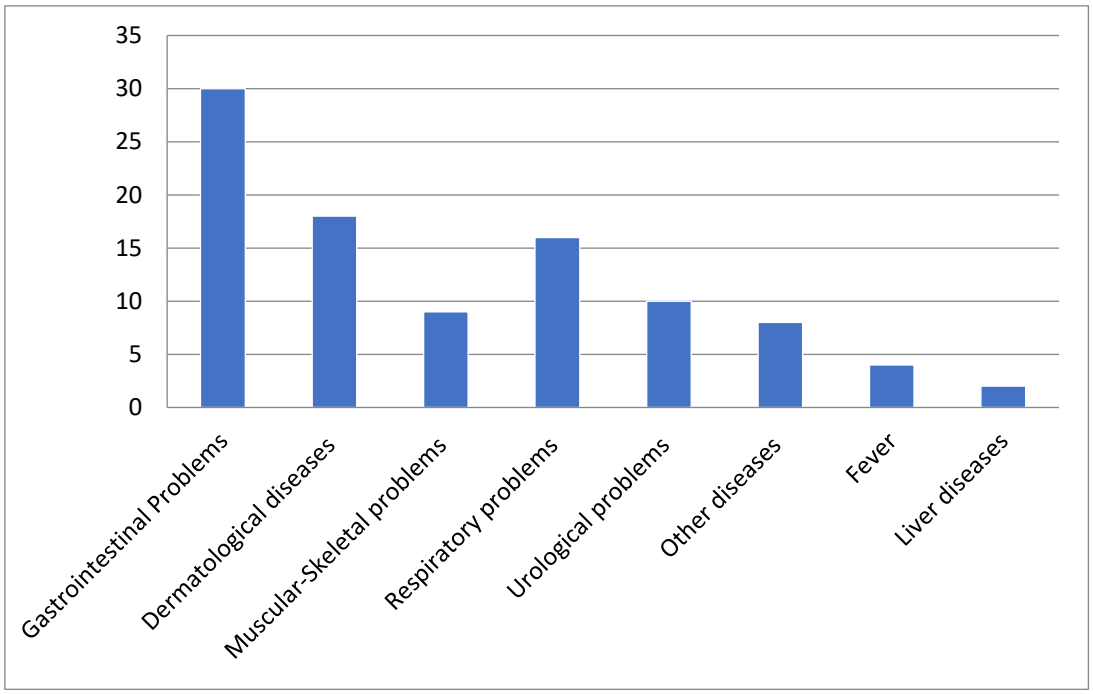


Figure 5. Percentage of plants used to treatment of various disorders in the study area.

Medicinal plants in Kehmil forest division Kupwara were used by different tribal communities for treatment of various diseases. A total of 135 different types of disease categories are being reported to be treated by 65 medicinal plants. There are three different tribal communities I.e. Gujjars, Bakarwals and Kashmiri, most of them are Gujjars. Most of the plants are used for various disease categories by all the Gujjars (40) followed by Bakarwals (31) and Kashmiri (29), while as all the communities contribute to (35) (Fig. 6). Gujjars and Bakarwals in the study visit to higher altitudes of study area during summers along their livestock.

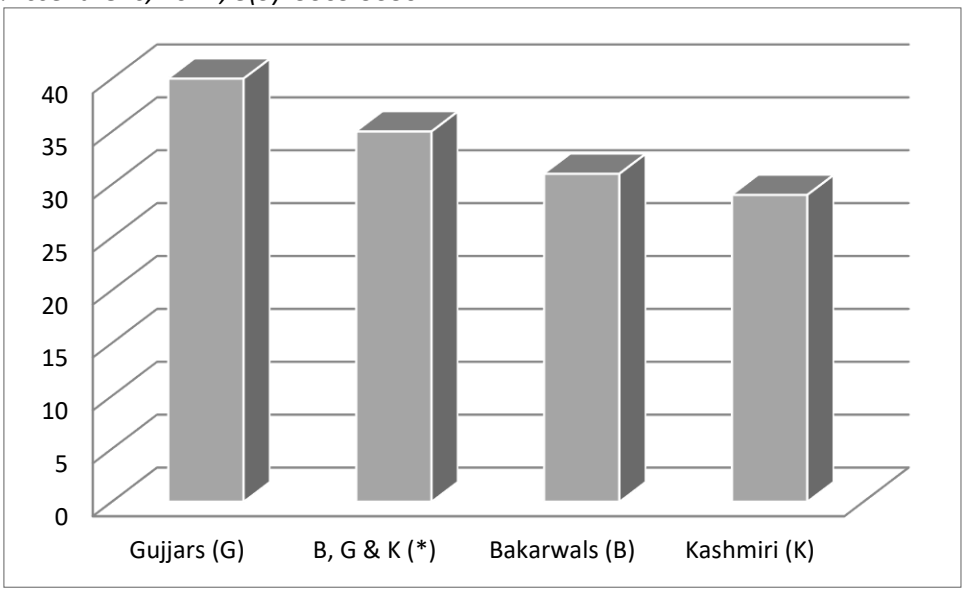


Figure 6: Shows the distribution of communities on the basis of diseases treated.

Informant consensus factor (ICF):

All the medicinal plants cured by the medicinal plants collected from Ramhal forest range was categorized into 8 ailment categories. ICF value ranges between 0.89 - 0.96. The highest value of ICF was reported for Muscular-Skeletal problems (0.96) while as the lowest value of ICF is reported for fever (0.89) while as the remaining six categories shows ICF value as gastrointestinal problems (0.95), Dermatological diseases (0.92), Muscular-Skeletal problems (0.96), Respiratory problems (0.94), Urological problems (0.94), other (0.93) and liver diseases (0.91). On the basis of use of the species and citation by the locals gastrointestinal problems (30 species and 550 use reports), Dermatological diseases (18 species & 218 use reports), Respiratory problems (16 species & 270 use reports) and Muscular-Skeletal problems (9 species & 236 use reports) are the most important ailment categories (Table 3). The values of ICF in the present study ranged from 0.76 to 0.93. The high value of ICF indicates highest share of similar plant use information within a community (Sharma et al., 2012) and is in line to the earlier studies of Ugulu et al. (2009), Sharma et al. (2012), Lulekal et al. (2013) and Bhatia et al. (2014, 2015). The highest number of species was used for the treatment of gastrointestinal and dermatological ailments, which is in agreement with the categories in the work of Heinrich et al. (1998), Andrade-Cetto (2009) and Bhatia et al. (2014).

Ailment category	Diseases	No. of plant species used (nt)	Use citations (nur)	ICF
Gastrointestinal problems	Abdominal pain, acidity, constipation, diarrhea, dysentery, indigestion, bloat, intestinal worms, stomach ache, colic, stomach cramps, dysentery, Stomach Gas, abdominal bloating, cholera	30	550	0.95
Dermatological diseases	Skin diseases, hair fall, boils, burns, wounds, dandruff.	18	218	0.92
Muscular-Skeletal problems	Joint pain, factures, arthritis, Rheumatism.	09	236	0.96
Respiratory problems	Asthma, whooping cough, cough & cold, throat infection, asthma, sore throat, tonsillitis.	16	270	0.94
Urological problems	Diuretic, kidney stones, urine disorders, Albinuria, urine infection.	10	168	0.94
Fever	Fever, foot fever, hay fever, typhoid	07	57	0.89
Other diseases	Foot & mouth disease, lice killing,	11	141	0.93

	thirsty, mastitis, toothache, cleaning of teeth, mumps, blood purifier.			
Liver diseases	Liver diseases jaundice.	05	45	0.91

Table 3 Ailment categories and informant consensus factor (ICF).

Use Value UV:

The use value (UV) indicates the importance of a species to the informants and the local ethno medicinal system. The main species (table 2) in the current study were as *Acorus calamus* (UV=0.62), *Aconitum heterophyllum* (0.66), *Artemisia absinthium* (0.67), *Saussurea costa* (0.65), *Rheum webbianum* (0.63) are the species having the highest UV value while as the lowest UV value is recorded for *Stipa sibirica* (0.20). The high UV of medicinal plants species in the study region is attributed to their common distribution in the area and the local people are well familiar of their medicinal uses (Rahman et al. 2016). Several phytochemical substances have been extracted and reported from *Artemisia absinthium* including, sesquiterpene lactones, a class of natural compounds with several proved medicinal effects, guanolide dimmers as absinthin and its isomers anabsinthin, anabsin, artabsin and absintholide (Beauhaire et al. 1984), germacrene type as artabin (Akhmedov et al. 1970), matricin, beta-santonin and ketopepenolid-A (Perez-Souto et al. 1992). Due to the presence of these phytochemical constituents the plant species has been reported to show hyper-secretary activity (Blumberger and Glatzel 1966), antiulcer activity (Shafi et al. 2004)), Neuroprotective activity (Wake et al. 2000), anthelminthic activity (Meschler and Howlett 1999), Neurotoxic activity (Donald 1981), Antiprotozoal activity (Valdes et al. 2008), antifungal activity (Essawi and Srour 2000) and anti-microbial activity (Kordali et al. 2005).

Table 2 Ethno-medicinal plants, their description, ethno-medicinal methodology and use value.

Botanical name (Family) Voucher No.	Life form	Local name	Part used	Preparation	Disease cured	Ethno-pharmacological usage	Administration	∑U	UV
Acorus calamus L. (Araceae) 4225-KASH	Herb	Vai gander	Roots	Dried roots are eaten raw	Stomach ache, (K) abdominal pain (K) diarrhea (G,K)	Dried roots are eaten empty stomach to treat stomach pain & abdominal pain while as to cure diarrhea it's taken in powder form along with water & salt.	The mixture is taken orally usually early in the morning for 2-4 days.	42	0.62
Aconitum heterophyllum Wall. ex Royle (Ranunculaceae) 4094-KASH	Herb	Patres	Roots	Roots are dried are crushed into powder	Abdominal pain (G,K) intestinal worms (B)	Dried roots are taken along with water in small quantity to treat abdominal pain & intestinal worms.	The mixture is taken orally at least twice usually early in the morning.	45	0.66
Ajuga parviflora Benth. (Lamiaceae) 4095-KASH	Herb	Jainadam	Leaves	Leaves are crushed along with water to make	Stomach ache*, diuretic (K, G).	Green leaves along with water are taken against stomach ache & urine problems.	The mixture is taken early in the morning for at least 3 days.	32	0.47

				decoction					
Allium victorials L. (Amaryllidaceae) 3812-KASH	Herb	Jungle rohan	Roots	Dried roots are crushed into powder	Joint pain*	Dried roots are boiled in water the extract is used to cook rice which is eaten to treat joint pain.	The mixture is taken orally for 2 days.	22	0.32
Angelica glauca Edgew. (Apiaceae) 4111-KASH	Herb	Chour	Roots	Dried roots are crushed into powder	Stomach ache*, bloat (G, B).	Dried roots are taken along with water or after boiling it's used to cure stomach ache and bloat in cows.	The mixture is taken orally usually 3 or 4 times.	28	0.41
Anagallis arvensis L. (Primulaceae) 4239-KASH	Herb	Dand dawa	Roots	Raw roots are used	Toothache (K).	Dried roots are taken in small quantity and placed under infected teeth to treat toothache.	Dried root is applied externally.	15	0.22
Artemisia absinthium L. (Asteraceae) 4224-KASH	Herb	Tethwan	Areal part	Areal part is sun dried and crushed with water to make decoction	Abdominal pain *, intestinal worms (B, G), indigestion (B, K)	Areal part of the plant is taken along with water to cure abdominal pain, intestinal worms & indigestion	The mixture is taken orally mostly during morning time.	46	0.67
Arnebia benthamii Wall. ex G.Don (Boraginaceae)	Herb	Gowzaban	Whole plant	Leaves are boiled in water to make infusion	Enhances lactation *, cough &cold (B, G), thirsty (K).	Dried leaves or soaked or boiled in water which is taken to enhance lactation in pregnant women's also its used to cure cough & cold, thirsty.	The mixture is taken orally	36	0.53
Aesculus indica (Wall. ex Cambess.) Hook. (Sapindaceae) 4111-KASH	Tree	Handoon	Fruit	Fruits are crushed into powder	Dandruff *.	A dried fruit along with mustard oil is applied on a hair which takes care of dandruff.	The mixture is applied externally at least for 3 days.	18	0.26

Adinatum capillus-veneris L. (Pteridaceae) 4115-KASH	Fern	Guether	Whole frond	Whole plant is crushed along with water to make decoction	Cough (G), jaundice *, stomach ache (B).	Dried whole frond is used to treat cough, jaundice & stomach ache.	The mixture is taken orally for 5 days.	22	0.32
Achillea millefolium L. (Asteraceae) 4097-KASH	Herb	Chaikul	Whole plant	Dried roots are crushed into powder	Toothache*, diuretic (K, B), jaundice (G).	Dried roots are placed in small quantity to treat toothache; powder of whole plants is taken along with water to diuretic, while as to cure wound small amount of powder is applied on the wound.	The mixture is used both externally as well as orally depending upon the condition.	26	0.38
Aralia cachemirica Decne (Araliaceae) 4245-KASH	Herb	Khoree	Roots	Dried roots are grinded into powder	Joint pain*.	Dried roots are boiled in the water which is used to make rice & used to treat joint pain.	The mixture is taken orally twice a day.	19	0.28
Berberis lyieum Royle (Berberidaceae) 4102-KASH	Shrub	Kawdach	Whole plant	Whole shrub is crushed into powder	Cholera (G), respiratory disorders *.	Dried shrub is boiled in the water which upon cooling is taken against Respiratory disorders & cholera.	The mixture is taken orally.	24	0.35
Bergenia ciliate (Haw.) Sternb. (Saxifragaceae) 4213-KASH	Herb	Palfort	Roots	Roots are crushed into powder	Joint pain*, wounds (K), liver diseases (B, G) & asthma (G).	Dried roots are applied on wounds to heal them, while in case of joint pain & liver diseases it's boiled in the water which is used to cook food to treat joint pain, liver diseases & asthma.	The mixture is taken orally as well as externally.	39	0.57
Betula utilis	Tree	Burz	Wood	Dried	Asthma	Dried wood is	The water is	15	0.22

D.Don (Betulaceae) 4015-KASH				Wood is used to make glass	(G, K).	used to make glasses in which water is filled & kept for night it's said to be curing asthma.	taken orally.		
Bistorta amplexicaulis (D.Don) Greene (Polygonaceae) 4108-KASH	Herb	Masloom	Roots	Dried roots are used to make tea	Hay fever (B), whitening of tongue (G) & stomach ache (G).	Dried roots are used to make tea which taken against hay fever, whitening of tongue & stomach ache.	The mixture is taken orally for 3-5 days usually twice a day.	27	0.40
Cascuta reflexa Roxb. (Cuscutaceae) 4082-KASH	Herb	Kukliport	Whole plant	Whole herb is crushed into powder	Wounds (K), swelling of testicles (G), hair fall (B, G).	Whole herb is applied on effected part to treat wounds, swelling of testicles & hair fall.	The mixture is applied externally usually for 2-3 days.	22	0.32
Cynoglossum glochidiatum Wall. ex Benth. (Boraginaceae) 4083-KASH	Herb	Nil tooth	Roots	Roots are crushed into paste	Skin diseases *.	Roots are crushed and applied on skin bumps to cure them.	The mixture is applied externally.	26	0.38
Cichorium intybus Linn. (Asteraceae) 4222-KASH	Herb	Heand	Leaves	Dried leaves are cooked as vegetable	blood purifier*, typhoid (K),	Leaves are cooked as vegetable and eaten along with rice to cure typhoid and also acts as blood purifier.	The mixture taken orally twice a day.	31	0.45
Conyza Canadensis L. (Asteraceae) 4116-KASH	Herb	Shalut	Leaves	Leaves are grinded to make paste	Indigestion*, stomach gas (B, G).	Leaves are boiled in the water which upon cooling is taken against indigestion & stomach gas.	The mixture is taken orally for 3-5 days.	27	0.40
Cedrus deodara (Roxb.) G.Don (Pinaceae) 4228-KASH	Tree	Deodar	Resin	Dried wood is kept in the utensil and around it	Lice killing (G, K), foot & mouth disease*.	Oil extracted from dried wood is applied on hairs to kill lice, while in case of foot & mouth disease	The mixture is applied externally special care is taken while applying it	35	0.51

				fire is given to extract the oil		in cattle it's applied on foot and mouth in small quantity along with water.	should not be licked by cattle which may lead to death.		
Corydalis govianiana Wall. (Fumariaceae) 3810-KASH	Herb	Sang herbi	Leaves	Leaves are crushed into paste	Respiratory disorders *, whooping cough (B), asthma (G)	Leaves are taken along with water to treat respiratory disease, whooping cough & asthma.	The mixture is taken orally.	19	0.28
Eryngium billardieri Delar. (Apiaceae) 4247-KASH	Herb	Dawamool	Roots	Dried roots are eaten raw	Jaundice (K), diuretic (B,G)	Dried roots are taken orally in small quantity to cure jaundice and are diuretic.	Roots are taken orally especially in the morning.	15	0.22
Euphorbia willichii Hook.f. (Euphorbiaceae) 4216-KASH	Herb	Herbi	Stem latex & seeds	Stem extract & Seeds are crushed along with piper to make paste	Skin diseases *, cholera (G).	Stem latex is applied externally to treat fungal infection of skin, while seeds are taken along with piper to cure stomach cramps and cholera.	The mixture is applied externally as well as orally.	32	0.47
Equistem diffusum D.Don (Equisetiaceae) 4233-KASH	Fern	Gandamgud	Whole frond	Whole frond is crushed along with water to make decoction	Kidney stones (K), stomach ache (B, G), teeth cleaning *.	Raw frond is applied on teeth's to clean them and juice extracted from whole frond is used to cure kidney stones and stomach diseases.	The mixture is taken orally empty stomach.	28	0.41
Fragaria nubicola Lindl. ex Lacaita R(osaceae) 4087-KASH	Herb	Ringrish	Roots	Dried roots are used to make tea	Fever (G), tonsillitis (K), joint pain (G, B).	Dried roots are used to make tea which is taken to cure fever, tonsillitis & joint pain.	The mixture is taken orally usually twice or thrice a day.	25	0.37
Ficus carica L. (Moraceae)	Tree	Anjeer	Fruit stem latex	Fruits are boiled	Skin diseases *, throat	Skin latex is applied on infected portion	The mixture is applied externally as	33	0.48

4088-KASH				and stem latex	infection (G, B), cough (K).	to cure skin diseases while as fruits are boiled in water & eaten to treat throat infection & cough.	well as orally.		
Geranium wallichianum Oliv. (Geraniaceae) 4112-KASH	Herb	Ratanjog	Roots & Leaves	roots are dried under shade & are crushed into powder	Joint pain*, general weakness (G), acidity (B).	Dried roots are cooked along with rice which is eaten to cure joint pain, general weakness & acidity.	The mixture is taken orally twice a day for 2-4 days.	41	0.60
Geranium pratensis L. (Geraniaceae) 4098-KASH	Herb	Ratanjog	Roots & Leaves	Dried roots are crushed into powder	Joint pain *, diarrhea (G, B).	Dried roots are taken along with milk to treat joint diseases & diarrhea.	The mixture is taken orally twice a day for 2-4 days.	43	0.63
Hypericum perforatum L. (Hypericaceae) 4089-KASH	Herb	Chaikul	Roots	Dried roots are crushed into powder	Diarrhea (K).	Dried roots are taken along with water to treat diarrhea.	The mixture is taken orally usually early in the morning.	22	0.32
Isodon rugosus (Wall. ex Bentha) (Lamiaceae)	Shrub	Shulekhat	Leaves	Dried leaves are boiled in water	Foot fever (K), stomach ache G, B), diarrhea (G).	Leaves are boiled in the water which is used to wash foot to treat foot fever. It's also taken orally to treat stomach ache & diarrhea.	The mixture is applied orally as well as externally.	25	0.37
Jurinea dolomiaea Boiss, (Asteraceae) 4090-KASH	Herb	Gogeldoop	Roots	Roots are dried in the shade are crushed into powder	Skin diseases (K,G), wound healing*	Dried roots are applied on effected portion to treat skin diseases & wound healing.	The mixture is applied externally for 2 days.	36	0.53
Lavatera cashmeriana Camb. (Malvaceae) 4099-KASH	Herb	Jungle souchal	Flowers	Flowers are used to make decoction	Cough & cold (K, G).	Flowers are used to make KHAMBEER which is eaten during winters to treat cough	The mixture is taken orally twice a day.	21	0.31

						& cold.			
Ligularia jacquemontiana (Decne.) (Asteraceae) 4214-KASH	Herb	Hapatkouth	Roots	Dried roots are eaten raw	Abdominal pain *, intestinal worms (B, G).	Dried roots are chewed early in the morning to treat abdominal pain & to kill intestinal worms.	Dried roots are taken orally early in the morning.	29	0.42
Lychnis coronaria Desr. (Caryophyaceae) 4229-KASH	Herb	Chock dawa	Leaves	Leaves are boiled in water	Burns (K).	Green/dried leaves are boiled in the water and applied on burns to treat them.	Leaves are applied externally for 2-3 days.	19	0.28
Lamium alba L (Lamiaceae) 4092-KASH	Herb	Zakhmedawa	Whole plant	Whole plant is crushed to make paste	Wound healing (K, G).	Whole plant paste is applied on the wounds for quick healing.	The mixture is applied externally.	22	0.32
Malva neglecta Wallr. (Malvaceae) 4114-KASH	Herb	Souchal	Leaves	Leaves are crushed to make small balls	Constipation (K), stomach cramps (B, G).	Green leaves are crushed into small balls which mostly given to cattle to treat constipation, stomach cramps.	The mixture is given orally twice a day.	26	0.38
Mentha arvensis L. (Lamiaceae) 4234-KASH	Herb	Fudine	Leaves	Leaves are crushed into powder	Asthma (K), cough & cold (G, K), diarrhea (B).	Dried leaves are taken along with chili and salt as salad to treat asthma, cough & cold and diarrhea.	The mixture is taken orally twice a day.	21	0.31
Mentha longifolia (L.) (Lamiaceae) 4251-KASH	Herb	Guddpudine	Leaves	Dried leaves are used to make tea	Abdominal pain*, tonsillitis (G).	Tea made from the dried leaves is taken to treat abdominal pain & tonsillitis.	The mixture is taken orally twice a day.	16	0.23
Morchella esculanta Fr (Morchellaceae) 4215-KASH	Fungi	Gucchi	Fruiting body	Fruiting body is dried in open sun & crushed into powder	Wound healing* & cough (B).	Fruiting body is applied on the wounds for quick healing, it's taken along with water to treat cough.	The mixture is applied orally as well as externally.	32	0.47
Nepeta cataria L. (Lamiaceae)	Herb	Gandsoi	Leaves	Leaves are used to make	Colic (G), urine disorders	Tea made from the leaves is taken against	The mixture is taken orally.	25	0.37

4093-KASH				herbal tea	(K), skin infection (B, G).	colic, urine disorders & skin infection.			
Nasturtium officinale W.T.Aiton (Brassicaceae) 4226-KASH	Herb	Nag souchal	Leaves	Dried leaves are crushed into powder	Mumps (G). & stomach cramps (B).	Dried leaves are given along with milk to treat mumps & stomach diseases.	The mixture is taken orally for 2-3 days.	18	0.26
Origanum vulgare L. (Lamiaceae) 4100-KASH	Herb	Babeer	Seeds	Seeds are sundried & crushed into fine powder	Thirsty* & diuretic (B, G).	Seeds are socked in the water along with sugar and taken to treat thirsty & diuretic.	The mixture is taken orally usually for 4 days.	27	0.40
Oxalis corniculata L. (Oxalidaceae) 4113-KASH	Herb	Chok chrey	Whole plant	Whole plant is dried & is used to make tea	Diarrhea (G, K), abdominal pain*, tonic (G, B).	Tea made from dried plant is taken against diarrhea, abdominal pain. It's also given to women's after delivery as tonic.	The mixture is taken orally.	23	0.34
Podophyllum hexandrum (Royle) T.S Ying (Berberidaceae) 4218-KASH	Herb	Wanwagun	Roots	Dried roots are crushed into powder	Diarrhea *, constipation (G, K).	Dried roots are taken along with milk & sugar to treat diarrhea & constipation.	The mixture is taken orally for 2 days.	27	0.40
Prunella vulgaris L. (Lamiaceae) 4254-KASH	Herb	Kathyuth	Whole plant	Whole plant is boiled in water	Foot fever (K), constipation (B), sore throat (B, G).	Whole plant is boiled in water which is taken against constipation & sour throat, for foot fever foot are washed in the water after boiling.	The mixture is taken orally as well as externally for 3 days.	35	0.51
Plantago major L. (Plantaginaceae) 4118-KASH	Herb	Beadgul	Whole plant	Dried roots are eaten raw	Abdominal bloating (K), dysentery (B).	Dried roots are eaten raw to treat abdominal bloating & dysentery.	Dried roots are eaten Orally mostly in the morning.	31	0.45
Polygonatum cirrhifolium (Wall.) Royle	Herb	Salapmesri	roots	Dried roots are crushed	Albinuria *	Dried roots are taken along with milk to	The mixture is taken orally for 2-5	33	0.48

(Asparagaceae) 4231-KASH				into powder		treat Albinuria,	days.		
Polygonatum verticillatum (L.) All. (Asparagaceae) 4230-KASH	Herb	Salamesri	Roots	Dried roots are crushed into powder	Albinuria*	Dried roots are taken along with milk to treat Albinuria,	The mixture is taken orally for 2-5 days.	37	0.54
Pinus wallichiana A. B. Jacks (Pinaceae) 4227-KASH	Tree	Kayur	Resin	Resin collected from tree is used raw	Wound healing* & skin problems (G, K).	Resin from the tree is mixed with salt to treat wounds and also to treat puss	The mixture is applied externally.	42	0.62
Rheum webbianum Royle (Polygonaceae) 4212-KASH	Herb	Pambchalan	Roots	Roots are sundried & grinded into powder	Joint pain (K), wound healing*, skin burns*	Dried roots are boiled in the water which is used to cook rice which is eaten to cure joint pain. Roots are applied on infected portion to treat wounds & skin burns.	The mixture is taken orally as well as externally.	43	0.63
Rhodoila fastigiata (Hk. f. et Thoms.) (Crassulaceae) 4091-KASH	Herb	Hisbe di jaldi	Roots	Roots are dried in shade & crushed into powder	Diarrhea (B, G).	Dried roots are taken along with water to treat diarrhea.	The mixture is taken orally thrice a day.	22	0.32
Saussurea costa (Falc.) Lipsch. (Asteraceae) 4211-KASH	Herb	Kouth	Roots	Roots are crushed into fine powder	Joint problems*	Dried roots are boiled in the water which is used to cook rice which is eaten along with ghee to treat joint problems.	The mixture is taken orally twice a day special care is taken after eating this boiled water is taken for 3 days.	44	0.65
Senecio chrysanthemoides DC. (Asteraceae) 4101-KASH	Herb	Boug	Leaves	Roots are crushed along with water to make infusion	Fever (G), kidney diseases (B).	Dried roots are taken along with the water to treat fever & kidney diseases.	The mixture is taken orally.	32	0.47
Selinum	Herb	Budd	Roots	Roots	Arthritis	Roots are taken	The mixture	28	0.41

vaginatum C.B.Clarke (Apiaceae) 3811-KASH		jeath		are sundried & crushed into powder	(B, K), abdominal pain*	along with milk to treat arthritis & abdominal pain	is taken orally twice a day.		
Stipa sibirica (L.) (Poaceae) 4236-KASH	Herb	Guddgass	Areal part	Areal part is boiled in water	Mastitis (G).	Areal part of the plant is boiled in the water which is externally applied on udder of cows to treat mastitis	The mixture is applied externally.	14	0.20
Skimmia anquetillia N.P. Taylor & Airy Shaw (Rutaceae) 4223-KASH	Shrub	Nairpan	Leaves	Leaves are crushed along with water to make decoction	Asthma *, whooping cough (B), stomach ache (G, K).	Dried/ green leaves are boiled in the water which is taken along with sugar to treat asthma, whooping cough & stomach ache.	The mixture is taken orally usually for 3-5 days.	35	0.51
Thymus linearis Benth (Lamiaceae) 4107-KASH	Herb	Javind	Leaves	Dried leaves are used to make tea	Stomach ache (G), stomach cramps (K).	Tea made from the dried leaves is taken against stomach ache & stomach cramps.	The mixture is taken orally early in the morning.	40	0.59
Trigonella foenum-graecum L (Fabaceae) 4248-KASH.	Herb	Meath	Seeds	Dried seeds are crushed into fine powder	Factures *.	Seeds are crushed into powder which is mixed with egg or water & pasted on the paper and applied on factures to treat them quickly.	The mixture is applied externally.	29	0.42
Trillium govanianum Wall. ex D.Don (Melanthiaceae)	Herb	Trupatri	Roots	Roots are dried in shade & grinded into powder	Boils*, intestinal worms (K)	Dried root powder is applied externally along with oil to treat boils; it's also taken along with milk to kill intestinal worms.	The mixture is used both externally as well as orally.	24	0.35
Tussilago farfara L. (Asteraceae)	Herb	Wattpan	Roots	Dried roots are crushed	Abdominal pain (G,B)	Dried roots are mixed with feed & given to cows	The mixture is given orally twice a	18	0.26

4103-KASH				into powder		to treat abdominal pain.	day.		
Urtica dioica L. (Urtiaceae) 4219-KASH	Herb	Soi	Roots	Roots are sun dried & crushed into powder	Rheumatism *, urine infection (G, B).	Dried roots are boiled in the water which is used to cook rice which is eaten against Rheumatism and urine infection.	The mixture is taken orally for at least a week.	24	0.35
Viburnum grandiflorum Wall. ex DC (Viburnaceae) 4241-KASH	Shrub	Kilmish	Fruits & roots	Fruits are eaten raw & roots are boiled in water	Cough* & stomach ache (G).	Fruits are eaten raw while roots are boiled in water upon cooling it's taken against cough & stomach ache.	The mixture is taken orally.	31	0.45
Verbascum Thapsus L. (Scrophulariaceae) 4242-KASH	Herb	Sarfe Makai	Areal part	Areal part is crushed into powder	Bloat (K, G), burns*.	Areal part is boiled in the water upon cooling it's given to cows to treat bloat, leaves are used to treat boils.	The mixture is applied externally as well as given orally.	27	0.40
Viola oderata L. (Violaceae) 4238-KASH	Herb	Nunposh	Whole plant	Whole plant is used raw	Cough & cold (K) & foot fever*.	Whole plant is used to make KHAMBEER which is mostly taken in the winter to treat cough & cold, foot fever.	The mixture is taken orally twice a day.	22	0.32

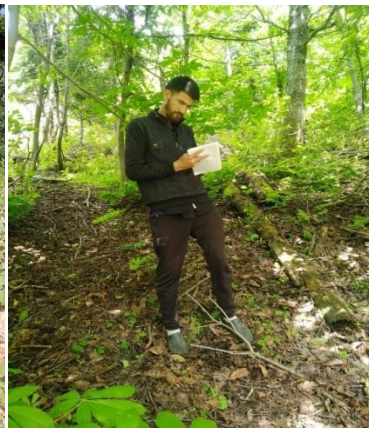
G (Gujjars), B (Bakarwals), K (Kashmiri) *(Gujjars, Bakarwals and Kashmiri).

Conclusion:

In the current study a total of 65 medicinal plants have been collected from study area belonging to 40 families. Informants in this study area have a good understanding of medicinal plants. The contribution of plant part used is dominated by roots, collection of roots leads to decrease in the population of parent plant and may be extreme danger for survival of the frequently uncommon and gradual reproducing medicinal plants. The plants collected by these strategies require maintainable utilization and conservation strategies. The highest value of ICF within the studies witness most noteworthy share of comparative plant use data inside the community. Native population still believe medicinal plants for his/her primary healthcare, however at the same time are afraid about the loss of flora in the wild. It absolutely was found that the old aged people possessed a good wealth of traditional information as compared to younger generation; this distinction in knowledge would possibly flow from to the ever-changing mode of younger generation. Therefore, it should be immediate to document the necessary plants and associated information and to require necessary measures for the conservation of those resources thus on save this treasure; otherwise a good variety of medicinal plants can become extent in the wild.


A

B


C


D

E

F


G

H

I

Fig A,B,D showing interviewing with tribes. Fig C & E showing collection of data in the field

Fig F showing preperation of medicinal plants. Fig G showing crushed medicinal plants before cooking. Fig H & I showing drying of medicinal plants.

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Declarations:

Ethics approval and contest to participation: earlier information was collected from the participants before conducting the study.

Author's contribution: the research was conducted by Aadil Abdullah Methodology, Formal analysis, Writing–original draft, Formal analysis. Dr Syed Aasif Visualization, Supervision, Writing–review & editing.

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References:

1. Aadil A, S.A. Hussain Andrabi. 2021. Wild edible plants and fungi used by locals in Kupwara district of Jammu and Kashmir, India. *Pleione* 15(2): 179-189.
2. Aadil Abdullah & Syed Aasif Hussain Andrabi. 2021. An approach to the study of traditional medicinal plants used by locals of block Kralpora Kupwara Jammu and Kashmir India. International Journal of Botany Studies 6(5): 1433-1448.
3. Adnan M, Begum S, Khan AL, Tareen AM, Lee IJ. 2012. Medicinal plants and their uses in selected temperate zones of Pakistani Hindukush-Himalaya. *Journal of Medicinal Plants Research* 6(24):4113-4127.
4. Ara, S., Naqshi, A.R., 1992. Ethnobotanical studies in Gureiz valley. *J. Econ. Taxon. Bot*. 17 (3), 185.
5. Andrade-Cetto, A., 2009. Ethnobotanical study of the medicinal plants from Tlanchinol, Hidalgo, México. *J. Ethnopharmacol*. 122, 163–171.
6. Akhmedov IS, Kasymov SZ, Sidyakin GP. 1970. Artabin-a new lactone from Artemisia absinthium. Chemistry of Natural Compounds 1970, 6:634.
7. Baig, B.A., Ramamoorthy, D., Bhat, T.A., 2013. Threatened medicinal plants of Menwarsar Pahalgam, Kashmir Himalayas: distribution pattern and current conservation status. Proc. *Int. Acad. Ecol. Environ*. *Sci.* 3 (1), 25–35.
8. Bhat, T.A., Nigam, G., Majaz, M., 2012. Study of Some medicinal plants of the Shopian District, Kashmir (India) with emphasis on their traditional use by Gujjar and Bakerwal tribes. *Asian J. Pharm. Clin*. Res. 5 (2), 94–98.
9. Bhatia, H., Sharma, Y.P., Manhas, R.K., Kumar, K., 2014. Ethnomedicinal plants used by the villagers of district Udhampur, J&K, India. *J. Ethnopharmacol*. 151 (2), 1005–1018.
10. Bhatia, H., Sharma, Y.P., Manhas, R.K., Kumar, K., 2015. Traditional phytoremedies for the treatment of menstrual disorders in district Udhampur, J&K, India*. J. Ethnopharmacol*. 160, 202–210.
11. Bahukhandi A, Rawat S, Jugran AK, Bhatt ID, Rawal RS. 2021. Seasonal Variation in Phenolics and Antioxidant Activity of Acorus calamus Linn.: An Important Medicinal Plant of Himalaya*. National Academy Science Letters* 44:13–15.
12. Beauhaire J, Fourrey JL, Guittet E. 1984. Structure of absintholide a new guaianolide dimer of Artemisia absinthium L. *Tetrahedron Letters* 25:2751-2754.
13. Blumberger W, Glatzel H. 1966. Contributions to the physiology of spices and condiments. VII. Research on the mechanism of action on salivary gland function. Nutritio et dieta; *European review of nutrition and dietetics* 8(2):145-160.
14. Dar, G.H., Bhagat, R.C., Khan, M.A., 2002. Biodiversity of Kashmir Himalaya. *Valley Book House*, J&K, India.
15. Dar G H, Bhagat R C & Khan M A., 2001. Biodiversity of Kashmir Himalayas. *Valley book house,* Srinagar, Kashmir. 120.
16. Dhar U, Rawal R S & Upreti., 2000. Setting priorities for conservation of medicinal plants – a case study in the Indian Himalayas*. J Biol conserv* 95-57.
17. Donald DV. 1981. Artemisia Absinthium: a nineteenth-century drug of abuse. *Journal of Ethnopharmacology* 4:337- 343.
18. Essawi T, Srour M. 2000. Screening of some Palestinian medicinal plants for antibacterial activity. *Journal of Ethnopharmacology* 70:343-349.
19. Gazzaneo, L.R.S., Lucena, R.F.P., Albuquerque, U.P., 2005. Knowledge and use of medicinal plants by local specialists in a region of Atlantic Forest in the state of Pernambuco (Northeastern Brazil). *J. Ethnobiol. Ethnomed.* 1, http://dx.doi.org/ 10.1186/1746-4269-1-9.

20. Haq SM, Hamid M, Lone FA, Singh B. 2021. Himalayan Hotspot with Alien Weeds: A Case Study of Biological Spectrum, Phenology, and Diversity of Weedy Plants of High-Altitude Mountains in District Kupwara of J&K Himalaya, India. Proceedings of the National Academy of Sciences, India Section B: *Biological Sciences* 91(1):139- 152.
21. Hassan, G.A., Ahmad, T.B., Mohi–ud–din, R.A., 2013. An ethnobotanical study in Budgam District of Kashmir valley: an attempt to explore and document traditional knowledge of the area. *Int. Res. J. Pharm.* 4 (1), 201–204.
22. Heinrich, M., Ankli, A., Frei, B., Weimann, C., Sticher, O., 1998. Medicinal plants in Mexico: healers' consensus and cultural importance*. Soc. Sci. Med*. 47, 1863–1875.
23. slam MA, Rai R, Quli SMS. 2015. Forest resources use for building livelihood resilience in ethnic communities of Jharkhand. *Trends in Biosciences*, 8(5): 1256-1264
24. Jeelani, S.M., Wani, M.P., Kumari, S., Gupta, R.C., Siddique, M.A.H., 2013. Ethnobotany of some polypetalous plants from the Kashmir Himalaya*. J. Med. Plants Res*. 7 (36), 2714–2721.
25. Kapahi, B.K., Srivastava, T.N., Sarin, Y.K., 1999. Traditional medicinal plants of Gurez (Kashmir)—an ethnobotanical study. *Anc. Sci. Life* 1–2, 119–124.
26. Kaul, M.K., 1997. Medicinal Plants of Kashmir and Ladakh (Temperate and Cold Arid Himalaya). *Indus Publishing* Company, New Delhi.
27. Khan A, Gilani SS, Hussain F, Durrani MJ. 2003. Ethnobotany of Gokand valley, district Buner, Pakistan. *Pakistan Journal of Biological Sciences* 6(362):9.
28. Khan, Z.S., Khuroo, A.A., Dar, G.H., 2004. Ethnomedicinal survey of Uri, Kashmir Himalaya*. Indian J. Tradit. Knowl*. 3 (4), 351.
29. Kordali S, Kotan R, Mavi A, Cakir A, Ala A, Yildirim A. 2005. Determination of the chemical composition and antioxidant activity of the essential oil of Artemisia dracunculus and of the antifungal and antibacterial activities of Turkish Artemisia absinthium, A. dracunculus, Artemisia santonicum, and Artemisia spicigera essential oils. *Journal of Agricultural and Food Chemistry* 53(24): 9452-9458.
30. Perez-Souto N, Lynch RJ, Measures G, Hann JT. 1992. Use of high-performance liquid chromatographic peak deconvolution and peak labelling to identify antiparasitic components in plant extracts. *Journal of Chromatography* 593:209-215.
31. Phondani PC, Maikhuri RK, Rawat LS, Farooquee NA, Kala CP, Vishvakarma SR, Rao KS, Saxena KG. 2010. Ethnobotanical uses of plants among the Bhotiya tribal communities of Niti Valley in Central Himalaya, India. *Ethnobotany Research and Applications* 8:233-244.
32. Phillips, O., Gentry, A.H., Reynel, C., Wilki, P., Gávez-Durand, C.B., 1994. Quantitative ethnobotany and Amazonian conservation. *Conserv. Biol*. 8, 225–248.
33. Lone, P.A., Bhardwaj, A.K., Bahar, F.A., 2013. A study of some locally available herbal medicines for the treatment of various ailments in Bandipora district of J&K, India. *Int. J. Pharm. Biosci*. 4 (2), 440–453.
34. Lone, P.A., Bhardwaj, A.K., Shah, K.W., Tabasum, S., 2014. Ethnobotanical survey of some threatened medicinal plants of Kashmir Himalayas, India*. J. Med. Plant Res*. 8 (47), 1362–1373.
35. Lulekal, E., Asfaw, Z., Kelbessa, E., Van Damme, P., 2013. Ethnomedicinal study of plants used for human ailments in Ankober District, North Shewa Zone, Amhara Region, Ethiopia*. J. Ethnobiol. Ethnomed*. 9, 63.
36. Malik, A.H., Khuroo, A.A., Dar, G.H., Khan, Z.S., 2011. Ethnomedicinal uses of some plants in the Kashmir Himalaya. *Indian J. Tradit. Knowl*. 10 (2), 362–366
37. Meschler JP, Howlett AC. 1999. Thujone exhibits low affinity for cannabinoid receptors but fails to evoke cannabimimetic responses. *Pharmacology Biochemistry and Behavior* 62:413-480.
38. Med JA. 2017. The Wiled RET edible plants consumed by the Irula tribals of Walayar valley, Southern Western Ghats of India. *Journal of Ayurvedic and Herbal Medicine* 3(4):205-9.
39. Rahman IU, Ijaz F, Iqbal Z, Afzal A, Ali N, Afzal M, Asif M. 2016. A novel survey of the ethno medicinal knowledge of dental problems in Manoor Valley (Northern Himalaya), Pakistan. Journal of Ethnopharmacology 194:877-894.
40. Schmidt, B. Ribnicky, D.M. Poulev, A. Logenda, S. Cefalu, W.T. Raskin, I. 2008. Natural history of botanical therapeutics. *Metabolism* 57,3-7.
41. Singh J S 2002. The biodiversity crises, a multifaceted review. *Curr sci*. 82(6) 638.
42. Singh B, Singh S, Singh B, Kitchlu S, Babu V (2019) Assessing ethnic traditional knowledge, biology and chemistry of Lepidium didymum L., lesser-known wild plants of Western Himalaya. Proc Natl Acad Sci India *B Biol Sci* 89(3):–1094, https://doi.org/10.1007/s40011-018-1027-4.

43. Shedayi AA, Gulshan B. 2012. Ethnomedicinal uses of plant resources in Gilgit-Baltistan of Pakistan. *Journal of Medicinal Plants Research* 6(29):4540-4549
44. Shafi N, Khan GA, Ghauri EG. 2004. Antiulcer effect of Artemisia absinthium L. in rats. *Pakistan Journal of Scientific and Industrial Research* 47(2):130-134.
45. Sharma, R., Manhas, R.K., Magotra, R., 2012. Ethnoveterinary remedies of diseases among milk yielding animals in Kathua, Jammu and Kashmir, India. *J. Ethnopharmacol*. 141 (1), 265–272.
46. Tariq A, Adnan M, Iqbal A, Sadia S, Fan Y, Nazar A, Mussarat S, Ahmad M, Olatunji OA, Begum S, Mazari P, Ambreen B, Khan SN, Ullah R, Khan AL. 2018. Ethnopharmacology and toxicology of Pakistani medicinal plants used to treat gynecological complaints and sexually transmitted infections. *South African Journal of Botany* 114:132-149.
47. Tantray, M.A., Tariq, K.A, Mir, M.M., Bhat, M.A., Shawl, A.S., 2009. Ethnomedicinal survey of Shopian, Kashmir, India. *Asian J. Tradit. Med*. 4 (1), 1–6.
48. Ugulu, I., Baslar, S., Yorek, N., Dogan, Y., 2009. The investigation and quantitative ethnobotanical evaluation of medicinal plants used around Izmir province, Turkey. *J. Med. Plants Res.* 3, 345–367.
49. Valdes AFC, Martinez JM, Lizama RS, Vermeersch M, Cos P, Maes L et al. 2008. In vitro anti-microbial activity of the Cuban medicinal plants Simarouba glauca DC, Melaleuca leucadendron L. and Artemisia absinthium L. Memorias do Instituto Oswaldo Cruz 103:615-618.
50. Wake G, Court J, Pickering A, Lewis R, Wilkins R, Perry E et al. 2000. CNS acetylcholine receptor activity in European medicinal plants traditionally used to improve failing memory. *Journal of Ethnopharmacology* 69:105-114.
51. Wani, P.A., Dar, A.R., Mohi-ud-din, G.G., 2006. Treasure and tragedy of Kashmir Himalaya*. Int. J. Bot.* 2 (4), 402–408.