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## Ethno-botanical and geo-referenced profiling of medicinal plants of Nawagai Valley, District Buner (Pakistan)

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The prime objective of the research was to list the important ethnomedicinal plants of Nawagai village, District Buner. During the survey, 44 plant species from 27 families were observed and collected from the targeted area of Khyber Pakhtunkhwa, Pakistan. Lamiaceae members were the most dominant (54%) followed by members of Asteraceae (30%), Poaceae (18%) and Solanaceae (12%). Relevant information such as field data, GPS coordinates family names, local names, therapeutic uses and plant habits were recorded for each species. For preservation purposes, specimens were mounted on herbarium sheets, and identified with the help of flora of Pakistan, flora of Australia and other relevant floristic records. During this research work all the collected specimens were preserved in the (BG&H, UOM) Botanical Garden and Herbarium, the data were also provided to the Department of Botany, University of Malakand Dir (Lower), Khyber Pakhtunkhwa, Pakistan.

**Keywords:** medicinal plants; therapeutic uses; georeferenced data; District Buner

### Introduction

District Buner comes under the administrative umbrella of Malakand division. The word Buner is most probably taken from Sanskrit language which means “forest”, since the area has some old growth coniferous forests patches present. The climate of the study area is of moderate nature. Buner covers an area of 1760 km<sup>2</sup> lies between 34°09' and 34°43' N latitudes and 72°10' and 72°47' E longitudes. The village of Nawagai was chosen for the study as it provides easy access to the diverse representative vegetation of the district. Most of these plant species have medicinal value. Soil variation and diversification might be of the reason for this floristic diversity. The common types of soil found are sandy, clay and loamy textured.

Plants provide a wide range of products and services to people throughout the world. Most people of the third world countries rely on wild plants for their basic health care. The term “ethnobotany” was first introduced in 1896 by John Hershberger as the study of aromatic and wild plants used by primitive and aboriginal people. From that time, it has been defined as the traditional information of indigenous communities of the encompassing plant variety and the investigation of how the general population of a specific culture and area utilizes indigenous plants. Worldwide medicinal plants and medicines derived from them are used widely in traditional recipes and becoming popular in today's modern society. Ethnobotanical studies contribute to the knowledge of plant biodiversity, human awareness about the uses, applications, natural resources conservation and provide further social and scientific interventions for scientists (Parada et al., 2009). Ethnobotanical study helps the local community to establish the priorities for local use of plants for different ailments, this is also an effective source for conservation and cultural knowledge of the areas where these important plants occur (Ibrar et al., 2007).

Globally, over five thousand plant species belonging to the angiosperm group are used for medicinal purposes (Govaerts, 2001). Medicinal plants and their products have been used successfully for many diseases, both externally and internally. Medicinal plant material has persisted as the “treatment of choice” as it has no or few side effects

(Halberstein, 2005). Ethnobotany in Pakistan is not a highly profiled research area; however, many botanists have published research articles about medicinal plants. It has been reported that 84% of the population used traditional medicinal plants for many diseases (Shahzeb et al., 2013). Aromatic and wild medicinal plants are important tools for the treatment of different diseases (Bakoet al., 2005). Pakistan exhibit a rich history of traditional utilization of flora. Medicinal plants play a very important role in traditional health care of humans and animals. Extracts of medicinal plants are used in allopathic drugs (Hussain et al., 2010). In the national flora of Pakistan, more than 10% of medicinally important plant species were used in traditional treatments (Shinwari, 2010). Ethno-botanical information also helps ecologists, pharmacologists, taxonomists, watershed and wild life managers in their efforts for improving the economic status of the locals in remote areas (Ibrar et al., 2007).

In the study area, local peoples depend mostly upon medicinal plants, which provide a good source of primary health care material. The knowledge of use of particular medicinal plants for particular diseases is passed-on from generation after generation. Manan et al. (2007), reported an ethno-botanical review of Wari Sub-division Dir (U) with the main emphasis on the indigenous uses of the local plants. The inhabitants use medicinal plants on the advice of elders, such as wise men, herbalists, and traditional practitioners. They use them with the advice of nonqualified but professional traditional herbalists (Hakims), who have also gained some experience through apprenticeship with some registered practitioners. Medicinal plants are prescribed for a wide range of diseases and ailments by qualified registered practitioners of the Unani system of medicine. These herbal medications were made by using water as a medium and administered along with milk, ghee, oil, egg, sulphur, and butter etc. There are different steps to prepare herbal medicine, plant parts used in crushed form, in powders, in pastes, fresh, in decoctions, in juices, in extracts, as latex, in infusions, and as resin etc. (Abbasi et al., 2010). Medicinally important plants are divided into two broad types. Firstly, plants which are used by local physicians in different crude formulation to provide some relief to the local inhabitants in developing countries. Secondly, those plant which are in demand by pharmaceutical industries for

extraction of their active ingredients (Hussain et al., 2008). Medicinal plants which are still widely used have been noted in Swat district. Some species seem to be adapted to wood-pasture, but vulnerable to overcollection, and in particular to deforestation. The better idea is to develop small-scale agroforestry systems to cultivate medicinally important plants for commercial and medicinal use by locals or with the help of the government (Akhtar et al., 2013).

## Materials and methods

Field survey and collection of specimens was done in the study area of Nawagai. The data of use of medicinal plants was collected predominantly from old residents. Specimens of all the available species were collected along with their relevant field data and georeferenced location data (Fig. 1, Table 1–4).

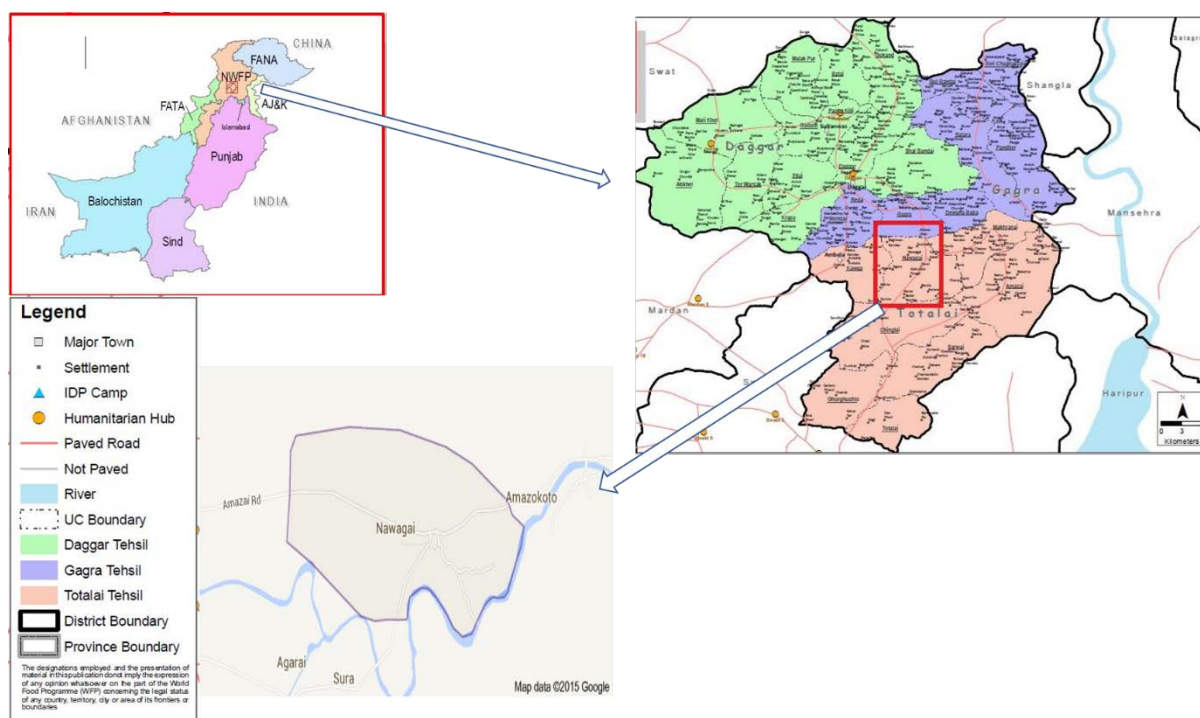


Fig. 1. Map of District Buner, Khyber Pakhtunkhwa

Table 1

List of GPS locations of selected plants

| No | Species  | Latitude  | Longitude | Elevation |
|----|--|-----------|-----------|-----------|
| 1  | <i>Adiantum venustum</i> D. Don                                  | 34°24'01" | 72°33'30" | 665       |
| 2  | <i>Narcissus tazetta</i> (L.)                                    | 34°23'52" | 72°33'43" | 666       |
| 3  | <i>Hedera nepalensis</i> K. Koch                                 | 34°23'52" | 72°33'34" | 664       |
| 4  | <i>Calotropis procera</i> (Aiton) W. T. Aiton                    | 34°24'45" | 72°33'32" | 702       |
| 5  | <i>Caralluma tuberculata</i> N. E. Brown                         | 34°24'12" | 72°33'36" | 675       |
| 6  | <i>Taraxacum officinale</i> Wigg.                                | 34°34'01" | 72°33'37" | 667       |
| 7  | <i>Xanthium strumarium</i> (L.)                                  | 34°24'06" | 72°33'38" | 672       |
| 8  | <i>Silybum marianum</i> Gaertn.                                  | 34°24'16" | 72°33'42" | 672       |
| 9  | <i>Carthamus oxycantha</i> M. Bieb.                              | 34°23'55" | 72°33'30" | 668       |
| 10 | <i>Launea procumbense</i> (Roxb.) Ramayya & Rajagopal            | 34°23'54" | 72°33'27" | 673       |
| 11 | <i>Coryza canadensis</i> (L.) Corgn.                             | 34°23'51" | 72°33'33" | 666       |
| 12 | <i>Berberis lycium</i> Royle                                     | 34°23'54" | 72°33'30" | 669       |
| 13 | <i>Nasturtium officinale</i> R. Br.                              | 34°23'58" | 72°33'46" | 662       |
| 14 | <i>Cannabis sativa</i> (L.)                                      | 34°4'03"  | 72°33'43" | 668       |
| 15 | <i>Opuntia monacantha</i> (Willd.) Haw. f. <i>variegata</i> Hort | 34°24'48" | 72°34'09" | 703       |
| 16 | <i>Euphorbia helioscopia</i> (L.)                                | 34°24'08" | 72°33'49" | 671       |
| 17 | <i>Trigonella foenum-graecum</i> (L.)                            | 34°23'41" | 72°33'35" | 663       |
| 18 | <i>Medicago sativa</i> (L.)                                      | 34°24'21" | 72°33'36" | 670       |
| 19 | <i>Fumaria indica</i> (Hausskn.) Pugsley                         | 34°24'00" | 72°33'39" | 667       |
| 20 | <i>Ajuga bracteosa</i> (Wall. ex Benth)                          | 34°23'54" | 72°33'30" | 670       |
| 21 | <i>Mentha longifolia</i> (L.)                                    | 34°24'49" | 72°33'42" | 706       |
| 22 | <i>Mentha spicata</i> (L.)                                       | 34°24'01" | 72°33'31" | 665       |
| 23 | <i>Salvia moercroftiana</i> (L.)                                 | 34°23'59" | 72°33'06" | 676       |
| 24 | <i>Origanum vulgare</i> (L.)                                     | 34°24'18" | 72°34'18" | 671       |
| 25 | <i>Isodon rugosus</i> (Wall. ex Benth.) Codd.                    | 34°25'05" | 72°34'09" | 735       |
| 26 | <i>Ocimum basilicum</i> (L.)                                     | 34°24'18" | 72°34'22" | 673       |
| 27 | <i>Lathyrus aphaca</i> (L.)                                      | 34°24'01" | 72°33'23" | 667       |
| 28 | <i>Otostegia limbata</i> (Benth.) Boiss                          | 34°23'46" | 72°33'49" | 659       |
| 29 | <i>Melia azedarach</i> (L.)                                      | 34°23'55" | 72°33'57" | 665       |
| 30 | <i>Olea ferruginea</i> Royle                                     | 34°24'06" | 72°33'49" | 669       |

| No | Species                                   | Latitude  | Longitude | Elevation |
|----|---|-----------|-----------|-----------|
| 31 | <i>Oxalis corniculata</i> (L.)            | 34°24'38" | 72°33'12" | 686       |
| 32 | <i>Piper nigrum</i> (L.)                  | 34°24'35" | 72°33'23" | 682       |
| 33 | <i>Plantago lanceolata</i> (L.)           | 34°24'02" | 72°33'29" | 665       |
| 34 | <i>Polygonum barbatum</i> (L.)            | 34°25'24" | 72°34'14" | 815       |
| 35 | <i>Rumex hastatus</i> D. Don              | 34°25'11" | 72°34'16" | 698       |
| 36 | <i>Desmostachya bipinnata</i> (L.) Stapf. | 34°24'08" | 72°33'41" | 672       |
| 37 | <i>Punica granatum</i> (L.)               | 34°24'12" | 72°33'28" | 680       |
| 38 | <i>Rubus fruticosus</i> Agg.              | 34°24'01" | 72°33'35" | 667       |
| 39 | <i>Zanthoxylum armatum</i> DC.            | 34°24'18" | 72°34'19" | 671       |
| 40 | <i>Dodonaea viscosa</i> (L.) Jacq.        | 34°24'56" | 72°34'54" | 807       |
| 41 | <i>Verbascum thapsus</i> (L.)             | 34°23'54" | 72°33'23" | 675       |
| 42 | <i>Solanum nigrum</i> (L.)                | 34°23'41" | 72°33'34" | 666       |
| 43 | <i>Vitex negundo</i> (L.)                 | 34°24'50" | 72°34'26" | 674       |
| 44 | <i>Verbena officinalis</i> (L.)           | 34°24'26" | 72°33'26" | 682       |

Table 2

List of species with their family and local name and habit

| Family         | Species   | Local name    | Habit |
|----------------|---|---------------|-------|
| Adiantaceae    | <i>Adiantum venustum</i> D. Don                                   | Sumbal        | herb  |
| Amaryllidaceae | <i>Narcissus tazetta</i> (L.)                                     | Gule-e-Nargis | herb  |
| Araliaceae     | <i>Hedera nepalensis</i> K. Koch                                  | Ropai panra   | shrub |
| Asclepiadaceae | <i>Calotropis procera</i> (Aiton) W.                              | Spalmai       | shrub |
| Asclepiadaceae | <i>Caralluma tuberculata</i> N. E. Brown                          | Pamankay      | herb  |
| Asteraceae     | <i>Taraxacum officinale</i> Wigg.                                 | Ziar gulae    | herb  |
| Asteraceae     | <i>Xanthium strumarium</i> (L.)                                   | Gishkey       | herb  |
| Asteraceae     | <i>Silybum marianum</i> Gaertn.                                   | Bangi         | shrub |
| Asteraceae     | <i>Carthamus oxycantha</i> M. Bieb.                               | Kareeza       | herb  |
| Asteraceae     | <i>Launea procumbense</i> (Roxb.)                                 | Paiwaray      | shrub |
| Asteraceae     | <i>Coryza canadensis</i> (L.) Corgn.                              | Paleet        | herb  |
| Berberidaceae  | <i>Berberis lycium</i> Royle                                      | kwaray        | shrub |
| Brassicaceae   | <i>Nasturtium officinale</i> R. Br.                               | Talmeera      | herb  |
| Cannabaceae    | <i>Cannabis sativa</i> (L.)                                       | Bhang         | shrub |
| Cactaceae      | <i>Opuntia monacantha</i> (Willd.) Haw. f. <i>variegata</i> Hort. | Zooqam        | shrub |
| Euphorbiaceae  | <i>Euphorbia helioscopia</i> (L.)                                 | Peryan dholay | herb  |

| Family           | Species                                       | Local name    | Habit |
|------------------|---|---------------|-------|
| Fabaceae         | <i>Trigonella foenum-graecum</i> (L.)         | Malkhoza      | herb  |
| Fabaceae         | <i>Medicago sativa</i> (L.)                   | Shpeshty      | herb  |
| Fumariaceae      | <i>Fumaria indica</i> (Hausskn.) Pugsley      | Papra         | herb  |
| Lamiaceae        | <i>Ajuga bracteosa</i> Wall. ex Benth         | Booti         | herb  |
| Lamiaceae        | <i>Mentha longifolia</i> (L.)                 | Villanay      | herb  |
| Lamiaceae        | <i>Mentha spicata</i> (L.)                    | Podeena       | herb  |
| Lamiaceae        | <i>Salvia moorcroftiana</i> (L.)              | Kharghwag     | herb  |
| Lamiaceae        | <i>Origanum vulgare</i> (L.)                  | Shamakay      | shrub |
| Lamiaceae        | <i>Isodon rugosus</i> (Wall. ex Benth.) Codd. | Sperkay       | shrub |
| Lamiaceae        | <i>Ocimum basilicum</i> (L.)                  | Kashmali      | shrub |
| Lamiaceae        | <i>Lathyrus aphaca</i> (L.)                   | Kurkamany     | herb  |
| Lamiaceae        | <i>Otostegia limbata</i> (Benth.) Boiss       | Spen Azghay   | herb  |
| Meliaceae        | <i>Melia azedarach</i> (L.)                   | Tora bakanara | tree  |
| Oleaceae         | <i>Olea ferruginea</i> Royle                  | Khona         | tree  |
| Oxalidaceae      | <i>Oxalis corniculata</i> (L.)                | Tarookay      | herb  |
| Piperaceae       | <i>Piper nigrum</i> (L.)                      | Mirch         | tree  |
| Plantaginaceae   | <i>Plantago lanceolata</i> (L.)               | Jabai         | herb  |
| Polygonaceae     | <i>Polygonum barbatum</i> (L.)                | Palpolak      | herb  |
| Polygonaceae     | <i>Rumex hastatus</i> D. Don                  | Tarookay      | herb  |
| Poaceae          | <i>Desmostachya bipinnata</i> (L.) Stapf.     | Drub          | herb  |
| Punicaceae       | <i>Punica granatum</i> (L.)                   | Ananghori     | tree  |
| Rosaceae         | <i>Rubus fruticosus</i> Agg.                  | Karwara       | shrub |
| Rutaceae         | <i>Zanthoxylum armatum</i> DC.                | Dambara       | tree  |
| Sapindaceae      | <i>Dodonaea viscosa</i> (L.)                  | Ghwarasky     | shrub |
| Scrophulariaceae | <i>Verbascum thapsus</i> (L.)                 | Khargad       | herb  |
| Solanaceae       | <i>Solanum nigrum</i> (L.)                    | Kachmachu     | herb  |
| Verbenaceae      | <i>Vitex negundo</i> (L.)                     | Marvandai     | shrub |
| Verbenaceae      | <i>Verberna officinalis</i> (L.)              | Shamakay      | shrub |

**Table 3**

List of plants name and their abbreviations

| No | Species                          | Abbreviation | No | Species                       | Abbreviation |
|----|----------------------------------|--------------|----|-------------------------------|--------------|
| 1  | <i>Adiantum venustum</i>         | Adi ven      | 23 | <i>Salvia moorcroftiana</i>   | Sal moo      |
| 2  | <i>Narcissus tazetta</i>         | Nar taz      | 24 | <i>Origanum vulgare</i>       | Ori vul      |
| 3  | <i>Hedera nepalensis</i>         | Hed nep      | 25 | <i>Isodon rugosus</i>         | Iso rog      |
| 4  | <i>Calotropis procera</i>        | Cal pro      | 26 | <i>Ocimum basilicum</i>       | Oci bas      |
| 5  | <i>Caralluma tuberculata</i>     | Car tub      | 27 | <i>Lathyrus aphaca</i>        | Lat aph      |
| 6  | <i>Taraxacum officinale</i>      | Tar off      | 28 | <i>Otostegia limbata</i>      | Oto lim      |
| 7  | <i>Xanthium strumarium</i>       | Xan str      | 29 | <i>Melia azedarach</i>        | Mel aze      |
| 8  | <i>Silybum marianum</i>          | Sil mar      | 30 | <i>Olea ferruginea</i>        | Ole fer      |
| 9  | <i>Carthamus oxycantha</i>       | Car oxy      | 31 | <i>Oxalis corniculata</i>     | Oxa cor      |
| 10 | <i>Launea procumbense</i>        | Lau pro      | 32 | <i>Piper nigrum</i>           | Pip nig      |
| 11 | <i>Conyza canadensis</i>         | Con can      | 33 | <i>Plantago lanceolata</i>    | Pla lan      |
| 12 | <i>Berberis lycium</i>           | Ber lyc      | 34 | <i>Polygonum barbatum</i>     | Pol bar      |
| 13 | <i>Nasturtium officinale</i>     | Nas off      | 35 | <i>Rumex hastatus</i>         | Rum has      |
| 14 | <i>Cannabis sativa</i>           | Can sat      | 36 | <i>Desmostachya bipinnata</i> | Des bip      |
| 15 | <i>Opuntia monacantha</i>        | Opu mon      | 37 | <i>Punica granatum</i>        | Pun gra      |
| 16 | <i>Euphorbia helioscopia</i>     | Eup hel      | 38 | <i>Rubus fruticosus</i>       | Rub fru      |
| 17 | <i>Trigonella foenum-graecum</i> | Tri foe      | 39 | <i>Zanthoxylum armatum</i>    | Zan arm      |
| 18 | <i>Medicago sativa</i>           | Med sat      | 40 | <i>Dodonaea viscosa</i>       | Dod vis      |
| 19 | <i>Fumaria indica</i>            | Fum ind      | 41 | <i>Verbascum thapsus</i>      | Ver tha      |
| 20 | <i>Ajuga bracteosa</i>           | Aju bra      | 42 | <i>Solanum nigrum</i>         | Sol nig      |
| 21 | <i>Mentha longifolia</i>         | Men lon      | 43 | <i>Vitex negundo</i>          | Vit neg      |
| 22 | <i>Mentha spicata</i>            | Men spi      | 44 | <i>Verberna officinalis</i>   | Ver off      |

After collection, the plants were pressed to obtain good herbarium specimens. They were pressed before their wilting in newspaper sheets. The newspapers were changed every 24 hours. After pressing and drying, the specimens were mounted on herbarium sheets for obtaining morphological data for their identification to species level. After their identification, all the available information about the taxa were transferred upon their respective herbarium sheet. The plant species were either identified directly in the field or after processing at the Botanical Garden and Herbarium, University of Malakand Chakdara, Dir lower, Khyber Pakhtunkhwa with the help of flora of Pakistan, flora of Australia and other relevant published sources. The voucher specimen of each species was deposited in the Herbarium and Department of Botany, University of Malakand, Pakistan.

## Results

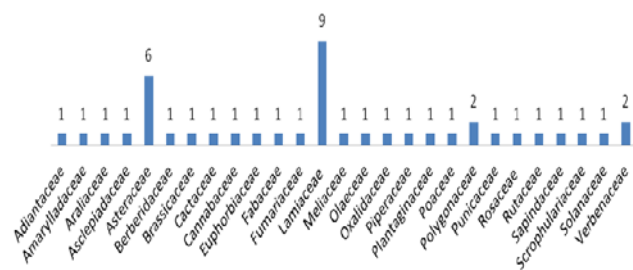
The ethnomedicinal flora of Nawagai Village consists of 44 species belonging to 27 families. Among the collected plants, 9 plants belong to

the family Lamiaceae, 6 to the family Asteraceae, 2 to Asclepiadaceae, Polygonaceae, Fabaceae and Verbenaceae. One species was recorded for Adiantaceae, Amaryllidaceae, Araliaceae, Berberidaceae, Brassicaceae, Cactaceae, Cannabaceae, Euphorbiaceae, Meliaceae, Oleaceae, Oxalidaceae, Piperaceae, Plantaginaceae, Poaceae, Punicaceae, Rosaceae, Rutaceae, Sapindaceae, Scrophulariaceae and Solanaceae (Fig. 2).

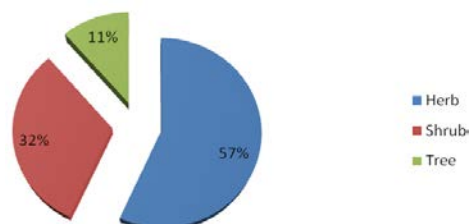
**Table 4**

List of therapeutic uses abbreviation

| No | Full name       | Abbreviation | No | Full name          | Abbreviation |
|----|-----------------|--------------|----|--------------------|--------------|
| 1  | stomach-ache    | sto          | 38 | tumours            | tum          |
| 2  | vermifuge       | ver          | 39 | anaemia            | ane          |
| 3  | diuritics       | diu          | 40 | digestive          | dig          |
| 4  | astrigent       | ast          | 41 | appetite           | app          |
| 5  | diarrhea        | dia          | 42 | lung infections    | lun          |
| 6  | expectorant     | exp          | 43 | cancer             | can          |
| 7  | cough           | cou          | 44 | heartburn          | hea          |
| 8  | tonic           | ton          | 45 | sore throat        | thr          |
| 9  | stimulant       | sti          | 46 | antioxidant        | ant          |
| 10 | purgative       | pur          | 47 | antimicrobial      | ant          |
| 11 | rheumatism      | rhe          | 48 | cns disorders      | cns          |
| 12 | toothache       | too          | 49 | ant dyspeptic      | ant          |
| 13 | honey formation | hon          | 50 | cholagogue         | cho          |
| 14 | fever           | fev          | 51 | diaphoretic        | dia          |
| 15 | blood purifying | blo          | 52 | abdominal cramps   | abd          |
| 16 | dysentery       | dys          | 53 | achene's           | ach          |
| 17 | laxative        | lax          | 54 | antiseptic         | ant          |
| 18 | carminative     | car          | 55 | analgesic          | ana          |
| 19 | sedative        | sed          | 56 | aromatic           | aro          |
| 20 | asthma          | ast          | 57 | ear pain           | ear          |
| 21 | emetic          | eme          | 58 | bums               | bur          |
| 22 | diabetes        | dia          | 59 | gum diseases       | gum          |
| 23 | pulmonary       | pul          | 60 | hysteria           | hys          |
| 24 | skin disease    | ski          | 61 | antiperiodic       | ant          |
| 25 | hypertension    | hyp          | 62 | curing of flu      | cur          |
| 26 | kidney          | kid          | 63 | muscle relaxation  | mus          |
| 27 | liver disease   | liv          | 64 | mouth diseases     | mou          |
| 28 | flow            | flo          | 65 | fish poison        | fis          |
| 29 | haemorrhage     | hae          | 66 | strangury          | str          |
| 30 | apparent        | app          | 67 | vaginal discharges | vag          |
| 31 | sudorific       | sud          | 68 | vesicle calculi    | ves          |
| 32 | cnolagogue      | cno          | 69 | biliousness        | bil          |
| 33 | micturition     | mic          | 70 | bladder diseases   | bla          |
| 34 | wound           | wou          | 71 | swelling           | swe          |
| 35 | anti-scorbic    | ant          | 72 | ophthalmopathy     | opt          |
| 36 | narcotic        | nor          | 73 | odontalgia         | odo          |
| 37 | urinary         | uri          | 74 | verminosis         | ver          |



**Fig. 2.** Frequency distribution of selected plant families



**Fig. 3.** Frequency distribution for habits of selected plant species

Based on their status, these plants were further divided into herbs, shrubs and trees (Fig. 3).





As per medicinal use of the plants, 74 therapeutic classes as shown in Table 5, 6 were formed, in which 8 plants are used for fever, 7 as diuretics, 7 as cure for dysentery and 7 helping in wound healing, 6 as cough suppressant, 6 used as tonic, 6 plants are also used for curing diarrhea, 6 plants are used for the treatment of stomach ache and 6 species are used for curing diabetes, 5 as blood purifying, 4 as antiseptic, 4 used as laxative, 4 used for skin disease and 4 plants are used in toothache, 3 as honey bee plants, 3 as sedatives, 3 used in asthmatic situation, 3 as cure for pulmonary and liver disease, 2 plants are used as vermifuge, 2 as astringent, 2 as purgative, also 2 plants are used as anti-emetic, 2 as hypertension remedy, also 2 species used in kidney problems, 2 as haemorrhage, 2 used in abdominal cramps, 2 as analgesic, 2 as aromatic, 2 used for burns, 2 as gum disease, and 2 plants used as fish poison. And only one plant species is used for each of the following: stimulant, rheumatism, flow, apparent, sudorific, micturition, antiscorbic, narcotic, urinary, tumors, anemia, digestive, appetite, lung infections, cancer, heartburn, sore throat sore, antioxidant, antimicrobial, CNS disorders, ant dyspeptic, cholagogue, diaphoretic, achene's, ear pain, hysteria, antiperiodic, curing of flu, muscle relaxation, mouth diseases, strangury, vaginal discharges, vesicle calculi, biliousness, bladder diseases, swelling, ophthalmopathy, odontalgia, verminosis and anti-inflammatory.

## Discussion

The study indicates that the local people use various native plants for different purposes such as for fuel e.g. *Berberis lycium*, *Cannabis sativum* and as fodder for animals like *Plantago lanceolata*, *Oxalis corniculata*, *Medicago sativa*. Some people used these plants as medicine against different diseases, *Ajuga bracteosa* is used for abdominal pain, *Verbascum thapsus* for external wound healing and *Berberis lycium* for gum diseases. Extraction of leaves of *Hedera nepalensis* locally used to maintain level of diabetes. The leaves of *Mentha longifolia*, *Isodon rogosus*, *Ajuga bracteosa*, *Salvia moorcroftiana* were used for the treatment of abdominal pain, digestive disorders, woundshealing. In the Indian system of medicines *Zanthoxylum armatum* is used as carminative, stomachic and treatment of toothache (Prasanta & Mukherjee, 2011).

Medicinal plants have no side effects so use of medicinal plants or their resources should be rapidly increased, and they should be easily available and this is only source of health care available to the middle-class population (Acharya et al., 2009). Ahmad et al. (2014) reported a total of 50 plant species belonging to 48 genera of 35 families from Chail valley Swat. Umair et al. (2017) listed 85 species belonging to 71 genera, and 34 families were documented along with their ethnomedicinal uses. A total of 163 plant species belonging to 73 families were reported with the help of standardized questionnaires for their traditional, medicinal and economic uses (Sher et al., 2014). A total of 200 local inhabitants were found utilizing 52 plants of 37 families for various ethnomedicinal purposes, notably as timber wood, fodder and forage for cattle, condiments, for shade, usage in construction and agricultural tool making etc. (Hassan et al., 2015). Khan and Musharaf (2015) also reported 34 plant species belonging to 20 families from tehsil Thakht bhai, District: Mardan. An ethnomedicinal survey was conducted in Tirat Valley, Swat District, Pakistan, reporting 65 species belonging to 35 families, from the Valley which belonged to the ethnomedicinal domain of the area (Ali et al., 2017). The author found that *Myrtus communis* is a bushy, aromatic, ever-green shrub, belonging to the family Myrtaceae, is commonly found in Bajaur Agency (FATA) Pakistan.

Our study indicated that local people of the area used different parts of medicinal plants. *Taraxacum officinale* is used in many traditional medical systems particularly in Asia, Europe, and North America, the root being primarily considered a gastrointestinal remedy supporting digestion and liver function, while the leaf is used as a diuretic and bitter digestive stimulant (Yarnell & Abascal, 2009).

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