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Taxo-ethnomedicinal diversity of Asteraceae family of Dir Upper, Khyber Pakhtunkhwa, Pakistan

Ali Hazrat¹, Tour Jan¹, Khan Sher², Gul Rahim¹, Shah Zaman¹, Muhammad Mukhtiar³, Tabinda Nowsheen^{1,2}, Zakia Ahmad⁴, Zahid Fazal⁵, Shabana Bibi^{1,2}, Jehan Zada¹, Abid Ullah¹ and Mohammad Nisar¹

¹Department of Botany University of Malakand, Chakdara, Dir Lower, **Pakistan**

²Department of Botany Shaheed Benazir Bhutto University Sheringal Dir Upper, **Pakistan**

³Department of Pharmacy, University of Poonch Rawalakot, Azad Kashmir, **Pakistan**

⁴Department of Botany University of Swat, KPK, **Pakistan**

⁵Department of Botany University of Peshawar, **Pakistan**

*Correspondence: aliuom@gmail.com Received 02-04-2020, Revised: 20-05-2020, Accepted: 22-05-2020 e-Published: 01-06-2020

In the present study diversity of Asteraceae was studied throughout the Dir Valley. Some species of the selected family is widely distributed in the study area i.e *Senecio chrysanthemoides*, *Xanthium strumarium*, *Artemisia scoparia*, *Silybum marianum*, *Cichorium intybus*, *Taraxacum officinale* and *Achillea millefolium*. The species of the selected family grown both in wild and cultivated form majority of them are grown wild. A total of 45 species and 34 genera of the Asteraceae were collected and identified. Eleven species of the family are cultivated in the study area and the remaining 34 species are naturally/wild-grown in the research area. Furthermore, all the species are a new records from the selected area and some species are a new records from Pakistan. All the species are identified with the help of the taxonomic key. The ethnobotanical survey was conducted through an open-ended and semi-structured questionnaire. The questionnaire collected information about plant species, its therapeutic uses and data about the regular uses of these species. Mostly people belonging to rural areas and of more than 40 years of age were interviewed due to their vast experience and knowledge. Several informants were interviewed to confirm information regarding the uses of each plant species. These plants were taken to the local hakims and pansaris additionally. In the majority of cases, single plant species were found to be used in several ways. On the basis of collected data, a total of 45 plant species of the selected family were documented in the area which plays a key role in improving the health and wealth of local inhabitants. The selected family being ranked on the top as it contributes numbers to collected species. Out of 45 plant species, some species were recorded best for medicinal purposes, some plant species were found good as fodder, ornamental purposes, food and vegetable, firewood and fence. The study area is found rich in terms of floral diversity. Local inhabitants of the area use the plant species in traditional ways for the curving of different diseases since early times. Due to anthropogenic pressure and natural disasters flora of the area facing huge pressure of extinction.

Keywords: Asteraceae, Taxonomy, District Dir, Pakistan

INTRODUCTION

The Asteraceae is one of the largest families of flowering plants. It includes a large number of

genera and species. It is an advanced and botanically highly specialized family of herbaceous plants. They are widely distributed in

the dry temperate, moist temperate and warm temperate regions of Pakistan (Hazrat et al., 2011). The family is represented by about 950 genera and 20000 species all over the world (Sharma, 2004). Many species of this family are the sources of medicine. Some are widely cultivated in the field for medicinal purposes in Dir (Hazrat et al., 2007). They are distributed over most of the earth and in almost all habitats. The greater proportions are herbaceous, although about 2 percent are trees or shrubs (Lawrence 1973). The family is not only a large family also abundant everywhere in the study area that's why declare is a diverse one. Evolution has produced in many directions and the principal developmental lines are summarized by a grouping of related genera into tribes (Benson 1957, Huq, 1986, Pasha 1988) 40, 351 acres were covered by coniferous/pines forests (DCR 1998).

The present project was carrying out in order to evaluate the ethnobotanical uses of vegetation including herbs, shrubs and trees. Dir Kohistan has a diverse habitat for medicinal plants. However, no extensive study has so far been undertaken to examine the ethnobotanical uses with some additional of other uses of plants species. This chapter describes a brief account of the ethnobotanical work carried out in Pakistan. However, it is worth to mention that the description is mainly based on the literature. The ethnobotanical study in Pakistan is still at the pioneer stage. In the beginning, the ethnobotanical studies carried out in Pakistan were mostly observational and most of the information was carried out by interviewing the local inhabitants. In this prospect, Ibrar and Khan (2000) conducted ethnobotanical studies in Margalla Hill National Park. They reported that the local inhabitants in and around the National Park are dependent on herbal plants since time immemorial. Many plant species were reported which were used by the local inhabitant for different ailments. A similar approach was used by Mujtaba and Khan (2001) and documented the ethnomedicinal folk recipes that used to cure different disorders in their study area. They approached the knowledgeable people including Hakims, old women and old men who are consider the primary user of medicinal plants. Their work was systematic and helpful in terms of exploration of different plant species used in folk recipes. Addition was made by Rahman et al., (2002) by summarizing the available literature on antidiabetic activities of 343 plant species and

described the pharmacological activities of some extracts. Irshad and Buth (2002) conducted a detailed study of an ancient medicinal system of the world while Shinwari and Gilani (2003) focused on plant resources for their conventional uses under *in-situ* and *exsitu* conservation, training of the community regarding the collection of medicinal plants and their marketing. They highlighted the ethnobotanical uses of 33 plant species which were being used by the local communities for various diseases. Their study also exposed the suitability of *Ephedra gerardiana* and *Bunium persicum* for cultivation in Vitro in to obtain immediate profits in the future. The extreme north area of the country has rich flora and cultural diversity. However, the ethnobotanical information's regarding these floras in these areas is scanty. Though some fragmentary information's are available like Qureshi et al., (2005) presented the ethnobotanical uses of different medicinal plants of District Gilgit and adjacent areas while Saqib and Sultan (2005) conducted a detail ethnobotanical survey in Palas valley, and attempted to sum up the preexisting ethnobotanical information's. They collected 139 plant species which is ethnobotanically very important plant species belonging to 72 families are being reported from the current study area. Similarly, Abid et al., (2005) worked on medicinal plants that constituted an excellent source of traditional and modern medicines. On the other hand Mushtaq et al., (2005) worked out on ethnobotanical studies of Galliyat area and mainly gathered information about the indigenous uses of plants for medicines and also used for other purposes that are relaxing for the local inhabitants. For this purpose, they documented the ethnobotanical data of 40 species of plants with 37 genera and 26 families, during winter and summer. The area is floristically rich and the selected family is unexplored from this area that's why efforts are made to explore the selected family from this research area.

MATERIALS AND METHODS

Field trips were conducted in the blooming season in the month of May-September. Different villages of the selected district were visited for the collection of plant specimens of the selected family in order to explore the total number of species and genera in the selected area. The tools available during the research work are map of the area, plant presser, note book, pencil, old newspaper, knife, compass, polythene bags and

digital camera. The plants were collected during different periods of the season. Many species were collected during the field visit and put in the newspaper, pressed in the plant presser for 2-3 days and change the newspaper daily to remove the moisture. After this processes identified the plants on the basis of morphological characters. All the collected plants are properly pressed, dried and mounted on standard herbarium sheets and the voucher specimens are deposited at Shaheed Benazir Bhutto University and Malakand University. Specimens were identified with the help of relevant Floras. The nomenclature is based on Flora of Pakistan (Stewart 1972, Nasir and Ali, 1970-1979: Nasir & Ali, 1980-1989: Ali & Nasir, 1989-1992: Ali & Qaiser 1993-2009). Then provide the voucher number to all species and mount on the herbarium sheet according to stander procedure of (Ali & Qasir., 2009) and placed in the herbarium of Malakand University for future reference for the researchers. The ethnobotanical data were collected through questionnaire form the aged and knowledgeable experts of the selected area.

RESULTS AND DISCUSSION

The plants collected from research area consists of 45 species belonging to 18 genera of the selected family. Out of these 45 species all were dicot and belonging to herbs and shrubs (Table 1). The medicinal plants usage data showed that the selected plants were used as medicine, pot herb, beverage, fodder, hay fodder, medicine, poison, green pesticide, graveyard things, fuel wood, agricultural tools, soil binder, soil fertilizer, wind break, shade tree, spice/flavoring agent, ornamental, dye, Ink, Incense/perfume, paper, cushion plant, fence, furniture, fishoison, soil

reclamation, dry fruits, brooms, miswak, hedge plant, granary/basketry (Table 1). The species of medicinal uses are classified on their utilitarian basis. Plant utilization by the isolated communities for curing various ailments have supplied tremendous information which can be properly utilized in planning for utilization of the endemic knowledge for better planning of the plant natural resources for the well-being of the community in general and for medicinal plants utilization in particular (Table 1). Medicinal plants are used by the human beings since long (Lama et al., 2001; Partel *et al.*, 2005). While, Rigveda between 4500-1600 BC and Ayurveda Between 2500-600 BC are the first medicinal books in the subcontinent. The medicinal plants practice is very old and in present era of technology still people believe in traditional use of medicinal plants (Ali and Qaiser, 2009).

The study was conducted for the collection of plant species of the selected family from all the target spots of in the research area. A total of 45 species belonging to 34 genera of the selected family were collected. The leading genus is *Artemisia* having 4 species, while the genus *Calendula*, *Helianthus*, *Pluchea*, *Scorzonera*, *Senecio*, *Sonchus*, *Tanacetum* have 2 species each. Similarly 25 genera are available in table 01 has only one specie each. Furthermore, the plants species are widely distributed in the research area. The plant species were identified with the help of keys in the form species keys and genera keys are listed below. The species checklist is available in the form Voucher number, Botanical Name, Vernacular name and research area in table 01.

Table 1: Checklist of collected plants species of Asteraceae

S.No	V.N	Botanical Name	Vernacular Name	Research Area	Status	Uses
1.	227	<i>Achillea millefolium</i> L.	Karkara	Common	Reported	2,3, 4,9,10,12,18,19,21,
2.	356	<i>Artemisia scoparia</i> Waldst. & Kit.	Naray jaukey, Jaokae	Common	Reported	2,3, 4,9,10,12,18,19, 20, 21,
3.	197	<i>Artemisia vulgaris</i> L.	Jaukay	Kumrat, Sheringal, Sunderae, Lamutai	Reported	2,3, 4,9,10,12,18,19,21,
4.	177	<i>Artemisia biennis</i> Willd.	Tharkha	Shahoor, Dogdara, Sheringal, Sunderae	Reported	2,3, 4,9,10,12,18,19,21,
5.	167	<i>Artemisia santolinifolia</i> Turcz. Ex Krasch.	Tharkha	Kumrat, Sheringal, Sunderae, Lamutai	Reported	2,3, 4,9,10,12,18,19,21,
6.	316	<i>Calendula officinalis</i> L.	Zair gulae	Common in the lower areas of the valley	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
7.	326	<i>Calendula arvensis</i> L.	Zair gulae	Common in the lower areas of the valley	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
8.	296	<i>Cichorium intybus</i> L.	Han, Hanshamakay	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
9.	1014	<i>Cosmos bipinnatus</i> Cav.	Nil	Cultivated seringal	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
10.	306	<i>Centaurea iberica</i> Trev. ex Spreng.	Gana	Cultivated	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,

11.	286	<i>Cirsium falconeri</i> (Hf. k.) Petra	Nil	Samang, Shahoor, Dogdara, Sheringal, Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
12.	276	<i>Cnicus benedictus</i> L.	Sharai	Ganshal, Shahoor, Dogdara, Sheringal,	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
13.	266	<i>Conyza Canadensis</i> (L.) Corgn.	Maluch	Samang, Shahoor, Dogdara, Sheringal	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
14.	256	<i>Coreopsis tinctoria</i> Nutt.	Nil	Cultivated in the area	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
15.	367	<i>Cousinia minuta</i> Boiss.	Nil	Cultivated	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
16.	175	<i>Chrysanthemum indicum</i> L.	Gul abase	Cultivated in the area	Reported	2,3, 4,9,10,12,18,19,21,
17.	146	<i>Carthamus oxyacantha</i> M.B.	Kareza	Shahoor, Dogdara Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
18.	337	<i>Eclipta prostrata</i> (L.) L.	Nil	Janus, Shahoor, Dogdara, Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
19.	135	<i>Erigeron multicaulis</i> Bth.	Nil	Cultivated	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
20.	124	<i>Gaillardia pulchella</i> Foug.	Nil	Cultivated	New reported from Pakistan	1, 2,3, 4,9,10,12,18,19,21,
21.	1020	<i>Galinsoga parviflora</i> Cavanilles.	Spena starga	Sheringal university	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
22.	1012	<i>Helianthus annuus</i> L.	Noor paras	Cultivated	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
23.	645	<i>Helianthus tuberosus</i> L.	Aloopach	Cultivated	New reported from Pakistan	1, 2,3, 4,9,10,12,18,19,21,
24.	206	<i>Leontopodium himalayanum</i> DC.	Barzela, Sarbazela	Thall, Shahoor, Dogdara, Sheringal, Sunderae	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
25.	376	<i>Matricaria chamomilla</i> L.	Babona	Cultivated in sheringal	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
26.	176	<i>Onopordum acanthium</i> L.	Danga Karyoza Wrejakai	Guldae, Shahoor, Dogdara, Sheringal, Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
27.	166	<i>Parthenium hysterophorus</i> L.	Nil	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
28.	798	<i>Pluchea arguta</i> Boiss.	Nil	Samang, Shahoor, Sunderae, Lamutai	Reported	2,3, 4,9,10,12,18,19,21,
29.	788	<i>Pluchea lanceolata</i> (DC.) C.B. Clarke	Kamala	Shahoor, Dogdara, Sunderae, Lamutai	Reported	2,3, 4,9,10,12,18,19,21,
30.	245	<i>Scorzonera mollis</i> M. Bieb.	Putkanda	Kumrat, Shahoor, Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
31.	235	<i>Scorzonera virgata</i> DC.	Shamatha	Ganshal, Shahoor, Sunderae, Lamutai	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
32.	225	<i>Senecio chrysanthemoides</i> DC.	Zeare gulaey	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
33.	215	<i>Senecio desfontanei</i> Druce	Zera kasa	Samang, Shahoor, Dogdara, Sheringal	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
34.	1021	<i>Seriphidium kurramense</i> (Qazilb.)	Tarkha	Sheringal	New reported from Pakistan	2,3, 4,9,10,12,17, 18,19,21,
35.	768	<i>Silybum marianum</i> Gaertn.	Werigakae	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
36.	758	<i>Solidago virgaurea</i> L.	Bangira	Janus, Shahoor, Dogdara, Sheringal	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
37.	738	<i>Sonchus asper</i> (L.) Hill	Shouda Pai	Common	New reported from Pakistan	2,3, 4,9,10, 11, 12,18,19,21,
38.	156	<i>Sonchus oleraceus</i> L.	Shoua pai	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
39.	207	<i>Tagetes minuta</i> L.	Dambergule	Common in the lower part of the area	New reported from Pakistan	2,3, 48, ,9,10,12,18,19,21,
40.	145	<i>Tanacetum artemisioides</i> Sch. Bip. ex Hk. F.	Zear gul	Jaz banda, shahor	Reported	2,3, 4,9,10,12,18,19,21,
41.	113	<i>Tanacetum emodi</i> R. Khan	Nil	Sunderae, Shahoor, Dogdara, Sheringal	Reported	2,3, 4,9,10,12,18,19,21,
42.	102	<i>Taraxacum officinale</i> Wigg.	Booda Boodai Ziar Gwalae	Common	New reported from Pakistan	2,3, 4,9,10,12,18,19,21,
43.	195	<i>Tragopogon gracilis</i> D.Don	Nil	Shahoor, Dogdara, Sheringal, Sunderae Shahoor, Dogdara, Sheringal, Sunderae	New reported from Pakistan	2,3, 4,5, 9,10,12,18,19,21,
44.	165	<i>Xanthium strumarium</i> L.	Gishkae	Sheringal, Shahoor, Dogdara, Sunderae,	New reported from Pakistan	2,3, 4,6, 9,10,12, 15 18,19,21,
45.	1013	<i>Zinnia elegenes</i> Nuttall, Trans.	Nil	Cultivated	New reported from Pakistan	2,3, 4,7, 9,10,12,18,19,21,

Key of plant use: 1.Pot herb 2. Fodder 3. Hay Fodder 4. Medicine 5. Poison 6. Green Pesticide 7. Fuelwood 8. Agricultural tools 9. Soil binder 10. Soil fertilizer 11. Spice/flavoring agent 12. Ornamental 13. Dye
 14 Incentse/perfume 15. Wind Break 16. Stick/handles 17. Cushion plant; 18. Fence 19. Soil reclamation 20. Brooms 21. Bee attractants.

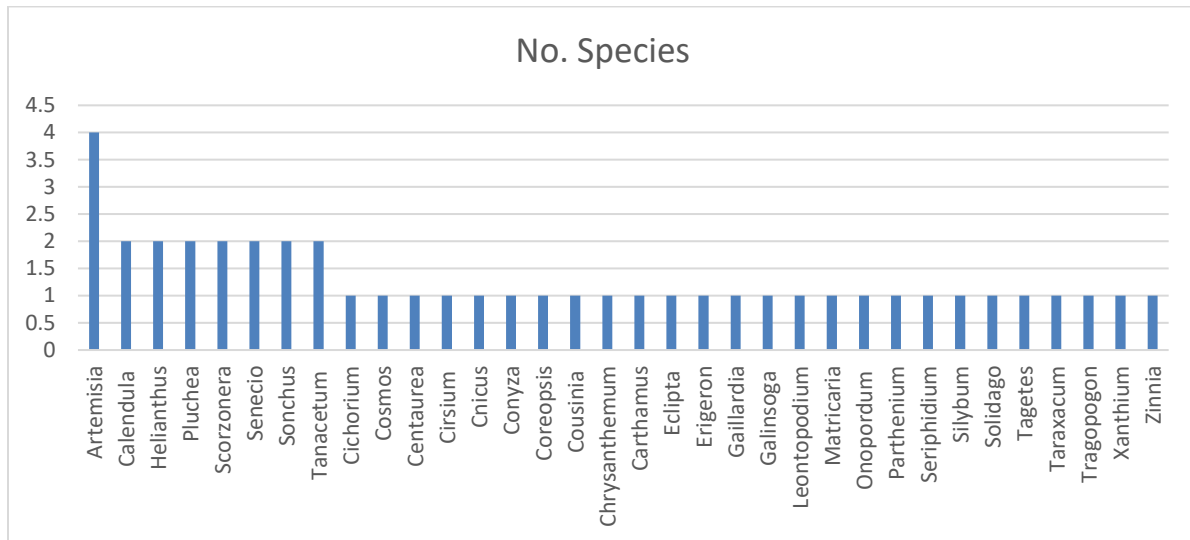


Figure1: Number of genera and species

Key to the genera

- 1 Achenes in hard prickly, bichambered burs-----**Xanthium**
- + Achenes not in hard prickly, bichambered burs -----2
- 2 Plants shrubs or subshrubs-----3
- + Plants herbs-----6
- 3 Florets pale, yellow-----4
- + Florets white, lilac-----5
- 4 Capitulum heterogamous, tubular florets unisexual----- **Artemisia**
- + Capitulum hogogamous, tubular florets bisexual ----- **Seriphidium**
- 5 Florets white. Disc florets bisexual, sterile----- **Parthenium**
- + Florets pink or violet. Disc florets funtionaly male----- **Pluchea**
- 6 Plants spinescent-----7
- + Plants spineless -----11
- 7 Stems with continuously or interrupted spiny wings-----8
- + Stem without spiny wings-----9
- 8 Achenes with simple pappus----- **Onopordum**
- + Achenes with feathered pappus ----- **Cirsium**
- 9 Leaves with milk white veins----- **Silybum**
- + Leaves otherwise -----10
- 10 Flowers yellow, pappus present, bristles in 1-2 series-----12
- + Flowers yellow, pappus non or scale like----- **Carthamus**
- 11 Pappus bristles in 2 seriate----- **Cnicus**
- + Pappus bristles in 1 seriate----- **Cousinia**
- 12 Leaves grass like ----- **Tragopogon**
- + Leaves otherwise-----13
- 13 Flowers blue----- **Cichorium**
- + Flowers white or yellow-----14
- 14 Ray florets white-----15
- + Ray florets not white-----16
- 15 Ray florets usually five-----17

- + Ray florets more than five-----*Eclipta*
- 16 Leaves 2-3 times pinnate into linear segments----- *Achillea*
- + Leaves simple opposite toothed----- *Galinsoga*
- 17 Foliage all basal, Capitulum scapose----- *Taraxacum*
- + Not as above -----18
- 18 Plants white tomentose, capitula with conspicuously spreading bracts-----*Leontopodium*
- + Plants not white tomentose, capitula without conspicuously spreading bracts -----19
- 19 Florets in the capitulum all ligulate-----20
- + Florets in the capitulum tubular or tubular and ligulate-----21
- 20 Achenes 3-5 ribbed with white simple pappus-----*Sonchus*
- + Achenes many ribbed with bristled plumose pappus----- *Scorzonera*
- 21 Florets tubular.Achenes without pappus----- *Tanacetum*
- + Florets tubular and ligulate. Achenes with pappus-----22
- 22 Achenes ribbed -----23
- + Achenes not ribbed----- *Conyza*
- 23 Phyllaris 3-5 seriate----- *Solidago*
- + Phyllaris 5-22 free ----- *Senecio*

Genus: *Artemisia* L., Sp. Pl. 1845.

Key to the species

- 1 Disc florets functionally male, with rudimentary ovaries; styles shorter than the corolla-----
----- *Artemisia scoparia*
- + Disc florets fertile, with well-developed ovaries, style longer than the corolla -----2
- 2 Ultimate leaf segments, 2 mm or more wide-----*Artemisia vulgaris*
- + Ultimate leaf segments, less than 1.5 mm wide-----3
- 3 Capitula sessile-----*Artemisia biennis*
- + Capitula shortly peduncle----- *Artemisia santolinifolia*

Genus: *Sonchus* L., Sp.Pl. 1753.

Key to the species

- 1 Achene strongly compressed, wrinkled -----*S. asper*
- + Achene distinctly compressed, not wrinkled -----*S. oleraceus*

Genus: *Tanacetum* L., Sp.Pl. 1753.

- 1 Inflorescence with 10-70 capitula; stem leaves elliptic-ovate-----*T. emodi*
- + Inflorescence with 3-10 capitula; stem leaves linear-oblong -----*T. artemisioides*

Genus: *Senecio* L. 1883.

Key to the species

- 1 Plants annual-----*Senecio desfontainei*
- + Plants perennial-----*Senecio chrysanthemoides*

Note: Some species of the following genera of Asteraceae are cultivated in the area for ornamental purposes. These are *Cosmos*, *Zinnia*, *Coreopsis*, *Tagetes*, *Helianthus*, *Erigeron*, *Calendula*, *Matricaria*, *Gaillardia*, *Chrysanthemum* and *Centaurea*.

CONCLUSION

Total 45 plants species are collected, identified with the help of keys. These plant species reported for the first time from the study area and some species from Pakistan. This study

will be help for future researcher working on Pharmaceutical, Phytochemistry, Biological activities and Medicinal/Ethnobotanical studies. These plants are still widely used for health care by local peoples in District Dir upper. Some species of forest area to be vulnerable to over collection and deforestation. It is recommended to

control the local community should restrict deforestation in the selected area for next two to three decades for the conservation of plant biodiversity.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

All the author contributed in the paper the first author AH collection of Plants and identification, TJ Poisoning of Plant, KS, GR and SZ Mounting of Plants, MM help in medicinal uses, TN identification, ZA help in key designing, G R help in identification, S Z Sheet preparation, ZF provided voucher number, SB and JZ Proofreading of the paper, AU and MN reviewed the paper and data analysis. All the authors approved the final version of the paper.

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