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An ethnobotaical study of important medicinal plants practicized by local community at Rabat valley (district Dir), Pakistan

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Abstract

Total 72 medicinal plants distributed in 36 families were investigated to be used against 35 different type of ailments in human and livestock. Information collected about renowned medicinal species through the help of semi structured questionnaire containg information exploring Relative frequency citation (RFC) and Use valve (UV) of a specific species. The family that has most cited number of species was Asteraceae (10 spp), followed by Apiaceae (7), Lamiaceae (6 spp). 42% people relive their pain with decoction method. The other methods of preparation of herbal medicine are Powder (13%) infusion(8%), and herbal juice (6%).In term of life form 56 were herbs, followed by tree (9), and shrubs (7).Most frequently use part are leaves (38%), followed by roots (14%), fruits (12%), whole plant (11%), stem (6%), seed (12%), Bark (5%), and rhizome (2%). Leaves containing active phytochemical constituents which provide base for the investigation of new and novel compounds.

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Introduction

In the present study, both traditional and therapeutic uses of 72 plants were investigated. The aims of study to analyzed traditional knowledge based on Relative frequency citation (RFC) and Use valve (UV) of a specific species. This study created positive impact on the local people especially in developing their awareness towards the conservation of the traditional knowledge as well as to preserve the plant diversity for the future generation.

The climatic conditions, topography and favorable habitat provide the best environment for floristic diversity in northern areas of Pakistan (Hameed *et al.,* 2012). The unique medicinal plants explore the importance of northern areas (Malcolm *et al.,* 2002). Himalaya mountain range provided habitat for 10,000 medicinally important plants (Pie, 1992). Traditional medicines are used by people for different types of human and livestock ailments (Hussain and Khaliq, 1996). Herbal medicine has got popularity from the very first day in our country. Traditional plants not only cured various diseases in the mountainous regions of Pakistan, but were also relied on for other purposes. (Ahmad *et al.*, 2010; Alam *et al.,* 2011; Shah *et al.,* 2014 and Abassi *et al.,* 2015).

The Himalaya range in Pakistan occupies the regions of Deosai, Chilas, Kaghan, Kohistan and Kashmir. In high altitude of Skardu valley about 50 medicinal plants have been reported to be used against 25 different ailments in the region. The ethno botanical data was analyzed statically using Pearson correlation coefficient (Bano *et al.*, 2014). During the floristic study of Deosai plateau region total 79 plant species enlisted, (Ahmad *et al.*, 2014). Ethno botanical analysis in Senhsa, District Kotli, Azad Jammu & Kashmir (Pakistan) was carried out and 112 medicinal plants were investigated (Khwaja Shafique Ahmad, 2012). Due to immense use of traditional medicinal plants by local people enormous pressure on native flora has been created (Shinwari, 1996; Ahmad *et al.*, 2010; Alam *et al.*, 2011). A number of ethno botanical studies elsewhere in Himalaya regions of Pakistan have reported different number of medicinal plants species used against various diseases in human and live stock (Aziz *et al.,* 2016; Abbas *et al.,* 2016) but this work is sporadic. Regional flora have not been touched upon. The present study will determine both traditional and therapeutic uses of plants. These findings will spur new dimension in research development of novel drugs.

Materials and methods

Study Area

Rabat valley is located between 35-04' to 35-46' north latitudes and 71^{0}- 32' to 71^{0}- 22' east longitude in western Himalaya range. The Lower Dir is comprised of 37 union councils, having 797852 population. Rabat Valley is among the congested one with 156512 population (District census report, 1998), occupied by Pathans and Syeds. Pathans are mainly Yousafzai by descent (McMahon and Ramsay, 1901). The boundaries of District Lower Dir are Swat District situated in the east, Bajour Agency to the west, Upper Dir to the north, and Malakand District to the south (Hazrat *et al.*, 2007).

Data collection

To enlist the flora Extensive field visits were conducted in spring and summer season during 2014-15. The research area was visited extensively to explore ethno botanical data, diversity among plants. The socioeconomic and ethno botanical data were collected from the people of six different villages of Rabat valley viz., Speenakhora, Dogai, Saligram, Charg, Segai, and Dabeera, by interviewing 150 (110 male, 30 female and 10 healer) local inhabitants.

Documentation and Analysis of Data

Valuable data were collected through the help of semi structured questionnaire containing standard question related to a specific plants. Plant specimens were collected, dried, and mounted on herbarium sheets. Picture of the selected plants were taken with the help of digital camera. The collected plants were identified with the help of flora of West Pakistan (Stewart, 1967; Nasir & Ali, 1971-91; Ali and Qaiser, 1991-2004). The inventory for indigenous knowledge of folk medicines was arranged as disease name, local name, botanical name, method of preparation and administration.

Quantitative ethno botanical data analysis

Frequency Citation

Frequently plant species used in research area were investigated from frequency citation. The data were analyzed as by using fallowing formula.

RFC = FC/ N

Locally important species were investigated using this formula (FC, show the number of informants provided information about a specific plant, while N shows total number of informants questioned during the survey.

Use Valve (UV)

Locally important species were investigated with the help of fallowing formula.

UV = ∑ Ui / N

Ui stand for plant uses described by informants. While N is the total number of informants taking part in study.

Results and discussion

Medicinal plant diversity

A total of 72 medicinal plant species distributed in 36 families were tabulated in (table 1). The botanical name, local name, life form of species with their applications were also presented. The family that has most cited number of species was Asteraceae contain (10 spp), followed by Apiaceae (7), Lamiaceae (6 spp). Our result showed similarities with other ethno botanical studies concerning with the predominance of family Asteraceae and Lamiaceae (Bano *et al.,* 2012 ; Blanco *et al.,* 1999). In term of life form 56 were herbs, followed by tree (9), shrubs (7). The present study reveals that herbaceous life form is dominant like other ecological studies (Jan *et al.,* 2011; Ibrar *et al.,* 2007). Among the reported species most frequently use part are leaves (38%), followed by roots(14%), fruits (12%), whole plant (11%), stem (6%), seed (12%), Bark (5%), and rhizome (2%). The plant was used to treat 35 different type of human and livestock diseases. Leaves mainly contributed in preparation of herbal medicine reported in various studies conducted in ethnic communities (Mahishi *et al.,* 2005; Gonzalez *et al.,* 2010; Giday *et al.,* 2010). The presence of active compounds increased Leaves importance in plants as compared to other parts of plants. Leaves utilization in the preparation of herbal medicine is better for maintenance of species (Mahmood *et al.,* 2013). Decoction mode (41 %) of preparation of herbal medicine was commonly used with 29 records, followed by powder method (13%). Infusion (6%), and herbal juice (7%) methods of herbal drug preparation are also applied. The roots, leaves of *Justicia adhatoda,* and fruits of *Ammivisnaga* mixed with sugar, orally administered for curing of rheumatism and cough. The roosted gums of *Acacia modesta* are administered with additional ingredients like desi ghee, to stop gum bleeding.

Table 1. Medicinal plants used to treat various diseases in Rabat valley

Family	Botanical name	Local name	Life form	Parts used/ Formulation	Applications	Administration route	*FC	**RFC	***∑ Ui	*** *UV
Acanthaceae	*Justicia adhatoda* L.	Baikar	Shrub	Roots and leaves mixed with sugar	Rheumatism cough and cold.	Oral/ Topical	21	.14	29	.19
Alliaceae	*Allium cepa* L	Piaz	Herb	Juice of Bulbs, leaves	Arestimulant, diuretic, aphrodisiac and Expectorant.	Oral	31	.20	42	.28
Alliaceae	*Allium sativum* L.	Ooga	Herb	Decoction of Bulbs, leaves	effective in heart diseases and hypertension.	Oral	33	.22	54	.36
Amaranthaceae	*Achyranthusaspera* L.	Spaebotay	Herb	Decoction of Stem, roots	chest problem and high fever, headache	Oral/Topical	27	.18	27	.18
Amaranthaceae	*Amaranthus caudatus* L	Chalwaiy	Herb	Stem	Leucorrhoea	Oral	19	.12	23	.15
Amaranthaceae	*Amaranthus viridis* L.	Gunhar	Herb	Decoction of Leaves	emollient.	Oral	18	.12	18	.12
Anacardiaceae	*Pistacia chinensis* Bunge.	Kakar Singi	Tree	Powder of Fruit	jaundice. bronchial diseases, asthma, Rheumatism	Oral	31	.20	32	.21

Apiaceae	*Ammi visnaga* L.	Spairkai	Herb	Fruits mixed with other plants	whooping cough and asthma	Oral	21	.14	27	.18
Apiaceae	*Bunium persicum* Boiss)	Torazeera	Herb	Powder of Fruit	carminative, stomachic and stimulant.	Oral	17	.11	17	.11
Apiaceae	*Coriandrums ativum* L	Dhanya	Herb	Decoction of Leaves, seeds	carminative, for piles, fragrance and digestive.	Oral	16	.10	45	.30
Apiaceae	*Cuminum cyminum* L.	Zeera	Herb	Powder of Seeds	Carminative and flavoring agent	Oral	16	.10	36	.24
Apiaceae	*Foeniculum vulgare* Mill.	Kagah	Herb	Powder of Leaves, Seeds	diuretic, digestive, aromatic improve eyesight	Oral	29	.19	27	.18
Apiaceae	*Trachyspermum ammi* L.	Sperkai	Herb	Decoction of seeds	laxative, stimulant and carminative	Oral	26	.17	33	.22
Apocynaceae	*Nerium oleander* L.	Ganderay	Shrub	Roots	skin diseases	Topical	23	.25	29	.19
Apocynaceae	*Catharanthus* roseus L .	SadaBahar	herb.	whole plant	blood cancer leukemia	Oral	20	.13	17	.13
Apocynaceae	*Calotropis procera* (Ait.) Ait.f.	Spulmay	Herb	Decoction of Stem, Leaves	Skin diseases	Oral	29	.19	37	.24
Apocynaceae	*Periploca aphylla* Dcne.	Barara	Herb	Latex	Antibiotic	Oral	21	.14	31	.20
Asphodelaceae	*Asphodelus tenuifolius* Cavan.	Piazakay	Herb	Leaves	Condiment	Oral	18	.12	27	.18
Asteraceae	*Artemisia brevifolia* Wall.	Tarkha	Herb	Decoction of Flower , leaves	Anthelmintic, stomach troubles	Oral	38	.25	39	.26
Asteraceae	*Artemisia vulgaris* L	Tarkha	Herb	Infusion of Leaves	skin diseases	Oral	40	.26	55	.36
Asteraceae	*Achilleamillefolium*L.	Jasifa,	Herb	Decoction of Whole plant	Stops intestinal bleeding	Oral	19	.12	26	.18
Asteraceae	*Calendula officinalis* L	Zairgulae	Herb	Leaves, flowers	diaphoretic and anthelmintic.	Oral/ Topical	18	.12	24	.16
Asteraceae	*Cichorium intybus* L.	Han	Herb	infusionof roots, Juice of leaves	Liver infection, laxative, diuretic	Oral	35	.23	35	.22
Asteraceae	*Conyza canadensis* (Linn.)	Malooch	Herb	Roots, stem, leaves	homeostatic, and dysentery	Oral	31	.20	17	.11
Asteraceae	*Sonchus asper* L.	Shawdapai	Herb	Decoction of shoots, flowers	Diuretic,jaundice.	Oral	16	.10	23	.15
Asteraceae	*Carthamus oxyacantha* M.B	Kareza	Herb	Roots, stem, leaves	Diuretic and aphrodisiac.	Oral	13	.08	13	.07
Asteraceae	*Taraxacum officinale* Weber.	Boodabooda i	Herb	Decoction of Whole plant	Liver disorder, Diuretic	Oral	31	.20	14	.08
Asteraceae	*Xanthium strumarium* L.	Ghutghiska y	Herb	Powder of seeds and root	Sedative, Diuretic	Oral	32	.21	40	.26
Berberidaceae	*Berberis brandisiana*	Kwaray	Shrub	Decoction of roots Bark, leaves	Skin disease, jaundice, antiseptic	Oral	35	.23	17	.11
Berberidaceae	*Berberis lycium* Royle	Tore kwaray	Shrub	Decoction Bark, leaves and roots	Skin disease, jaundice, antiseptic	Oral	38	.25	56	.37
Boraginaceae	*Onosma hispida* Wall.	Gaozaban	Herb	Leaves, flower	spasmolytic, relieves	Oral	16	.10	12	.06
Brassicaceae	*Lepidium sativum* Linn	Halam	Herb	Decoction of Seed	Carminative	Oral	42	.28	38	.25
Brassicaceae	*Capsella bursa-pastoris* L.	Bambaisa	Herb	Seeds	diuretic astringents; dropsy.	Oral	18	.12	22	.14
Buxaceae	*Buxus pappilosa* C.K.Schneid	Shamshad	Tree	Whole plant	Antirheumatic, diaphoretic, purgative, poisonous.	Oral	16	.10	19	.13
Buxaceae	*Sarcococca saligna* (D.Don)	Ladan	Herb	Leaves, flowers	Laxative, blood purifier , muscular pain.	Oral	19	.12	15	.11
Cannabaceae	*Cannabis sativa* L.	Bung	Herb	Powder of inflorescence , leaves	Excitement, It is sedative, tonic, narcotic	Oral	26	.23	57	.38
Chenopodiaceae	*Chenopodium album* L.	Sarmay	Herb	Infusion of Leaves	laxative, anthelmintic	Oral	21	.14	20	.14
Chenopodiaceae	*Chenopodium murale* L.	Binaka	Herb	infusion of whole plant	laxative.	Oral/ Topical	16	.10	18	.12
Convolvulaceae	*Convolvulus arvensis* L	Prewatai	Herb	Decoction of Stem, leaves	Purgative, skin diseases	Oral	12	.08	11	.07
Cucurbitaceae	*Cucumis sativus* L.	Badrang	Herb	Fruit	Refrigerant	Oral	11	.08	9	.06
Cucurbitaceae	*Cucurbita maxima* Duch	Khogkadoo	Herb	shoots, flowers, fruits	Digestive problems.	Oral	18	.12	13	.09
Cucurbitaceae	*Luffa cylindrica* (Linn)	Torai	Herb	Fruits	stomach and ulcer problems	Oral	19	.12	12	.08

Cuscutaceae	*Cuscuta reflexa* Roxb	Marazbootay	Herb	Juice of Whole plant	Wash sores, itching areas of the body.	Topical	12	.08	16	.10
Euphorbiaceae	*Mallotus philippensis* (Lam)	Kambila	Herb	Decoction of fruits	Purgative for young cattle	Oral	22	.14	31	.20
Euphorbiaceae	*Ricinus communis* L.	Arund	Herb	Leaves heated in water, applied on eye	Eye disease	Oral	20	.13	33	.22
Fumariacea	*Fumaria indica* (Hausskn.).	Papra	Herb	Decoction of Whole plant	blood purifier; produced cooling effect, Diuretic.	Oral	29	.19	40	.26
Fumariacea	*Corydalis govaniana* Wall.	desimamera	Herb	Decoction of whole plant	eye disordered	Oral	18	.12	18	.12
Geraniaceae	*Geranium* nepalense Sweet	Sra zeal	Herb	Juice of fruit,	hemorrhages and leucorrhoea.	Oral / Tropical	19	.12	32	.21
Geraniaceae	*Geranium wallichianum* Don	Warmagbootai	Herb	Powder of Roots	Diuretic	Oral	21	.14	23	.15
Lamiaceae	*Ajugabracteosa* Wall	Khwagabootei	Herb	Decoction of Leaves	Angina and for the treatment of achiness.	Oral	20	.13	32	.21
Lamiaceae	*Mentha longifolia* (L.) L	Villanay	Herb	Powder of leaves	Stimulant, ant rheumatic, flavoring agent, stomachache	Oral	25	.16	33	.22
Lamiaceae	*Mentha spicata* L.	Podina	Herb	Decoction of Leaves	Dyspepsia. stimulants and carminative	Oral	26	.17	23	.15
Lamiaceae	*Mentha ex piperita*L.	YakhaPodina	Herb	Decoction of Leaves	Dyspepsia stimulants and carminative	Oral	19	.12	26	.18
Lamiaceae	Otostegialimbata (Benth.) Boiss.	Spin azghai	Herb	Powder of leaves Mixed with honey	Healing wounds	Topical	17	.11	24	.16
Lamiaceae	*Salvia moorcroftiana* Wall	Khar dug	Herb	Powder of leaves Mixed with honey	healing wounds	Topical	26	.17	23	.15
Malvaceae	*Malva neglecta* Wall.	Panerak,	Herb	Decoction of roots	Purgative for cattle	Oral	20	.13	22	.14
Meliaceae	*Melia azedarach* L.	Torabakyanra,	Tree	Bark, leaves mixed with wheat	Hysteria, skin diseases.	Oral	28	.18	32	.21
Meliaceae	*Cedrela serrata* Royle.	Darawn	Tree	Juice of Leaves	Roundworms. Diabetes, metallic poison.	Oral	21	.14	18	.12
Mimosaceae	*Acacia modesta*Wall	Palosa	Tree	Roosted Gums mixed with ghee,	Tonic, stimulant	Oral	29	.19	31	.20
Mimosaceae	*Acacia nilotica* (L.)	Kikar	Tree	Roosted Gums mixed with ghee	Stop gums bleeding	Oral	28	.18	29	.19
Mimosaceae	*Albizia chinensis* (Osbeck)	Srikh	Tree	Decoction of bark	Skin diseases	Topical	21	.14	28	.18
Oleaceae	*Olea ferruginea* Royle.	Khona	Tree	Decoction of Leaves	Anti diabetic. toothache, throats soar, rheumatism	Oral	41	.27	41	.27
Oxalidaceae	*Oxalis corniculata* L	Manzakeentarookay	Herb	Juice of Whole plant	Stomach problems, diarrhea	Oral	26	.17	22	.14
Paeoniaceae	*Paeonia emodi* Wall.	Mamaikh	Herb	Powder of Rhizomes, roots	Backache, dropsy epilepsy	Oral	21	.14	12	.08
Papaveraceae	*Papaver somniferum* L.	Apeem	Herb	Decoction of seeds	narcotic and an anodyne.	Oral	27	.18	26	.18
Plantaginaceae	*Plantago ovata* Forssk	Speghoul	Herb	Powder of Seeds	dysentery,constipation	Oral	32	.21	23	.15
Podophyllaceae	*Podophyllum emodi* Wall.	Kakorra	Herb	Decoction of Rhizomes	Emetic drastic purgative	Oral	20	.13	48	.32
Polygonaceae	*Rumex dentatus* L	Shalkhay	Herb	Decoction of Leaves	Diuretic, cooling, demulcent	Oral	28	.18	26	.18
Punicaceae	*Punica granatum* L.	Anar	Tree	Decoction Fruits, bark,	Dysentery, skin diseases and cattle diarrhea	Oral	26	.17	22	.14
Rhamnaceae	*Sageretiat thea* (Osbeck)	Momanra	Shrub	Leaves, bark, fruits, Roots	Stimulant, blood purifier	Oral	24	.16	56	.37
Rhamnaceae	*Ziziphus nummularia* (Burm. f.)	Kurkanda	Shrub	Decoction of Roots, fruits,	Astringent, jaundice	Oral	23	.15	51	.34
Rhamnaceae	*Zanthoxylum armatum* DC.	Dambara	Shrub	Decoction of Bark, fruits, seeds	carminative, condiment,	Oral	41	.27	65	.43

Data on quantitative ethnobotanical uses

Quantitative ethno botanical information provided information about frequently used plants in term of its traditional use (Phillips and Gentry, 1993). The highest value of RFC ranked the *Zanthoxylum armatum* (0.45) first, followed by *Cannabis sativa* (38) and *Berberis lycium* (0.37) as second and third respectively. RFC value of plant depend upon number of informant mention the use of plants (FC). High RFC values species are *Fumaria indica* with RFC (19) *Calendula officinals* (16) *Mentha spictata* (17) *Mentha longifolia* (16), *Sagretia thea, Indigofera heterantha. Berberis lyceum* (25), *Malvaneglecta* (13) and *Accia modesta* (18) (Table 1).

The RFC valve range from .06 to .45 percent in medicinally important plants. *Cucumis sativus* showed lowest UV with (06) showing that mostly people are unaware of its medicinal properties while *Zanthoxylum armatum* (0.45) (Table1) from Rhamnaceae family show highest importance clearly explore the medicinal uses in the area. The uses of medicinal plants mentioning by informants (UV) is directly related with RFC.

RFC value not only show frequently used medicinal plants but also elucidate the relationship between plants and inhabitants. Our results are significantly various from other results concerning about most frequently used plants. (khan *et al.,* 2013).

Leaf was commonly used in herbal remedies preparation as compared to other parts of plants, showed resemblance to other studies conducted in Himalaya region (Ahmad *et al*., 2014) and other regions of world (Teklay *et al.,* 2013).

It was reported that 41% peoples preferred decoction method for the preparation of herbs. In this method plants materials is boiled in hot water and used as remedies. People relive their pain with decoction method. In juice method the plant material is grinded with or without water. Salt, peppers are also added to plants mixture in some methods and used as remedies. The preparation was mainly taken orally.

The other methods are Powder (13%), infusion (6%) and herbal juice (5%). Herbal drugs are administered with additional ingredients like milk, honey or butter to treat some diseases. To boost immunity system of the patients, local people preferred those medicines which are formed by the combination of different plant parts. It is reported during the study that utilization of fresh medicinal plants provided good results. The inhabitants are poor, they have neither accessibility nor affordability to modern medicine and therefore they rely on medicinal plants to cure their different ailments.

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