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## Ethnobotanical Survey And Traditional Use Of Indigenous Plants By Shepherd, Gujjar And Bakerwal Communities From Narwav Forest Ranges Of District Baramulla, Jammu And Kashmir, India

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### ABSTRACT

**Purpose:** To explore the medicinal uses of traditional plants of narwav forests with an assessment to preserve the ethnobotanical knowledge related with this area. **Methods:** The survey of field was conducted during a period of one year. Data were composed through a semi-structured questionnaire and discussions with native tribal people and traditional health practitioners inhabited in the side villages and in the study area.

**Results:** The present study documented ethnobotanical uses of 48 plant species belonging to 39 families. Result revealed that most of the documented species were used medicinally and roots are mostly harvested for medicinal purposes (19 species). The most common method of remedy preparation was decoction/tea.

**Conclusions:** The present research contributes significantly to the ethnobotanical knowledge, and represents a robust human-plant relation. There is an urgent need to further document indigenous uses of plants for future domestication.

**KEYWORDS:** - Ethnomedicine, Narwav Forests, Shepherds, Gujjar, Bakerwals, Indigenous knowledge, Conservation.

### INTRODUCTION

The scientific study of the relationships between people and plants is known as Ethnobotany which was invented first time by the US botanist John Hershberger in 1896 but the history of ethnobotany began long before that. Ethnobotany is the traditional study of how the people identify the plants, give names, use and establish the data about the plants nearby them which plays a significant role

in understanding the vigorous relationships between biological diversity and social and cultural systems. Medicinal plants are frequently utilized for healthcare management in developing countries and are also in great demand in the developed world because people believe "natural is better" [1]. The Documentation of ethnic knowledge, particularly medicinal values of plant species, provided various modern drugs. The ethnic medicinal evidences of plants is also helpful to ecologists, pharmacologists, taxonomists, watershed and wild life managers in improving the richness of an area, besides listing the traditional uses [2].

The Himalayas are rich depositories of biodiversity. The climatic condition in major area of Jammu is subtropical, while in Kashmir the temperate to alpine climate prevails in the Kashmir valleys [3]. The elevation gradients range from 300 to 8000 m above mean sea level, due to the diverse climate and topography, this region is ideal for the evolution of different forms of life, including microbes and plants [4, 5]. In the Kashmir province, a study indicated that 833 plant taxa belonging to 378 genera and 112 families have potential medical properties [6]. The ethnobotany of the study area is well developed and may be due to the presence of different community of primitive tribes in large number, diversity of species and remote location. The above mentioned studies have revealed that least medical infrastructures in the study area, which leads to the greater support and belief in traditional medical practices and focused on the utilization of herbs and other plant taxa to treat various seasonal diseases [7,8,9]. Previously published literature provides least knowledge regarding the ethnobotany of the Baramulla district; nevertheless, few studies have been published from the Baramulla district but this is the first attempt to study the mountain ranges of Narwaj which is located in District Baramulla. A study carried out by [10] revealed that 40 plant taxa belonging to 22 families are used as a medicine, have cultural value, have a known aroma, and are used up as wild food. One of the topical findings from District Baramulla [11] reported 64 plant taxa belonging to 34 families as potent high value ethnomedicinal plants. Fragmented information on ethnomedicines of Shepherds, Hakeem, Gujjar and Bakerwal tribes of district Baramulla is available in the work of [12]. In Himalayan the medicinal plants are specific [13] and their distribution is restricted to small areas. However, there are various parts of the country which remain unexplored from an ethnobotanical point of view. Since most of the people of the area is rural with a low literacy rate and lack modern health facilities, they are more reliant on natural resources, particularly plants for their healthcare and livelihood necessities therefore the major portion of ethnic knowledge is still lying with among these communities needs to be explored and documented. The present study reports on the ethnobotanically important plants from mountain ranges of Narwaj and explores the indigenous traditional knowledge on the consumption of the most commonly used plants. This research will endow a lot in providing the valuable information on the conservation and sustainable use of the natural resources of the area. Therefore, a survey was conducted to explore and document the ethnomedicinal plants used by the Shepherds, Gujjar and Bakerwal tribes to identify new ethnomedicines used for Primary Health Care management and to identify popular medicines among Shepherds, Gujjar and Bakerwal in the study area.

## Materials and Methods

### Study area, climate and vegetation

The explored area has no permanent inhabitants but the adjoining villages are densely occupied and during the summer season the peoples of different community such as Shepherds, Gujjar and Bakerwals used to move the different villages which are located at high mountain ranges, for cultivation as well for pasturage. In our study the forest areas of nine villages of Tehsil sheeri were selected such as Gowas, Churkhodan, Sochliwaran, Kandwa, Kalsun, Doba, and Kangdoori (seven springs), Sheeri and Brari Nallah of district Baramulla.

These regions are covered with forest and residents from adjoining villages also used it for a variety of purposes such as medicine, vegetable, fodder and fuel timber. The weather of these regions are subtropical humid type in which, deodara (*Cedrus deodara*), chir pine [*Pinus roxburghii* (*P. roxburghii*)], Silver Fir (*Abies pindrow*) and reen [*Quercus dilatata* (*Q. dilatata*)] are the most dominant tree species. These areas of Narwaz receive large amount of precipitation due to which the climate of the area remains cool and humid for most of the year; the flora in the area comprises a wide diversity of trees, herbs, shrubs and climbers. Ground surface comprises a wide diversity of angiosperm along with ferns and mosses.

#### Shepherd, Gujjar and Bakerwal communities

The mountain areas of Narwaz District Baramulla includes, Gowas, Churkhodan, Kandwa, Kalsun, Doba, Kangdoori (seven springs), Botapatri, Gulmarg, Tangmarg, Srunz water fall which are inhabited by people of all verbal groups but the major portion of the inhabitants belongs to nomadic tribes, Shepherds, Gujjar and Bakerwal which used to stay there. These tribes were nomadic herdsmen. At present, cultivation and animal husbandry is the main livelihood for these people. Gujjar and Bakerwal communities speak same language named "Gojri" and Shepherds speak both Kashmiri as well Gojri. The Bakerwals are the offshoots of Gujjar and the difference among communities is only in the type of animal rearing and nature of migration. Gujjar and Shepherds rear buffalo possess small pieces of land, houses and are semi-nomadic. On the other hand, Bakerwals are completely nomadic people, rear herd of sheep and goats and in search of green meadows they are always migratory. They are true nomadic deprived of any land, live in tents and keep horses for transportation and dogs for protection. The socio-economic condition of Gujjar and Shepherds community is well settled than Bakerwals because they are semi-nomadic, educated and own home with small piece of land. Both the tribes are dependent on high altitude pastures for animal rearing. Since modern medicine and doctors are not available in inner areas, Shepherds, Gujjar and Bakerwal tribals are still dependent upon plants for primary treatment from the various floras of their surroundings. It has been witnessed that specialist herbal-healers are neither available in Gujjar nor in Bakerwal communities. The knowledge of traditional use of medicinal plants is distributed among common people and passed on to future generation through verbal communication.

#### Field survey and data collection

Field inspections were conducted during April 2020 to November 2020 to document ethnobotanical data through verbal interviews and designed semi-structured questionnaire from Shepherds, Gujjar, Bakerwals and the elderly people who were acquainted with traditional uses of plants particularly for medicinal, veterinary, fruit, vegetable, fodder, fuel and others. The questions were repeatedly made to increase the evenness of the data. During the field survey, 203 local inhabitants of 09 villages were selected based on age and gender (Table 1).

Table 1. Age and gender wise distribution.

Age Group	Gender	No. of questionnaires
Old (50+)	Male	70
	Female	27
Middle age (25+)	Male	57
	Female	23

Age Group	Gender	No. of questionnaires
Young people	Male	17
	Female	9
Total		203

### Plant identification

Plant samples were collected, pressed, dried and mounted on herbarium sheets and identified with the help of floristic literature [14,15,16].

### Quantitative methods for data analysis

The fidelity level was used during data collection and interpretation. Quantitative ethnobotanical techniques have ample scientific interest as they provide relative significance of plant species to different tribal groups, preference figures on diverse species and may also help in the conservation of biodiversity [17,18].

### Result

A total of 48 plant species belonging to 39 families are documented in the present study with the help of key informants which are being used for different purposes by native people. The (Table 2) showed the comprehensive study which includes botanical names, followed by, common names, family, parts used and ethnobotanical uses.

**Table 2: Ethnobotanical study of the area including name of medicinal plants their family and uses.**

S. No	Name of species	Common name (Kashmiri language)	Family	Parts used	Altitude (feet)	Ethnobotanical uses
1	<i>Ajuga bracteosa</i> Wallich.	Jaan-e- adam	Lamiaceae	Wp	3280–13123	Fresh plant is dried powdered and its extract is used before dinner for ulcer and jaundice
2	<i>Angelica archangelica</i> L	Choro	Apiaceae	Rt, Sd, Ft, Fl	3280–13123	Tea is made from 10–20 gm of roots which is taken before bed for 2–3 days to cure fever
3	<i>Acorus calamus</i> L	Vai	Araideae	Rt	4400–7217	Small quantity of dried roots are eaten empty stomach for curing constipation and indigestion
4	<i>Berberis lycium</i> , Royle <i>Podophyllum hexandrum</i> Royle	Kawdach, Bunwaangun	Berberidaceae	Rt, Lf, Ft, Bk	8202–9842	The paste of root bark is externally applied on wounds. Powdered bark is mixed in animal fat and the paste is applied on bone fracture. Leaves of <i>B. lycium</i> are used as fodder and dried branches for fuel. The fruits of <i>podophyllum</i> are cooked and are given for curing Jaundice
5	<i>Betula utilis</i> L	Burz	Betulaceae	Bk	8000–14765	The bark is applied on the wounds.

6	<i>Arnebia benthamii</i> Wall. ex G.Don	kahzabaan	Boraginaceae	Wp, Lf, Fl, Rt	1148 – 13126	Enhances lactation in women, cough and throat infection, root extract is mixed with oil to control hair fall.
7	<i>Chenopodium blitum</i> L	Wan palak	Chenopodiaceae	Wp, Sd and Lf	6561–14763	Leaves are cooked as vegetables
8	<i>Saussurea lappa</i> Clarke	koth	Compositae	Rt	8530–1312	Powder of flowers mixed with mustard oil is massaged over the whole body at bed time for about one week for curing paralysis. The roots are used against fever
9	<i>Euphorbia helioscopia</i> L.	Gurisochol, Gandhi booti	Euphorbiaceae	Wp	984–5905	The whole plant is cooked as vegetable
10	<i>Iris kashmiriana</i> L	mazaarmond	Iridaceae	Wp, Rh	4921–5905	Powder of dried roots is used to cure rheumatic pain, bronchitis and also act as insect repellent.
11	<i>Juglans regia</i> L	doon	Juglandaceae	Lf, Pl, Ft, Wd	3280–9000	Powder from kernel is mixed with honey to cure internal fever.
12	<i>Glycyrrhiza Glabra</i> L	shanger	Leguminosae	Rt	3280–5200	Tea is prepared from their roots to cure cold, cough and fever
13	<i>Fritillaria roylei</i> Hook <i>Colchicum leutium</i> Baker	Prink, irki	Liliaceae	Rt, Bl, Cn	4000–13000	Blub is used as tonic after pregnancy.
14	<i>Lavatera cashemiriana</i> , Camb <i>malva sylvestris</i> L	Sazposh/ Jungli sonchal	Malvaceae	Wp, sd	6000–9842	The both plants are cooked as vegetables as they provide energy to body. Seeds are thought to be Antiseptic
15	<i>Trillium govanianum</i> ex D.Don	tripater	Melanthiaceae	Rh, Lf, Rt	8202–1312	Powder of rhizome is given to cows to cure worms, and cure boils. Tea made from 5 to 10 g root is given once in a day for 3–4 days to cure headache and fever.
16	<i>Oenothera glazioviana</i> L	Raat ki rani	Onagraceae	Rt, Lf, Fl, buds and immature pods	4000–1200	Plant is used as fodder.

18	<i>Rosa webbiana</i> Wall. ex Royle	Jungle gulab	Rosaceae	Fl	2500–7400	<ul style="list-style-type: none"> <li>Dried flowers are used to make khambeer which is used to cure cough and cold, paste of petals is used to cure chest pain</li> </ul>
19	<i>Viburnum grandiflorum</i> Wall. ex DC	Kilmish	Viburnaceae	Fr, Rt	3937–12000	<ul style="list-style-type: none"> <li>Fruits are eaten after ripening, roots are boiled in water and then taken with food to treat cough and stomach problems</li> </ul>
20	<i>Coriandrum sativum</i> L.	Dainwall	Apiaceae	Wp	984–7874	<ul style="list-style-type: none"> <li>Plant extract mixed with honey is used to cure loss of hair fall, fatty liver, piles.</li> </ul>
21	<i>Cascuta reflexa</i> Roxb.	Kukliport	Cuscutaceae	St	3280–5200	<ul style="list-style-type: none"> <li>Whole plant extract is applied on effected portions of Swelling of testicles and falling of hair.</li> </ul>
22	<i>Origanum vulgare</i> L <i>Prunella vulgaris</i> L <i>Mentha piperita</i> , <i>Origanum majorana</i> ,	Babar, kulveth, mojouni	Lamiaceae	Wp	4265–8858	<ul style="list-style-type: none"> <li>Extract from the plant is applied to cure Skin diseases, intestinal pain and urinary disorders</li> </ul>
23	<i>Taraxicum officinalis</i> L	Hand, kulveyuth	Asteraceae	Wp, Fl	984–7874	<ul style="list-style-type: none"> <li>decoction of whole plant is used for bath after child birth. The taraxicum is given to postpartum women.</li> </ul>
24	<i>Artemisia absinthium</i> L, <i>Artemisia moorcroftiana</i> Wall. ex DC.	Teethwan, Jungle teethwan	Asteraceae	Lf, Fl Wp	984–7874	<ul style="list-style-type: none"> <li>Extract of whole plant is taken orally along with water and sugar to cure Anthelminthic, abdominal pain, fever and indigestion</li> </ul>
25	<i>Arisaema jacquemontii</i> Blume	Hapat gogij	Araceae	Rh, Tu	5000 – 6000	<ul style="list-style-type: none"> <li>Powder form of rhizome is taken along with water against Anthelminthic, dried root powder mixed with oil is applied on burns</li> </ul>
26	<i>Punica granatum</i> L.	dean	Lythraceae	Sd	1200–1200	<ul style="list-style-type: none"> <li>For curing intermittent fever and weakness one glass of sherbet (soft drink) prepared from the pulpy and a juicy seed mixed with mishri (crystallized sugar) is given once a day for one month.</li> </ul>
27	<i>Prunus persica</i>	xeair	Rosacea	Fr	4000–7000	<ul style="list-style-type: none"> <li>Fruit used as anti-pyretic, killings of worms and germs.</li> </ul>

28	<i>Ficus palmate</i> Forrsk	injeer	Moraceae	Fr ,Lf	3000– 8000	<ul style="list-style-type: none"> <li>The fruits are edible, used as laxative, tonic and demulcent. The leaves used as fodder. The ash of the leaves used in snuff preparation (Naswar). The wood used for burning.</li> </ul>
29	<i>Digitalis purpurea</i>	Tilpushpi	Plantaginac eae	Lf	7053– 8694	<ul style="list-style-type: none"> <li>Leaves are used for the treatment of cardiac disease.</li> </ul>
30	<i>Ephedra gerardiana</i>	Asmani bhuti	Ephedracea e	Rt,St	5350 – 13549	<ul style="list-style-type: none"> <li>Roots and stems are used to treat rheumatism and painful joints</li> </ul>

### Fidelity level (FL)

Fidelity level helps in identification of species according to their relative effectiveness [19], it was calculated as follows:

$$FL = \frac{1}{4} \frac{I_p}{I_u} \times 100$$

Where  $I_p$  refers to the number of informants who independently suggested the use of a species for same major purpose and  $I_u$  refers to total number of informants who mentioned the plant for the treatment of any given disease.

The medicinal plants having high FL values in the present study were *Prunella vulgaris*, *Podophyllum hexandrum*, *Glycyrrhiza glabra*, *Saussure lappa*, *Rheum emodi*, *Bergenia ciliata*, *Arnebia benthamii*, *Artemisia maritime*, *Artemisia absinthium*, *Fritillaria roylei*, *Taxus baccata*, *Taraxicum officinalis*, *Rheum austral*, *Trillium govaniun*, *Bergenia ligulata*, *Berberis lycium*, *Ajuga bracteosa*, *Urtica dioica* which are used for acute disease such as skin disease, pulmonary, cardiac disease, hepatic disease, breaking kidney stone and urinogenetal disease.

**Table 3: Fidelity level (FL) value of medicinal plants against a given ailment category**

Medicinal plant	Therapeutic Categories	$I_p$	$I_u$	FL Value (%)
Purnell vulgaris	Parasitic, Dermatological, Nervous system, Bleeding and external injuries	19	20	95.0
Podophyllum hexandrum	Dermatological, cancer, external injuries	26	28	92.8
Glycyrrhiza glabra	Pulmonary, Paralysis and blood sugar	15	17	88.2
Saussure lappa	Hepatobiliary, common cold, fever and cough	22	25	88.0
Rheum emodi	Cardiovascular, urinogenetal and hepatobiliary	7	8	87.5
Bergenia ciliata	Urinogenetal and Veneral	16	20	80.0
Arnebia benthamii	Cardiovascular disease and external injuries	15	19	78.9
Artemisia maritime	Gastrointestinal and parasitic	7	9	77.7
Artemisia absinthium	Hormonal disorder, memory tonic	5	8	62.5
Fritillaria roylei	Pulmonary disease	5	9	55.5
Taxus baccata	Ovarian cancer	9	18	50.0
Taraxicum officinalis	Muscoskeleton, Spleen and liver disorder	5	11	45.4
Rheum austral	Hepatobiliary, Lymphatic system	7	17	41.1

Trillium Govanium	Nervous system	5	13	38.5
Bergenia ligulata	Kidney stone	6	18	33.3
Berberis lycium	Hepatobiliary and bones	4	15	26.6
Ajuga bracteosa	Cholic ulcers	3	12	25.0
Urtica dioica	Arthritis	2	9	22.2

The analysis of the ethnobotanical data showed that area was best suited to the medicinal and aromatic plants and pasture. The ethnobotanical use category showed that most plants are used for treating different ailments and few plants are used for food and fodder.

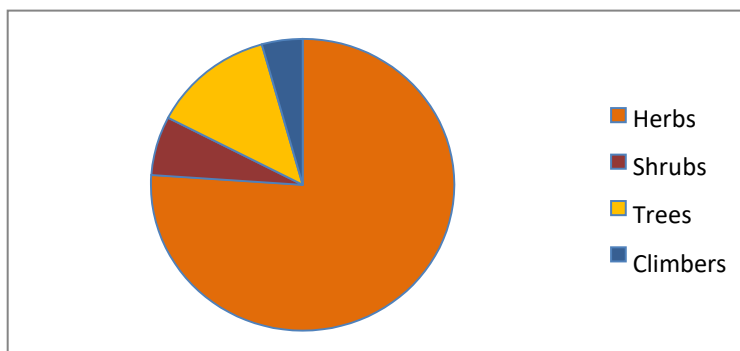


Fig 1. Percentage distribution of habit types of medicinal plants.

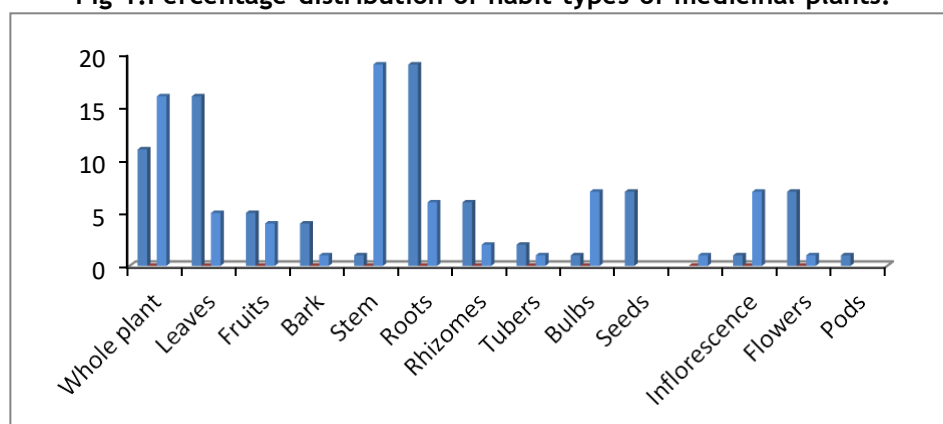


Fig 2. Parts used for ethnomedicinal purpose of flora of Narwav Mountains.

### Discussion

The association between humans and plants is very strong and are always dependent on each other as their dependence is obligate. Plant provides economic prosperity to inhabitants of an area as well as Shepherds, Gujjar and Bakerwals which used to travel in that place to feed their animals such as sheep, ox and buffalo's. The efficacy and use of plants are associated to the importance of them in that area [20]. Within the same context, it was found that the people of the study area depend on native plants for acquiring their basic livelihood requirements such as , medicines, fodder, fuel, fruits, vegetables, fuel, furniture, and roof thatching, use from the mountain areas of Narwav. One of the major reasons could be that the whole area is rural in nature and most of the people are not very well off. Therefore, most of them keep livestock as a source of income.

Ethnobotanical use categories indicated that 90% of species were used for medicinal purposes. Important medicinal plants are exploited by locals, collectors and herbal drug dealers with the increasing demand by the pharmaceutical industry. This caused an extreme decline in the existence and products of medicinal plants. Deforestation, Grazing and soil erosion were mainly accountable for a decline in the medicinal flora. *Ajuga bracteosa*, *Podophyllum hexandrum*, *Taxus baccata* and



*Trillium govanium* have become critically endangered in Baramulla, Kashmir due to extensive utilization for medicinal and other purposes [21, 22]. It is therefore essential to have conservation strategies for these medicinal plants. Due to overexploitation, only trace vegetation remained, which grows at high elevation where humans and grazing animals cannot easily reach in these regions. Due to increasing human population pressure has placed on the natural vegetation, which has extremely reduced the species richness and population size of medicinal plants [23]. The medicinal plants are collected by nomads for an income. They uproot and collect each part of the medicinal plants without any scientific approach. Earlier to this study, no reference exists on the medicinal plant species of this area. Most species in the present study have also been reported as medicinal by other research. The area is a pastureland sanctified with high number of palatable species, so there is great potential for livestock farming and majority of plants were utilized as fodder. Local live stocks grazed most of the medicinal plant species. It is therefore necessary to have conservation strategies for these species. The collection of plants must be correlated with their phenological cycle. The vegetation is vulnerable to grazing and collection pressure. Similarly, the plants grazed or collected for root, rhizome, bulb and flower become more vulnerable due to their inability to develop seed and flowers, while the rhizomatous plants are destructively collected. This will decrease the chance of their restoration.

The areas investigated showed that most peoples from near villages and in the areas studied are poor and lack the basic facilities. They depend upon the forest for fuel wood. Almost all woody species is being used as fuel wood in the study area *deodara (cedrus deodara)*, *chir pine [Pinus roxburghii (P. roxburghii)]*, *Silver Fir (abies pindrow)* and *reen [Quercus dilatata (Q. dilatata)]* are popular fuel wood species in the area. A number of studies listed that utmost of the species were chosen for fuel wood and therefore were under heavy pressure, which is similar to present findings [24]. Furniture wood from *deodara (cedrus deodara)* is also a valuable source of earning an income. A number of these plants have the similar uses [25, 26]. *Cedrus deodara* and *Pinus roxburghii* are Plants with high selling and buying prices for timber wood. The pressure on species for burning and construction lead to the major ecological problem in the area, which led to the formation of barren areas over there. The researchers observed that increased human population has resulted in increased demands for natural resources, leading to severe resource depletion, especially deforestation for fuel and timber wood mountain ranges of Baramulla, which is in line with the present study. The unending degradation of existing forest cover is serious threats to the sustainability of forestry in Kashmir, which is also true for the study area.

The investigated area is encountered with a multitude of problems like over exploitation of medicinal, deforestation, overgrazing and fuel wood species. A plant subjected to multiple pressures *viz.* grazing, medicinal utility and fuel wood is under immense biotic pressure that halts its spread and surviving ability. It is an urgent need to take action and create awareness about the usefulness of the flora so that people can save this wealth. Cultivation of threatened medicinal plants should be encouraged by the local community in order to relieve pressure on these plants. It is hoped that this research will contribute a lot in providing useful information on the conservation and sustainable use of the natural resources of the area .

## Conclusion

An adjacent interaction between medicinal plants and indigenous people has been found in the region. More than 50 remedies from wild medicinal plant species used by Gujjar, Shepherd and Bakerwal tribes of district Baramulla have been documented. All the ethnomedicinal claims described in present study are novel record for India. The evidence gathered from key informants and analysis

of data acquired shows that the use of medicinal plants for making home remedies is still prevalent among the Shepherded, Gujjar and Bakerwal.

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