In the study area, the traditional knowledge regarding the uses of local wild medicinal plants for the health care of human and domestic animals is totally in hold of old people. The young ones are unaware about such an indispensable practice. The objective of the current study was to transfer this sort of precious knowledge from old members of the community to young generations in documented form.

1. Introduction

As far as there is a concern of variety of diseases, it is being a part of our life but remedy from it is a challenge and in this scenario the plants especially the one with some medicinal value play a vital and indispensable role, with having no side effects on the body. Medicinal plants used for the remedy of different diseases and its domestic use is from a very long period of time that have gets its starts from early human civilization for the proper treatment of a variety of diseases and its use frequently pass down from one generation to another one (Lev and Amar, 2000). In accordance to Haq (2004), a total of five thousand and seven hundred plant species are under cultivation in our country in which four hundred to six hundred plant species have a regular use in medicines in the Unani allopathic and homeopathic medicine system while the rest of medicinal plant species ranging from three hundred to four hundred were frequently use in traditional medicine system. These natural medicines are prescribed by different schools of thought like Hakeem, religious leaders, heelers, mulas and akhuns, etc. there by providing the health care for the ruler areas. It is an estimation that round about 80 percent of the ruler population of our country are dependent on the traditional system, which is term as Unanic. This system was primarily introduced by the Muslims of subcontinent. The Unani medicine have a total depend on the use of medicinal plant species (Goldman et al., 1985). During the Mughal era another system come into being that is the Greek Arabic medicinal system, an accordance to Rasool (1998), the medicinal plants have important prevailing position in the Gilgit-Baltistan. It has been realized that there is a high risk of loss of this precious indigenous knowledge that is at the verge of extinction. Therefore the valuable tradition and traditional knowledge should be accordingly documented and preserved in scientific manner before it wiped out from the community and also report the total growing plants found in the world. There are more than...
Five thousand of medicinal plant species which are used as medicine (Schipmann et al., 2003).

Though there is enough literature regarding the medicinal plant species in the Gilgit-Baltistan Pakistan, however studies carried on various aspects are scattered and did not provide complete information particularly on the medicinal vegetation of Deosai plateau. Therefore it was pertinent to compile all of the important data on different aspect like collection, identification, traditional knowledge, ethnopharmacy, ethnopharmacological uses etc. This project was started in order to cover all these aspects like examination of their availability, biodiversity status, explore indigenous knowledge for traditional uses of plants and get information about their natural habitat and kinds of wild species in the wilderness.

2. Materials and methods

2.1. Study area

Deosai Plains are located on the north slope of the main Himalayan Ranges. They were formerly a part of the old state of Kashmir but it is now controlled by Government of Gilgit-Baltistan. Astore District is surrounded by Gilgit and Skardu districts, in north Daras District of Kashmir towards the west and south district Diamer and Gilgit. The whole area except a small corner towards Daras and Kargil is treeless. The region lies between 76 and 77° east longitude and it is crossed by the 35th parallel. The area is roughly 2500 sq miles with altitude of 13,000 feet. The flora is alpine and much likes a bit of arctic tundra. High mountains surrounded the plains on all sides by a rim of and the passes by which one enters are from 13,500 to 16,500 feet in altitude (Stewart, 1972). Most of the plants have very short growing period, which is from June to September. The project area was DassKhurm, Chilim, ChotiDeosai, Deosai, Sar-darkothi of District Astore, (Gilgit-Baltistan). During the whole period of the Research work ethno botanical information and traditional uses of plants were documented. Systemic interviewing and filling questionnaires has been done to collect the whole information regard the plants and their usage.

2.2. Necessary equipments

Maps, pencils, note book, plants pressers, blotting papers, polythene bags, knife, GPS and digital Camera were used during preparation of current the research study.

2.3. Collection of medicinal plants

During field survey all of the medicinal plants were collected in a scientific and systematic way and photographs were taken on the spot. The plant specimens were press by means of plant pressor and were identified by an expert taxonomist. Data about local names and uses of experimental plants were collected from experts from Hakims, shepherds, farmers, local herbal practitioners and forest guards.

2.4. Statistical analysis

The UVI was calculated using the formula proposed by Phillips et al. (1994), UVI, the use value of a species for an informant, where \( U_I = \text{No. of use reports for each species of given plant} \), \( N_I = \text{Total No. of informants interviewed for a given plant species} \). To calculate the use value of a species for an informant \( UVI = \frac{\Sigma U_I}{N_I} \).

3. Results and discussion

Various medicinal plants have been used from immemorial time (Stewart, 1972). In Indo-Pak the first compiled record is that of Ayurveda which is between 2500 and 600BC (Haq, 2004).

The predominant system of traditional medicine traces its origin back to Greek medicinal system, which was adopted first by the Arabs, and then spread to the subcontinent and Europe. Even in this present modern age of Science and Technology, the developed countries still depend upon the traditional solution of healthcare because it has very few side effects in addition to the low price, relatively to the modern allopathic medicines with a lot of side effects on the human body, therefore they are still being used in the developing countries extensively compared with other systems of healthcare. The people of the valley have been using plant resources for their various ailments. The local people know the beneficial plants and preparation of raw drugs through personal experience and ancestral prescription and long utility. People of the valley are dependents on plant resources. They collect the plants for medicinal uses, fuel wood, fodder, timber, and many other purposes. A total of 117 local inhabitants (92 men, 25 women) were interviewed via questionnaire, women were 34–65 years old and men were 30–72 years old out of them 8 were local hakims. Photographs of plant were taken during tour and verified with the assists of local people. In present study 51 plant belongs to 26 families were reported, these plants used commonly as an ethnomedicine. There were herbs (82%), trees (6%) and shrubs (12%) (Fig. 1). Upreti et al. (2010) also reported herbarious life form as the leading for medicinal purposes in Nepal (Upreti et al., 2010).

Ranunculaceae is dominant family that is used for the remedy of different sort of diseases (10 plant spp.) while other researchers (Teklehaymanot and Giday, 2007; Mesfin et al., 2009; Bhattarai et al., 2010) mentioned Asteraceae as the leading family with maximum number of medicinal plants species to cure diseases. However Ranunculaceae was followed by Apiaceae (6 Spp.), Asteraceae (5 Spp.), Papilionaceae (4 Spp.), Alliaceae, Cupressaceae, Lamiaceae and Polygonaceae (2 Spp. each) while rest of 18 families were comprised of single species (Table 1).

![Fig. 1. Life form of plants used for ethno medicinal practices.](image-url)
Fifty-one medicinal plants that belong to 26 families were being used in the treatment of twenty-eight various diseases by the local inhabitants. Table 2 describes that majority of medicinal plant species were used for the remedy of digestive problems (11.4%), skin diseases and wound healing (10.06%), fever, pain, (7.38%), cough (6.71%), asthma (6.04%), arthritis (5.36%), diabetes (4.69%), reproductive problems (4.02%), dental caries and carminative (3.35%), jaundice, cough, kidney stone and rheumatism (2.01%), followed by cardiac problems, pneumonia, ringworms, liver diseases, malaria and typhoid, milk production in animals, inflammation ulcer and laxative (1.34%) whereas lowest percentage of species were used against leukemia (0.69%) as shown in Fig. 2. All those diseases were treated orally except skin diseases which were treated externally (Table 4). Most of the diseases were treated orally while only skin diseases were externally treated as reported by many other researchers (Upreti et al., 2010; Lulekal et al., 2013; Luitel et al., 2014).

Table 1
Taxonomic diversity of medicinal plants in Deusai plateau of Gilgit, Pakistan.

| Family            | No. of species | Percentage of species | No. of genera | Percentage of genera |
|-------------------|----------------|-----------------------|---------------|----------------------|
| Ranunculaceae     | 10             | 19.6                  | 5             | 12.8                 |
| Apiaceae          | 6              | 11.7                  | 3             | 7.6                  |
| Asteraceae        | 5              | 9.8                   | 4             | 10.2                 |
| Papilionaceae     | 4              | 7.8                   | 3             | 7.6                  |
| Alliaceae         | 2              | 3.9                   | 1             | 2.5                  |
| Cupressaceae      | 2              | 3.9                   | 1             | 2.5                  |
| Lamiaceae         | 2              | 3.9                   | 2             | 5.1                  |
| Polygonaceae      | 2              | 3.9                   | 2             | 5.1                  |
| All other families| 18             | 35.2                  | 18            | 46.1                 |

Table 2
Diseases treated by number of plant species.

| Diseases            | No. of species | Percentage |
|---------------------|----------------|------------|
| Fever               | 11             | 7.38       |
| Skin diseases       | 15             | 10.06      |
| Arthritis           | 8              | 5.36       |
| Healing             | 15             | 10.06      |
| Jaundice            | 3              | 2.01       |
| Digestive problems  | 17             | 11.4       |
| Cardiac diseases    | 2              | 1.34       |
| Asthma              | 9              | 6.04       |
| Diabetes            | 7              | 4.69       |
| Cough               | 3              | 2.01       |
| Pneumonia           | 2              | 1.34       |
| Cough               | 10             | 6.71       |
| Blood pressure      | 7              | 4.69       |
| Ring worms          | 2              | 1.34       |
| Liver diseases      | 2              | 1.34       |
| Dental carries      | 5              | 3.35       |
| Kidney stone        | 3              | 2.01       |
| Rheumatism          | 3              | 2.01       |
| Pain                | 11             | 7.38       |
| Reproductive problems| 6             | 4.02       |
| Malaria and typhoid | 2              | 1.34       |
| Milk production in animals | 2 | 1.34 |
| Inflammation        | 2              | 1.34       |
| Ulcer               | 2              | 1.34       |
| Leukemia            | 1              | 0.63       |
| Carminative         | 5              | 3.18       |
| Laxative            | 2              | 1.27       |

Table 3
Most frequently used plants of Deusai plateau of Gilgit, Pakistan.

| Medicinal plants               | Used value | Ranking |
|--------------------------------|------------|---------|
| BerberisorthobotryBien. ex Aitch.| 0.88       | 1       |
| BergeniastracheyiBoiss.         | 0.81       | 2       |
| Ephedra gerardianaWall.         | 0.71       | 3       |
| BistortaaffinisD. Don           | 0.63       | 4       |
| AnaphlisnepalensisDC.          | 0.62       | 5       |
| BetalaurisiiD.Don               | 0.60       | 6       |
| Ferula narthex Boiss.          | 0.59       | 7       |
| CarumcarviL.                   | 0.55       | 8       |
| Dactylorhizahatagirad.Don      | 0.55       | 9       |
| Colchicum luteumbaker           | 0.54       | 10      |
| GentianatianschanicaRupr.      | 0.52       | 11      |
| MenthalongifoliaL.             | 0.49       | 12      |
| Codonopsisclatideac(Schernk)C.B Clarke| 0.48 | 13 |
| Delphinium brononianumRoyle    | 0.48       | 14      |
| Allium fedtschenkoanumRegel    | 0.44       | 15      |

Leaves are mostly used for the remedy of various diseases by the local inhabitants. Table 2 describes that majority of medicinal plant species were used for the remedy of digestive problems (11.4%), skin diseases and wound healing (10.06%), fever, pain, (7.38%), cough (6.71%), asthma (6.04%), arthritis (5.36%), diabetes (4.69%), reproductive problems (4.02%), dental caries and carminative (3.35%), jaundice, cough, kidney stone and rheumatism (2.01%), followed by cardiac problems, pneumonia, ringworms, liver diseases, malaria and typhoid, milk production in animals, inflammation ulcer and laxative (1.34%) whereas lowest percentage of species were used against leukemia (0.69%) as shown in Fig. 2. All those diseases were treated orally except skin diseases which were treated externally (Table 4). Most of the diseases were treated orally while only skin diseases were externally treated as reported by many other researchers (Upreti et al., 2010; Lulekal et al., 2013; Luitel et al., 2014).

The medicinal plant species with greater use values given in Table 3 were Berberisorthobotry Bien. ex Aitch. (0.88) ranked 1st, BergeniastracheyiBoiss. 2nd (0.81) and Ephedra gerardianaWall. (0.71) 3rd, BistortaaffinisD. Don (0.63), AnaphlisnepalensisDC.
Results obtained during the survey of the study area are listed below.

| Ser. no | Botanical name | Family name | Vernacular name (Shina) | Habit | Part used | Altitudinal range | Disease cured | Used value |
|---------|----------------|-------------|-------------------------|-------|-----------|-------------------|---------------|------------|
| 1       | Aconitum heterophylum Wall. ex Royle | Ranunculaceae | Patris | Herb | R | 2500–4200 | Fever, dyspepsia, dysentery | 0.32 |
| 2       | Aconitum violaceum Jacq. | Ranunculaceae | Bishmoulo | Herb | R, Wp | 3074–4000 | Leucoderma, skin diseases, arthritis | 0.37 |
| 3       | Anaphis nepalesensis DC. | Asteraceae | Chikee | Shrub | L, F | 4000–5000 | After delivery rapid healing, scars | 0.62 |
| 4       | Angelica glauca Degew | Apiaceae | Choro | Herb | L, R | 3000–4500 | Jaundice, fever | 0.21 |
| 5       | Angelica archangelicarv. himalaica Clarke | Apiaceae | Choro | Herb | R | 3800–4000 | Digestive problems, acidity, cardiac diseases | 0.18 |
| 6       | Arnabiabhami Wall. ex G. Don | Boraginaceae | Kazaban | Herb | L, F | 3300–5000 | Asthma, diabetes, pneumonia, cough | 0.27 |
| 7       | Artemisia martinsia (Berg.) Wellkom | Asteraceae | Zoon | Shrub | L, F | 2100–2700 | Blood pressure, ring worms, digestive problems, liver diseases | 0.41 |
| 8       | Artemisia absinthium L. | Asteraceae | Khakamos | Herb | L, F | 3700 | Diabetes, ring worms, malaria, blood pressure, digestive problems | 0.36 |
| 9       | Astragalus hispida Fisch. | Papilionaceae | Hapochi | Shrub | R | 2800–3000 | Fever, dental carries, asthma | 0.27 |
| 10      | Astragalus alsinodicus Royle | Papilionaceae | Hapochi | Herb | L, F | 3000–3200 | Fever, diarrhea, dental carries | 0.30 |
| 11      | Aquilegia fragans Benth. | Ranunculaceae | ShaiMakhoti | Herb | L, F | 3900 | Pneumonia | 0.19 |
| 12      | Aquilegia nigula Hook. | Ranunculaceae | HatiMakhoti | Herb | L, F | 4000–4500 | Fever, kidney stone, jaundice | 0.22 |
| 13      | Allium carolinianum Regel | Alliaceae | Phaloon | Herb | L, Bb | 4000–6000 | Rheumatism, blood pressure | 0.38 |
| 14      | Allium fedtschenkii Regel | Alliaceae | Phaloon | Herb | L, Bb | 4000–6000 | Anti-diarrhea, carminative, epigastric disorder, anti-emetic, anti-flatulence | 0.44 |
| 15      | Achilea milium L. | Asteraceae | Akirkarrha | Herb | L, F | 4000–4500 | Liver disease, digestive disorder, pain | 0.29 |
| 16      | Anemone bipicalo Camb. | Ranunculaceae | Bukumkote | Herb | L, F | 3500–5000 | Arthritis, skin diseases, allergic conditions | 0.33 |
| 17      | Anemone tetrarca Royle | Ranunculaceae | Buljaiphonar | Herb | Wp | 3500–5000 | Arthritis, skin disease, wounds | 0.20 |
| 18      | Anemone obtusiloba D. Don | Ranunculaceae | F | Herb | F, L | 3500–5000 | Arthritis, skin diseases | 0.20 |
| 19      | Berberis orthostachys Bjen. ex Aitch. | Berberidaceae | Ishkeen | Shrub | L, Fr, R | 1500–3000 | Broken bones, injuries, immediate healing of tissues after delivery, blood pressure, diabetes, ophthalmic disease | 0.58 |
| 20      | Bergeniastracheyi Boiss. | Saxifragaceae | Sanspar | Herb | R, L | 4000–4500 | Headache, blood pressure, vomiting, vertigo, joint pain, backache, immediate healing of tissues after delivery, hepatitis, in animals for diarrhea, dysentery | 0.81 |
| 21      | Bistorta affinis D. Don | Polygonaceae | Chomoi | Herb | L, Rh | 2000–3000 | Diarrhea, fever, urinary tract infection, pain, backache, skin diseases, ulcer, rheumatic pains, arthritis | 0.63 |
| 22      | Betula alba L. | Betulaceae | Jongi | Tree | B | 2700–4300 | Women after delivery for a period of forty (40) days, backache, tonic | 0.60 |
| 23      | Colchicum latum Baker | Liliaceae | Hinniphono | Herb | Bb | 3800 | Arthritis, gout, itchiness, neuralgia, leukemia, carminative, laxative | 0.54 |
| 24      | Codonopsis simplex (Schenk) C.B Clarke | Campanulaceae | Tumta q | Herb | R | 4000–5000 | Aphrodisiac, male potency, tonic, sexual stimulant | 0.48 |
| 25      | Coralsi govaniana Wall. | Apiaceae | Hayyo | Herb | Sd | 3000–4000 | Carminative, appetite stimulant, indigestion, colic, flatulence, diarrhea, tonic, severe cold, flue, cough | 0.55 |
| 26      | Corydalis govaniana Wall. | Papilionaceae | LaskarButi | Herb | R | 3000–5000 | Headache, fever, sedative | 0.13 |
| 27      | Delphinium cashmirianum Royle | Ranunculaceae | Mukhoti | Herb | Wp | 3500–4500 | Enlargement of hairs, cosmetics | 0.16 |
| 28      | Delphinium brononum Royle | Ranunculaceae | Mukhoti | Herb | Wp | 4000–6000 | Pesticide, enlargement of hairs, dandruff, cosmetic purposes | 0.27 |
| 29      | Equisetum arvense L. | Equisetaceae | Chiyi | Herb | Ap | 2500–3500 | Laxative, anthelmintic, appetizer, diabetes, liver diseases, intestinal amoebae in veterinary practice | 0.41 |
| 30      | Epilobium angustifolium L. | Onagraceae | Soom | Herb | F, L | 2700–4000 | Headache, fever, sedative | 0.31 |
| 31      | Ephedra gerardiana Wall. | Ephedraceae | Ap | Herb | Shrub | 2438–4266 | Asthma, bronchitis, hay fever, nasal congestion, bronchitis | 0.71 |
| 32      | Euphorbia thomsoniana Boiss. | Euphorbiaceae | Tentree | Herb | Wp | 3000–3300 | Gonorrea, bleeding, leucorrhoea, dandruff | 0.19 |
| 33      | Ferula narthex Boiss. | Apiaceae | Sup | Herb | R, S | 1800–3000 | Scorpion sting, whooping cough, toothache, carminative anti-diypeptic coregent, reduce blood pressure, making of ghee, promote milk production in domestic animals | 0.59 |
| 34      | Ferula jaeschkeana Vatke | Apiaceae | Sup, palongo | Herb | Rh, S, L | 1800–3500 | Wounds, ulcerative tissue, malignant ulcer | 0.31 |
| 35      | Fragaria nubicola L. | Rosaceae | Ichja, Bursay | Herb | Wp | 1800–3000 | Tonic, cough, asthma, bronchitis | 0.27 |
| 36      | Mentha longifolia L. | Lamiaceae | Phileel | Herb | Ap | 2000–3000 | Stomach trouble, digestion, purification of blood, headache, diarrhea, anti-emetic, carminative, blood pressure, diabetes | 0.49 |

(continued on next page)
and Betula utilis D.Don (0.60), respectively. Whereas lowest used value among the collected medicinal plants was of Corydalis govaniana Wall. (0.13) as given in Table 3. Greater used values of mentioned medicinal plants might be due to their common distribution and also due to local practitioner’s awareness which makes those plants as the first choice for remedy of disease (Ullah et al., 2014). Table 4 describes all of the plants listed with their respective indications, used value, method of use and parts used to prepare the ethno medicines.

### 4. Conclusions and recommendations

Field observation showed that vegetation of the area was generally threatened with the unwise of local communities. The biotic and abiotic challenges such as over grazing, deforestation, unscientific extraction of natural vegetation, habitat fragmentation, an introduction of the exotic taxa and habitat loss were the visible risks. It is recommended that the local community should be educated regarding the importance, pre and post-harvest methods. In addition, they should also be trained regarding the cultivation of these highly valuable medicinal plants on commercial basis, and thereafter their trade and marketing. This will ultimately generate extra sources of income and will reduce pressure on the extraction of these valuable medicinal plants. In DassKhirum, Chilim, ChotiDeosai, Deosai, SardarKothi of District Astore, (Gilgit-Baltistan), the use of plant resources is also a source of income, besides fulfilling their various utilitarian needs. Settlements of majority of the population are subject to the seasonal changes in

![Fig. 3. Plants parts used in traditional treatment of different diseases.](image-url)

### Table 4 (continued)

| Ser. no | Botanical name | Family name | Vernacular name (Shina) | Habit | Part used | Altitudinal range | Disease cured | Used value |
|---------|----------------|-------------|-------------------------|-------|-----------|-------------------|--------------|------------|
| 42      | Nepeta discolor Benth. | Lamiaceae | ChurChumroo Bangra | Herb | Ap, L, F | 3000–4000 | Haemostatic, backache, delivery bleeding, healing | 0.26 |
| 43      | Gentiana tianschanica Rupr. | Gentianaceae | Bangra | Herb | L, F | 2000–4000 | Purification of blood, pain in hemorrhoids, inflammation, astringent, antiseptic, wounds, injuries, diabetes mellitus | 0.52 |
| 44      | Geranium pretense L. | Geraniaceae | Plamat | Herb | L, 5d | 3000–4000 | Diarrhea, dysentery, wounds | 0.31 |
| 45      | Hyoscyamus niger L. | Solanaceae | Bazarbungs | Herb | L, F | 3000–4000 | Toothache, sedative, narcotic, anti-spasmodic, asthma, whooping cough | 0.27 |
| 46      | Iris hookeriana Foster | Iridaceae | Gusman | Herb | R | 2500–4000 | Skin diseases, production of milk in animals | 0.38 |
| 47      | Juniperus excelsa M. B | Cupressaceae | Chilli | Tree | Fr | 3000–3500 | Kidney stone, Diuretic, stimulant, anti-inflammatory, wound, kidney diseases, cough, asthmatic attacks | 0.41 |
| 48      | Juniperus communis L. | Cupressaceae | Muthari | Tree | Fr | 2000–3000 | Inflammation, urinary tract infection, leucorrhoea, gonorrhoea | 0.21 |
| 49      | Jurinea macrocephala Royle | Asteraceae | Gogaldhoop | Herb | R | 3000–4000 | Burnt wound, fever, tonic, aromatic smell, colic, puerperal fever, poutice to eruptions | 0.41 |
| 50      | Oxytropis glabra DC | Papilionaceae | Churki | Herb | L, F | 2500–3500 | Backache, delivery bleeding, healing | 0.25 |
| 51      | Oxyria digyna L. | Polygonaceae | Churki | Herb | R | 2500–3500 | Antipyretic, dental caries, hair strengthening, dandruff | 0.19 |

Abbreviations for part used: R—root, L—leaves, S—stem, F—flower, Fr—fruit, B—bark, Wp—whole plant, Ap—aerial part, Bb—bulb, Rh—rhizome.
the valley. In winter they come down to the valley bottoms due to the unavailability of fodder for their cattle, and at the onset of summer as the snow melts and new plants start sprouting, they move towards the higher altitudes. The local people are ignorant about the importance of these plants at global level. Sometimes they collect plants in excess quantity and in most cases the whole plant is uprooted. They do not know about the proper methods and time of plant collection, as a result most of their collection is useless. On the other hand they are ignorant about the drying, storing or preserving techniques, which ultimately lead to wastage of plant resource.

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