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RESEARCH PAPER

Journal of Biodiversity and Environmental Sciences (JBES)

ISSN: 2220-6663 (Print) 2222-3045 (Online)

Vol. 12, No. 5, p. 163-173, 2018

<http://www.innspub.net>

OPEN ACCESS

Quantitative ethnobotanical survey of medicinal plants used as remedy in Mera, District Charsadda, KP, Pakistan

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Article published on May 13, 2018

Key words: Ethnobotany, Diseases, Use value, Conservation status, Charsadda, Pakistan.

Abstract

Extensive field visits and interviews were carried out in spring and summer 2015, to document information on traditional uses of medicinal plants in Mera, District Charsadda, Kp, Pakistan. A total of 92 plants species from 50 families were reported which were taken against 48 different human ailments in the locality. Family Solanaceae with 7 species was the most leading family followed by Moraceae 6 species and Asteraceae, Brassicaceae, Cucurbitaceae with 4 species each. Herbs (62%) were the most dominant life form followed by trees (30%) and shrubs (8%). The most frequent plant parts used were leaves (33%) followed by fruit (22%), bark (8%), seed (8%), whole plants (7%) and flowers (5%). The highest (0.73) Relative Frequency Citation (RFC) for *Citrus aurantifolia* whereas highest (0.85) Use Value (UV) for *Coriandrum sativum* were observed. Person correlation coefficient (PCC=0.941) showed a strong positive correlation between RFC and UV. This survey will help, to identify high valued medicinal plant species in the locality for further drug discovery. Medicinal Plants with high use value should be subjected to comprehensive phytochemical studies for further drug discovery.

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Introduction

Ethno botany is the relationships between peoples and plants regarding their cultural values etc. Interactions and relationship between plants and people is different from area to area due to their relative importance, cultural values of plant exploration has a key role in pharmaceutical and nutritional industrial sectors (Ladio *et al.*, 2011). Herbal medicines are naturally occurring plant-based medicines. About 80% of the world's populations are still relies on traditional plant-based medicines for primary health care because of their effectiveness, no side effect, easily accessible at affordable prices (Mukerjee and Wahil, 2006; Gangadhar *et al.*, 2012). In the past medicinal plant species were under practice for the recovery of different health disorders in most parts of the world due to its less side effects easily accessible and effectiveness. Plant produce organic compound which provide a source of active chemicals used for medicinal purposes in herbal medicine form (Bussmann *et al.*, 2006). In hilly areas people use medicinal plant species in the form of herbal medicines for the treatment of different health disorders due to easily availability, effectiveness and trust (Hassan *et al.*, 2017c).

There is a huge crude drug (Tibbia Dawakhana) system in Pakistan with more than 50,000 registered Hakims (William and Zahoor, 1999). They use the plant's leaves, stem, roots, seeds, berries, barks, gums, fruits and flowers etc for medicinal purposes and play a vital role in the treatment of various human and livestock illnesses within local healing practices (Hussain and Khaliq, 1996). Rural population has a critical knowledge about medicinally important plants and treat diseases by using certain plant parts either directly or with some other suitable supplements (Nadeem *et al.*, 2013). Because of the rich floral diversity ethnomedicinal studies has been a major subject of interest in Pakistan. A number of workers carried out ethnomedicinal studies throughout the country including Begum *et al.*, (2005), Hamayun *et al.*, (2006), Manan *et al.*, (2007), Abbasi *et al.*, (2010), Alam *et al.*, (2011), Ghorbani *et*

al., (2011), Naghibi *et al.*, (2012), Tangjitman *et al.*, (2012), Bibi *et al.*, (2014), Nasab *et al.*, (2014), Begum *et al.*, (2014), Khan *et al.*, (2014) and also some parts of district Charsadda (Begum and Hamayun, 2015; Jan *et al.*, 2016). Therefore, the present study attempted to collect and preserve the ethnomedicinal knowledge of local flora in the form of an ethnomedicinal profile and to furnish the ethnomedicinal awareness in the natives for the upcoming generation. The present work might be helpful for the future researchers in the field of natural drugs discovery.

Materials and methods

Study area

District Charsadda is located in the west of the Khyber Pakhtunkhwa and is bounded by Malakand district on the north, Mardan district on the east, Nowshera and Peshawar districts on the south and on the west by Mohmand Agency. The district lies between 34-03' and 34-38' north latitudes and 71-28' and 71-53' east longitude. The mean maximum temperature in summer and winter is over 40 ° and 18.35 °C respectively. The mean minimum temperature is 25 °C in summer and 4 °C in winter. The highest winter and summer rainfall has been recorded in March and August respectively (Government of Pakistan).

Data collection and documentation

Various field visits were conducted in spring and summer season during 2015-16 for documenting and enlisting the ethno medicinal uses of medicinal flora of Mera (Turangai and Umarzai) District Charsadda, KP, Pakistan. Plants were collected, pressed, dried and preserved properly on herbarium sheet of standard size (Hassan *et al.*, 2017a). The collected plants were photographed using a digital camera. The informants were interviewed about local name, part used, method of preparation, dosage and traditional knowledge and experience of using plants for treatment of different health disorders. All the described information's were recorded by filling semi structure questionnaires (Hassan *et al.*, 2017b). A total of 103 informants with different age classes were

randomly selected for interviews. The informants include both male, female and local Hakeem with different age classes (above 40 years age) . The medicinal plants were identified through flora of Pakistan (Nasir and Ali, 1970-1995; Ali and Qaisar, 1993-2015).

Statistical analysis

The data was analyzed using Use Value (UV), Relative Frequency Citation (RFC) and Pearson Correlation Coefficient (PCC) Use Value demonstrates the relative importance of plant species known locally ($UV = \sum U_i / N$). Relative Frequency

Citation indicated the local importance of each species ($RFC = FC / N$). while Pearson Correlation Coefficient is the covariance of the two variables divided by the product of their standard deviations. it was measured between RFC and UV using SPSS version 16. (Savikin *et al.*, 2013; Vitalini *et al.*, 2013).

Results and discussion

Medicinal plants and natural plant products have always been used as first aid remedy throughout the history of mankind for various purposes. In the present survey, a total of 92 medicinal plant species from 50 families were reported (Table 1).

Table 1. Ethnomedicinally important plants of mera Turangzai and Umarzai district Charsadda.

Plant species	Family name	Local name	Habit	Part used	FC	RFC	$\sum U_i$	UV	Uses
<i>Portulaca oleracea</i> L.	Aizoonaceae	Warharhi	H	Shoot	8	0.08	14	0.14	Curative, urinary bladder swellings, kidney disorders
<i>Allium sativum</i> L.	Alliaceae	Ooga	H	Bulb	51	0.50	78	0.76	Blood pressure, vomiting, diarrhoea
<i>Allium cepa</i> L.	Alliaceae	Piaz	H	Bulb	36	0.35	47	0.46	Diabetes, carminative, help in digestion, aphrodisiac
<i>Achyranthes aspera</i> L.	Amaranthaceae	Spaiboti	H	Leaves	19	0.18	45	0.44	Stomach pain, asthma, blood purifier
<i>Coriandrum sativum</i> L.	Apiaceae	Dhanya	H	Leaves	70	0.69	88	0.85	Laxative, carminative, abdominal pain
<i>Daucus carota</i> L.	Apiaceae	Gazara	H	Root	36	0.35	50	0.49	Increase eye vision, tonic
<i>Foeniculum vulgare</i> M.	Apiaceae	Kaaga	H	Fruit	54	0.52	73	0.71	Vomiting, carminative
<i>Calotropis procera</i> A.	Apocyanaceae	Spalmai	H	Leaves, Latex	53	0.51	70	0.68	Leaves mixed with oils: Cough, skin itching, Anti-poisonous; Latex: wounds healing, Earache
<i>Phoenix dactylifera</i> L.	Arecaceae	Qajoora	T	Fruit	39	0.38	63	0.61	Laxative, tonic, stimulant. aphrodisiac
<i>Aloe vera</i> L.	Asphodelaceae	Alovera	H	Leaves	10	0.10	17	0.17	Inflammation of the skin, skin burn
<i>Artemisia vulgaris</i> L.	Asteraceae	Terkha	H	Whole plant	20	0.19	32	0.31	Analgesic, purgative
<i>Xanthium strumarium</i> L.	Asteraceae	Jishkay	H	Leaves, Stem	15	0.15	19	0.18	Leaves: asthma. blood purifier Stem ash: analgesic
<i>Sonchus asper</i> L.	Asteraceae	Shodapai	H	Leaves	18	0.17	26	0.25	Anti-poison, poultice to wounds
<i>Lactuca sativa</i> L.	Asteraceae	Salad	H	Leaves	25	0.24	33	0.32	Vermifuge, carminative
<i>Bombax ceiba</i> L.	Bombacaceae	Sumbal	T	Leaves	16	0.16	21	0.20	Stomach, kidney problems
<i>Coronopus didymus</i> L.	Brassicaceae	Sqabooti	H	Whole plant	14	0.14	16	0.16	Blood purifier, help in digestion
<i>Eruca sativa</i> M.	Brassicaceae	Jamama	H	Laves, Seed	66	0.64	79	0.77	Diabetes, Skin diseases, cough, anti-ulcer, alopecia
<i>Brassica campestris</i> L.	Brassicaceae	sharsham	H	Roots, Seed,	28	0.27	46	0.45	Root: emollient, diuretic, chronic cough Seed oil: alopecia
<i>Nasturtium officinale</i> R.	Brassicaceae	Talmera	H	Leaves	32	0.31	50	0.49	Tetanus, diuretic, expectorant, purgative
<i>Cannabis sativa</i> Linn.	Canabaceae	Bhang	H	Shoot	57	0.55	64	0.62	Shoot powder mixed with milk and nuts to form Tandai (a local drink) which is refrigerant, narcotic, headache, Anodyne, toothache, tonic
<i>Beta vulgaris</i> L.	Chenopodiaceae	Chaqandar	H	Root	11	0.11	18	0.17	Lower the blood pressure, carminative
<i>Spinacia oleracea</i> L	Chenopodiaceae	Palak	H	Leaves	36	0.35	52	0.50	Carminative, constipation, diabetes, diuretic, stomach-ache
<i>Chenopodium album</i> L.	Chinopodiaceae	Saarmi	H	Leaves	18	0.17	46	0.45	Carminative, laxative, vermifuge, diarrhoea
<i>Convolvulus arvens</i> L.	Convolvaceae	Privatai	H	Shoot	13	0.13	40	0.39	Purgative, skin disorders, fever
<i>Spinacia oleracea</i> L.	Cucurbitaceae	Torai	H	Fruit	22	0.21	28	0.27	Ulcer, diuretic
<i>Citrullus colocynthis</i> L.	Cucurbitaceae	Kalkondai	H	Fruit	17	0.17	30	0.29	Laxative, diabetes, analgesic
<i>Momordica charantia</i> L.	Cucurbitaceae	Karila	H	Fruit	23	0.22	38	0.37	Diabetes, piles
<i>Cucumis sativus</i> L	Cucurbitaceae	Badrang	H	Fruit	53	0.51	68	0.66	Refrigerant, carminative
<i>Cupressus sempervirens</i> L.	Cuperaceae	Serva	T	Cone	8	0.08	12	0.12	Vermifuge, coughs

<i>Cuscuta reflexa</i> R.	Cuscutaceae	Banoshai	H	Stem -	19	0.18	28	0.27	Fever, skin irritation, hepatic problems
<i>Cyperus rotundus</i> L.	Cyperaceae	Deela	H	Leaves	5	0.05	9	0.09	Analgesic, fever
<i>Diospyrus lotus</i> L.	Ebenaceae	Tor Amlok	T	Fruit	45	0.44	69	0.67	Diarrhoea, anti- diuretic for children
<i>Equisitum arvense</i> L.	Equisetaceae	Bandakay	H	Whole plant	14	0.14	30	0.29	Inflammation of urinary bladder, remove kidney stones, analgesic
<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Mandharo	H	Shoot, Latex	37	0.36	43	0.42	Purgative, vermifuge, skin eruption Latex: cause skin soreness and swellings
<i>Euphorbia prostrata</i> L.	Euphorbiaceae	Zeelay	H	Leaves	14	0.14	18	0.17	Sun burn, wounds
<i>Ricinus communis</i> L.	Euphorbiaceae	Arkhandia	T	Leaves	7	0.07	10	0.10	wounds washing and healing, skin disorders
<i>Bauhinia Variegata</i> L.	Fabaceae	Kachnaar	T	Leaves, Bark, Flower	35	0.34	60	0.58	leaves and flower: analgesic, cough, tonic, diarrhoea Bark: toothache
<i>Cassia Fistula</i> L.	Fabaceae	Landes	T	Fruit	30	0.29	53	0.51	Boiled in milk for urinary and abdominal disorders, diarrhoea, constipation, fever
<i>Dalbergiasisso</i> R.	Fabaceae	Shawa	T	Bark	32	0.31	45	0.44	Blood purifier, skin eruption, purgative, skin burn
<i>Mentha longifolia</i> L. Huds	Labiataeae	Veenali	H	Leaves	33	0.32	48	0.47	Leaves powder: Stimulant, stomach and abdominal pain, Carminative, dysentery, diarrhoea, vomiting, constipation.
<i>Mentha spicata</i> L.	Labiataeae	Pudina	H	Leaves	68	0.66	83	0.81	Stimulant, carminative, digestive and skin disorders, mouth wash
<i>Salvia moorcroftiana</i> Wall. Ex Benth.	Labiataeae	KharKwag	H	Leaves	11	0.11	17	0.17	Analgesic, stimulant
<i>Strychnosnux-vomica</i> L.	Loganiaceae	Lashorha	T	Fruit	18	0.17	44	0.43	Aphrodisiac, stimulant, tonic, digestive problems
<i>Abelmoschus esculentus</i> L.	Malvaceae	Binday	H	Fruit, Leaves	31	0.30	55	0.53	Fruit: Urinary problems, Diuretic, stimulant Leaves: leaves poultice for wound healing
<i>Malva neglecta</i> W.	Malvaceae	Panirak sag	H	Whole plant	15	0.15	24	0.23	Diuretic, expectorant, laxative
<i>Meliaazedarach</i> L.	Miliaceae	Bakynrha	T	Leaves	17	0.17	26	0.25	Diabetes, piles
<i>Acacia modesta</i> W	Mimosaceae	Palosa	T	Branch, Gum	26	0.25	42	0.41	Branch: Toothache Gum: Backaches
<i>Acacia nilotica</i> L.	Mimosaceae	Kikar	T	Gum, flower	38	0.37	72	0.70	Gum: Cough, diabetes, diarrhoea, vermifuge Flower: young flowers are mixed with sugar to cure cough.
<i>Broussonetia papyrifera</i> L.	Moraceae	Gultoot	T	Fruit	34	0.33	42	0.41	Constipation, wounds
<i>Ficus carica</i> L.	Moraceae	Inzar	T	Latex, Fruit	43	0.42	66	0.64	Latex: anti constipation, Purgative, urinary bladder disorders, Fruits: stomach and urinary disorders
<i>Ficus religiosa</i> L.	Moraceae	Peepal	T	Leaves	16	0.16	21	0.20	Cough and diarrhoea
<i>Morus alba</i> L.	Moraceae	Spin toot	T	Fruit, Leaves	24	0.23	32	0.31	Fruits: Diuretic, expectorant, laxative; Leaves: refrigerant, skin emollient throat infection, allergy
<i>Morusnigra</i> L.	Moraceae	Toor toot	T	Fruit, Leaves, Bark	22	0.21	37	0.36	Fruits: Tonic, laxative; Leaves: refrigerant, skin emollient; Bark: toothache
<i>Morus lavaegata</i> W.	Moraceae	Shahthooth.	T	Bark	25	0.24	31	0.30	wounds healing and washing, reduce skin inflammation
<i>Eugenia jamblana</i> L.	Myrtaceae	Jaman		Fruit, Bark, Seed, Leaves	44	0.43	57	0.55	Fruits: Tonic, laxative Leaves: refrigerant, skin emollient Bark: toothache
<i>Eucalyptus camaldulensis</i> Dehnh.	Myrtaceae	Lachi	T	Leaves	17	0.17	23	0.22	Coughs tonic, leaves oil used for washing and healing wounds and cuts
<i>Psidium guajava</i> L.	Myrtaceae	Amrooth	T	Fruits, Leaves	44	0.43	57	0.55	Fruits: diarrhoea, laxative, stimulant Leaves: laxative
<i>Boerhavia procumbens</i> Banks ex Roxb.	Nyctaginaceae	Insut	H	Whole plant	29	0.28	65	0.63	Wounds healing, Piles, Anaemia, Asthma, night blindness, Bronchitis
<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Gul-i-abbasi	H	Leaves	37	0.36	48	0.47	Wounds washing, Reduce skin and throat inflammation, analgesic
<i>Jasminum officinale</i> L.	Oleaceae	Rambil chambil	- H	Flower	6	0.06	11	0.11	Diuretic, headache, skin diseases
<i>Oxalis corniculata</i> L.	Oxilidaceae	Threwakai	H	Whole plant	13	0.13	21	0.20	Toothache, stomach problems, vomiting, diarrhoea

<i>Papaver somniferum</i> L.	Papaveraceae	Afuum	H	Fruit, Seeds	55	0.53	79	0.77	Latex: Narcotic, anodyne, analgesic, hypnotic (provide excitement) Cough, fever Seeds: tonic
<i>Piper nigrum</i> L.	Piperaceae	Toormirch	T	Fruits	22	0.21	36	0.35	Purgative, carminative
<i>Platanus orientalis</i> L.	Platanaceae	Chinar	T	Bark	5	0.05	7	0.07	Toothache and diarrhoea
<i>Avena sativa</i> L.	Poaceae	Jamdar	H	Flower	15	0.15	23	0.22	Sedative, tonic
<i>Hordeum volgare</i> L.	Poaceae	Warbashi	H	Seed	18	0.17	22	0.21	Digestive problems, tonic
<i>Rumex dentatus</i> L.	Polygonaceae	Shalhai	H	Leaves	13	0.13	15	0.15	Constipation, skin disease
<i>Adiantum capillus veneris</i> L.	Pteridaceae	Sumbalai	H	Leaves	15	0.15	26	0.25	Fever, coughing, abdominal pain, skin itching.
<i>Punica granatum</i> L.	Punicaceae	Anar	T	Fruit	43	0.42	58	0.56	Digestive problems, Blood purifier
<i>Ziziphus jujuba</i> M.	Rhamnaceae	Bira	T	Leaves, Fruit	33	0.32	48	0.47	Bronchitis, diabetes, coughs, dysentery, antiulcer
<i>Ziziphus nummularia</i> B.	Rhamnaceae	Karkana	S	Fruit, Seeds, Bark	21	0.20	35	0.34	All parts Obesity, digestive and skin disorders, diabetes, Fruits: Sedative, wound healing, dysentery; Seeds: abdominal pain
<i>Rosa damascena</i> M.	Rosaceae	Sur guli	H	Flower	48	0.47	61	0.59	Diabetes, eye drops (arqi- gulab) for eye diseases
<i>Rosa indica</i> L.	Rosaceae	Gulab	S	Flower	25	0.24	43	0.42	Stomach problems, eye diseases
<i>Citrus medica</i> L.	Rutaceae	Naranj	S	Leaves, Fruit	62	0.60	73	0.71	Leaves: leaves green tea prevent vomiting, Fruit: Dehydration and constipation
<i>Citrus aurantifolia</i> C.	Rutaceae	Nambo	S	Fruit, leaves	75	0.73	81	0.79	Vomiting, nausea
<i>Monothea buxifolia</i> A.	Sapotaceae	Gurgura	S	Fruit	11	0.11	15	0.15	Help in digestion, vermifuge
<i>Verbascum thapsus</i> L.	Scrophulariaceae	Kharghwag	H	Leaves	19	0.18	23	0.22	wounds washing and healings
<i>Ailanthus altissima</i> M.	Simaroubaceae	AngrezayShan day	T	Leaves	9	0.09	11	0.11	Vermifuge, purgative
<i>Capsicum annuum</i> L.	Solanaceae	Marchaki	H	Fruit	24	0.23	35	0.34	Diabetes, stimulant
<i>Cestrum nocturnum</i> L.	Solanaceae	Rat kerane	S	Flower	35	0.34	47	0.46	Throat inflammation, vomiting
<i>Datura stramonium</i> L.	Solanaceae	Datura	H	Seeds, Leaves	52	0.50	63	0.61	Seed: narcotic, fever toothache; Leaves: headache, wounds healing, ant poisonous, epilepsy
<i>Nicotiana Tobbacum</i> L.	Solanaceae	Tamako	H	Leaves	43	0.42	59	0.57	diuretic, narcotic, analgesic, sedative
<i>Solanum nigrum</i> L.	Solanaceae	Kachmaco	H	Leaves	20	0.19	33	0.32	Leaves: wounds washing, expectorant, skin diseases, piles, carminative, tonic and diuretic
<i>Withania somnifera</i> L.	Solanaceae	Kothilal	H	Leaves, Bark	17	0.17	26	0.25	Bark: Asthma Tonic Leaves: diabetes
<i>Withania coagulance</i> (Stocks) Dunal.	Solanaceae	Akri	S	Berries Branch	12	0.12	18	0.17	Berries: Inflammation of skin, diabetes; Branch: Toothache
<i>Pterospermum acerifolium</i> L.	Sterculiaceae	Sarwan	T	Bark	10	0.10	17	0.17	Backache, chest pain and anti- diabetic
<i>Tamarix indica</i> W.	Tamaricaceae	Ghazz	T	Bark	68	0.66	76	0.74	Plant powder mixed with oils are used for relieving wounds, skin fire burns, toothache
<i>Urtica dioica</i> L.	Utricaceae	Seezonki	H	Whole plant	11	0.11	14	0.14	Diuretic and jaundice.
<i>Vitis vinifera</i> L.	Vitaceae	Kwar	H	Fruit	28	0.27	34	0.33	Laxative, aphrodisiac
<i>Fagonia indica</i> Burm.f.	Zygophyllaceae	Azghakey	H	Whole plant	24	0.23	29	0.28	Blood purification, refrigerant
<i>Peganum harmala</i> L.	Zygophyllaceae	Spelani	H	Seed, Leaves	54	0.52	67	0.65	Urinary disorders, Digestive problems, Vermifuge
<i>Tribulus terrestris</i> L.	Zygophyllaceae	Markhondi	H	Seeds	18	0.17	25	0.24	Urinary disorder, Diabetes

Family Solanaceae (7.61%) contribute the highest number of species followed by Moraceae (6.52%), Asteraceae, Brassicaceae (4.35), and Cucurbitaceae (4.35%). Only a single plant species (1.09%) has been contributed by family Oleaceae, Oxilidaceae, Papaveraceae, Piperaceae, Platanaceae, Polygonaceae, Pteridaceae, Punicaceae, Sapotaceae, Scrophulariaceae, Simaroubaceae, Tamaricaceae,

Sterculiaceae, urticaceae and Vitaceae, Miliaceae, Loganiaceae, Equisetaceae, Bombacaceae, Asphodelaceae, Areaceae, Apocyanaceae, Amaranthaceae, Aizoaceae, Ebenaceae, Cypraceae, Cuscutaceae, Cuperaceae, Convolvaceae, and Canabaceae respectively (Table 2).

Table 2. Percentage family contribution of reported medicinal plant species.

Family name	No. of Species	%age contribution	Family name	No. of Species	%age contribution
Aizoonaceae	1	1.09	Mimosaceae	2	2.17
Alliaceae	2	2.17	Moraceae	6	6.52
Amaranthaceae	1	1.09	Myrtaceae	3	3.26
Apiaceae	3	3.26	Nyctaginaceae	2	2.17
Apocyanaceae	1	1.09	Oleaceae	1	1.09
Arecaceae	1	1.09	Oxilidaceae	1	1.09
Asphodelaceae	1	1.09	Papaveraceae	1	1.09
Asteraceae	4	4.35	Piperaceae	1	1.09
Bombacaceae	1	1.09	Platanaceae	1	1.09
Brassicaceae	4	4.35	Poaceae	2	2.17
Canabaceae	1	1.09	Polygonaceae	1	1.09
Chenopodiaceae	3	3.26	Pteridaceae	1	1.09
Convolvaceae	1	1.09	Punicaceae	1	1.09
Cucurbitaceae	4	4.35	Rhamnaceae	2	2.17
Cuperaceae	1	1.09	Rosaceae	2	2.17
Cuscutaceae	1	1.09	Rutaceae	2	2.17
Cypraceae	1	1.09	Sapotaceae	1	1.09
Ebenaceae	1	1.09	Scrophulariaceae	1	1.09
Equisetaceae	1	1.09	Simaroubaceae	1	1.09
Euphorbiaceae	3	3.26	Solanaceae	7	7.61
Fabaceae	3	3.26	Sterculiaceae	1	1.09
Labiataeae	3	3.26	Tamaricaceae	1	1.09
Loganiaceae	1	1.09	Utricaceae	1	1.09
Malvaceae	2	2.17	Vitaceae	1	1.09
Miliaceae	1	1.09	Zygophyllaceae	3	3.26

Table 3. Strong positive Correlation between UV and RFC.

		RFC	UV
RFC	Pearson Correlation	1	.941**
	Sig. (2-tailed)		.000
	Covariance	.028	.032
	N	92	92
UV	Pearson Correlation	.941**	1
	Sig. (2-tailed)	.000	
	Covariance	.032	.042
	N	92	92

** Correlation is significant at the 0.01 level (2-tailed).

Our study is in connection with Ishtiaq *et al.*, (2007) and Sher *et al.* (2011) who also observed mostly medicinal plants species from family Solanaceae. In present findings herbaceous life form (62%) was dominant followed by trees (30 %) and shrubs

(8%)(Fig. 1).The use of herbs mostly for the preparation of ethno medicines might be due to its easily availability and fruitful results. Our study is in line with (Ibrar *et al.*, 2007; Jan *et al.*, 2011) who also observed that locals used mostly herbs for the

preparation of herbal medicines. Decoction was the most common method for preparation of herbal medicines. Same was also reported by (Hassan *et al.*, 2017c) where the local inhabitants applied the method of decoction for preparation of herbal medicines. Leaves (33%) were mostly used for ethnomedicines preparation followed by, fruits (22%), bark (8%), seeds (8%), whole plants (7%) and flowers (5%) (Fig. 2).

Our study is in connection with (Rahman *et al.*, 2010) where locals taken leaves for the preparation of herbal medicines. Similarly the use of leaves have already been observed at national and international level for the preparation of herbal medicines (Gonzalez *et al.*, 2010, Giday *et al.*, (2010), Khan *et al.*, (2013), Mahmood *et al.*, (2013) and Bano *et al.*, (2014).

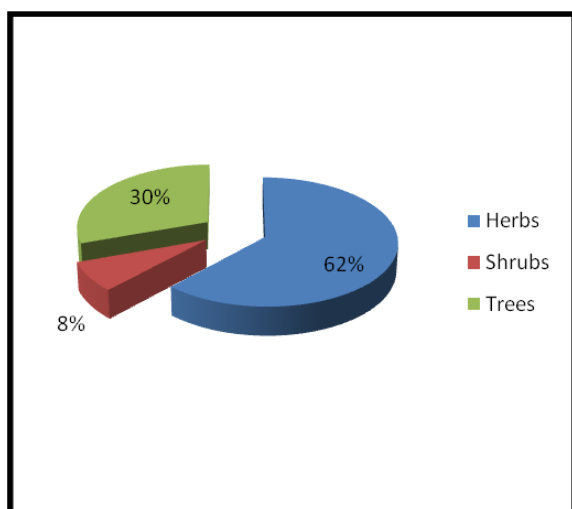


Fig. 1. Habit percentage.

Frequency of citation (FC), relative frequency of citation (RFC) and use value (UV) were also calculated following (Savikin *et al.*, 2013; Vitalini *et al.*, 2013). RFC was observed directly proportional to uses of plant species mentioning by local informants (Fig. 3). In other words, the uses of a particular plant species increases with an increase in the number of informants.

The phytochemical analysis of the plant species having high RFC value might be helpful for the discoveries novel drugs (Molares and Ladio, 2009). Highest RFC values (0.73) for *Citrus aurantifolia* and

(0.69) for *Coriandrum sativum* while lowest (0.05) was observed for *Cyperus rotundus* and *Platanus orientalis*. Our study is in connection with (Samoisy *et al.*, 2015) who also scored the highest RFC (RFC=1.02) value for *Citrus aurantifolia*. Use value (UV) was observed high (0.85) for *Coriandrum sativum* and (0.81) for *Menthaspicata* while lowest (0.07) for *Platanus orientalis*. Study like ours was also conducted by (Shafi *et al.*, 2014) wo observed that most commonly used medicinal plants were *Plantago ovata* with use value (UV=0.98), *Fagonia indica* (UV=0.87), and *Cannabis sativa* (UV=0.77), which indicates their extensive use in local herbal medicine.

The high UVs of these plants might be attributable to their wide distribution and the awareness of local healers, which makes that plant specie, first choice for treatment of health disorders.

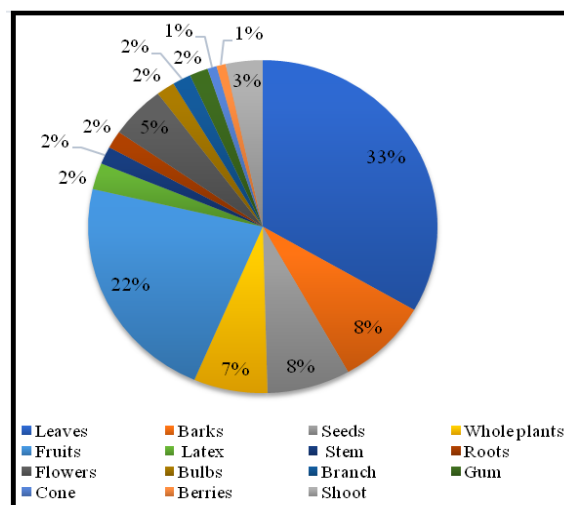


Fig. 2. Percentage of parts used.

Gastrointestinal diseases (33.33%) were observed high treated by medicinal plants followed by skin diseases (13%), urinary problems (12%), respiratory disorders (8.67%), blood disorder (8%), dental problems (3.33%), fever (2.33%), eye diseases (2%), abdominal pain (1.67%) and aphrodisiac (1.33%) (Fig. 4).

Gastrointestinal disorders were high which might be due to unhygienic standards and unclean drinking water. Current study is in line with other studies at

national and international level where mostly gastrointestinal disorder were treated by medicinal plants. Miraldi *et al.*, (2001), Ghorbani *et al.*, (2011), Naghibi *et al.*, (2012), Tangjitman *et al.*, (2012) Bibi

et al., (2014), Nasab *et al.*, (2014).Some time additives like sugar, salt, honey water and flour is added because some plant species have very bitter and unpleasant smell.

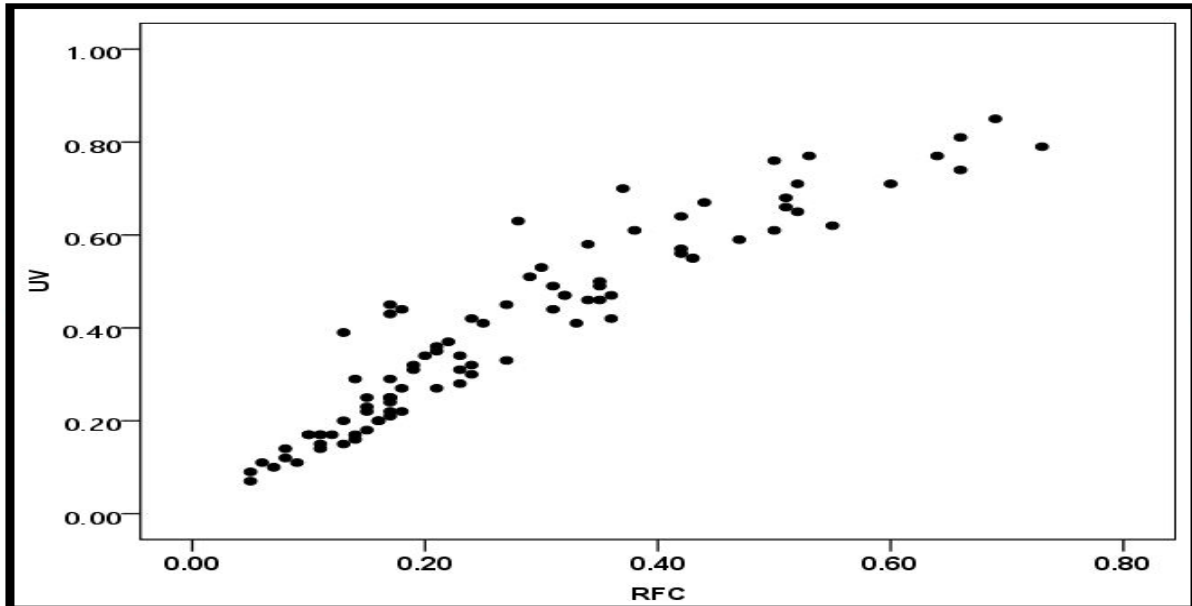


Fig. 3. Association between RFC and UV showing strong Pearson correlation coefficient.

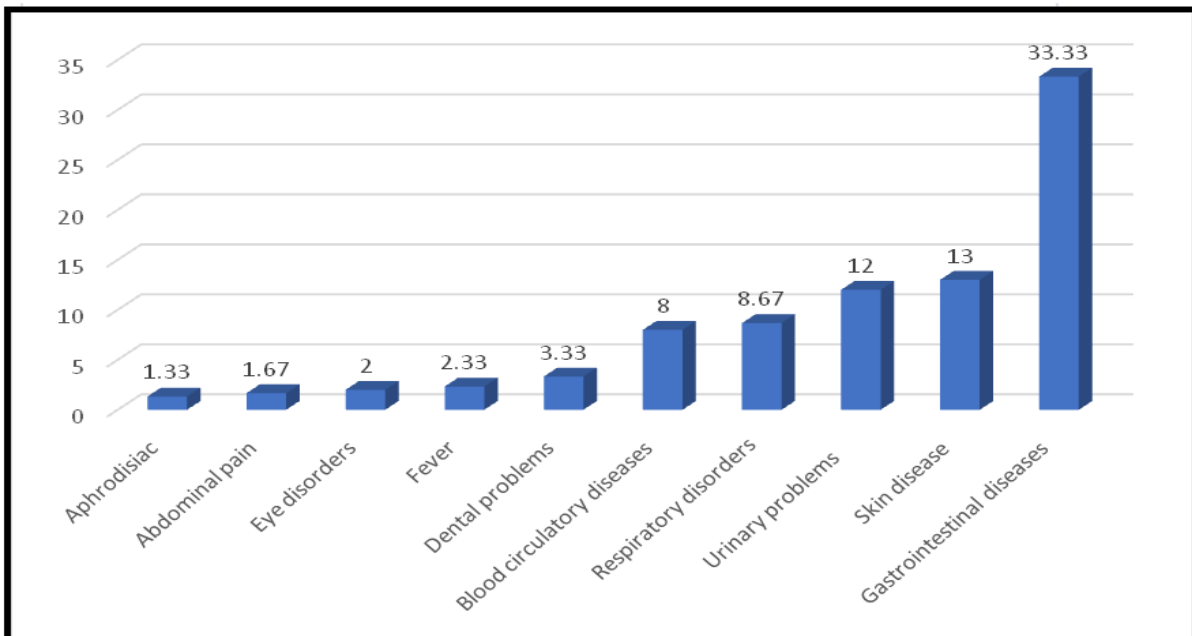


Fig. 4. Percentage of ailments.

Conclusion

The people of the locality use medicinal plant species for the treatment of different health disorders. Harvesting of wild medicinal plant species was observed common in the study area. Further

exploration and wise use of plant resources are recommended.

Acknowledgment

We are thankful to the people of the locality by sharing their ethno medicinal knowledge and entire support during data collection.

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