



Ethno Botanical Study of Wild Medicinal Plants of Peerano Valley, District Malakand, Khyber Pakhtoonkhwa, Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. Author AZ performed survey work. Authors AZ and SS carried out the research work. Authors YK and TY wrote the paper. All authors read and approved the final manuscript.

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ABSTRACT

The ethno medicinal study play a key role in the control of various disorders and provide a base for further study on scientific lines. The purpose of the survey was to observe the traditional medicinal plants and their uses for the various common disorders in Peerano Valley, district Malakand Khyber Pakhtoonkhwa, Pakistan. The study was carried out from March, 2015 to April, 2016 and collected the data from the local inhabitants through questionnaires, interviewed regarding the available medicinal plants. The total 35 plants are recorded as medicinal belonging to 31 families. The study showed that 20 plants species were herbs, 8 trees and 7 were shrubs. The common parts were leaf, fruit, and whole plant, which were used in greater numbers. The inhabitants used them for stomachache, fever, cough, healing of wounds, diuretic, antiseptics, hepatic disorders, diarrhea and digestive disorders. The survey aims to aware about valuable plants and to protect them from extinction. The old people are aware of the accurate knowledge of medicinal plants, it is needed to preserve this knowledge for the next generation.

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1. INTRODUCTION

Ethno botanical study is the branch of science related to special branch namely ethno biology, it is define as the science of the traditional use of plants [1]. Ethno botany is related with the study of direct, traditional and relationship between plants and human societies. It has been renowned as a multi-disciplinary science which comprises of many interesting and fruitful aspects of plants sciences record, anthropology, customs, traditions, and literature [2]. Ethno botany gives us an account of uses of plant species by the people relating to particular area that how they take into use plants as a foodstuff, for medicinal purposes, for clothes, as a hunting material and in local traditions [3]. Infact it is the sound study of the association between people and plants. The study have become increasingly valuable in the development of health care and conservation programs in different parts of the world [4] among the world population about 80% of people depend on medicinal plants use, which purely comes from medicinal plants [5]. More than 5000 plant species belonging to angiosperms are used worldwide for medicinal purposes [6]. Epidemiological studies have shown that many of the phytochemicals from medicinal plants possess anti-inflammatory, ant atherosclerotic, antitumor, ant mutagenic, ant carcinogenic, antibacterial, or antiviral activities, they are also associated with reduced risks of cancer, cardiovascular disease, diabetes and lower mortality rates of several human diseases [7]. The poor communities all over the world are using and get benefits from medicinal plants. Most of these medicinal plants are flowering plants [8]. However along with medicinal uses, the plant species are also playing a vital role in the improvement of the economics status of the local people [9]. Because of rapid use of medicinal plants approximately business of medicinal plant species will reach to 5 trillion dollars (US) by 2050 [10]. Six thousand species of higher plants are found in Pakistan, 12% of them are used medicinally [11]. It was studied by Hocking in 1958 that about 84% of the population of Pakistan uses plants for medicinal purposes [12]. Mostly unani system of medicine is used in Pakistan but still the people of distant areas uses plants for medicinal purposes [13]. This field is getting strength in Pakistan with the passage of time as a lot of work has been carried out in different parts of the country [14-17]. The attention must be given to these plants before

the lost forever. The survey is carried out to explore the important account of the wild medicinal plants which are used by the local people, exported to other parts of the country, and the species which are over exploited and are about to get threatened either due to overgrazing, deforestation and due to the law and order situation in the area since 2007 - 2009. The objectives of this survey was to bring awareness among the people about therapeutic uses of wild medicinal plants, control the diseases, and store the knowledge and medicinal uses of plants present in district Malakand, Khyber Pakhtoonkhwa, Pakistan.

2. MATERIALS AND METHODS

2.1 Ethno Botanical Survey

An ethno botanical study was carried out from March, 2015 to April, 2016 in different areas of tehsil Batkhela which are ecologically and economically important. Mostly the upper areas of tehsil Batkhela toward the south-east areas of tehsil Batkhela were selected which include the village of Peerano, Sangina, Akhtar ghwandai. The upper areas of tehsil toward west were selected because the people of these areas have less proper facility of hospital. They attend Batkhela hospital only in case of severe problems; in case of minor health diseases they use plants directly to overcome the problem. The information about the medicinally important wild plant species was collected from 42 peoples through a Questionnaire (Table 2); the questionnaire was classified into two categories. In category "A" there were information's about the informants, in category "B" there were general information about the plant species, and their medicinal uses. Within the questionnaire there were information's about the local name, part used in medicines, uses, marketing, distribution, availability, abundance and that in which way the part is used for diseases. A standard procedure was carried out for the information. Mostly those people were selected for the interviews who were above 40 years of age due to their knowledge and experience about local use of plants of the areas. The informants who were selected for the interviews were mostly the residents of rural areas. For the confirmation of the uses of the each plant species interviews were made from several informants. For further confirmation plants were taken to the local hakims (herbal practitioners)

and pansaris (traditional medicinal plants shopkeepers). The shop keepers were asked about the source of plants, that how they receive and export it to other markets within the locality especially with in the country.

2.2 Name of the Plants

Locally in the area certain places and villages are named after the name of plants species. Baghona village is present in Batkhela. "Baghona" named due to its abundant number and stone fruits.

2.3 Study Area

This place (study area) is situated in KPK, its geographical coordinates are 34° 37' 0" North, 71° 58' 17" East and its original name (with diacritics) is Batkhela (Fig. 1).

2.4 Climate of Peerano Valeey (District Malakand)

The climate of this area is broadly described as typically continental type. The weather is little bit pleasant in summer, but in winter it is very cold. The hottest temperature can be noted in the month of July i.e. (15.67°C to 45°C), while January and February are the coldest months and the temperature generally reaches to freezing point up to a temperature of mean maximum and minimum 8.8°C to -5°C. The average rain fall in the month of March is 119 mm (Fig. 2). The irrigation system of tehsil Batkhela depends on river Batkhela and Moon-son rain totally. Maximum land part is irrigated through this river. The soil of tehsil Batkhela is mostly loamy type and irrigated through Swat River [13].

2.5 Geography District Malakand

The soil of Malakand is loamy and moist, and is irrigated by the Batkhela River, which flows from Swat, through Kohistan and joins the river Kabul near Peshawar. There are rare scenic places and tourist resorts in Malakand like Jabban and Malakand hydro-electric project. Water passes through a three-mile-long tunnel, and has a natural fall of 350 feet. The main income-generating source in Malakand is the two power houses at Dargai and Malakand Khas. There are

about 11 other suitable sites for construction of Small Hydel Power projects that needed investors' attention. Malakand already mentioned that it is surrounded by high mountains rich with mineral resources, deposits of chromite iron, china clay and fuller earth have been found in Malakand.

2.6 Data Collection, Organizing and Analysis

The information was obtained from the local informants through questionnaires and oral interviews. The questionnaire included the whole status of the plant, parts use, local name, method of collection and consumption. The interview was conducted in the local languages (Pashto, Urdu). The part of the plant was classified into different categories like seeds, fruits, leaves and whole plant etc. The uses of the plant were divided into different groups.

2.7 Data Analysis

The data is analyzed with Microsoft excel 2019.

3. RESULTS

3.1 Demographic Data

In current study, ethno botanical survey of important wild medicinal plants of Sangina valley, tehsil Batkhela was carried out of which 35 plants were listed belonging to 31, families (Table 1). The overall information's about the local names, habit, part used and families are given in (Table 2). The list shows that 35 plants were used for medicinal purposes, in which 1 plant for blood purification, 1 plant for gastro disorders, 6 plants used for stomachache, 2 plants for cattle as vermifuge, 5 plants for treatment of fever, 2 plants for cold, and 7 plants for cough, 1 plant for make tooth brush, 2 plants for healing of wounds and other skin disorders, 12 plants useful for diuretic, 2 plants were useful in diabetes, 5 plants for relief in pain, 8 plants as a tonic or stimulant, 3 plants as sedative and 1 plant antiseptics, 4 plants for hepatic disorders, 5 plants for diarrhea and 5 plants for dysentery, 1 plant for used in Bhang, 1 plant as a source of wood and fuel, 3 plants used for heart diseases, 1 plant was found to be used as a source of vegetable and fruits by the local inhabitants, 3 plants were found to be useful as an antidandruff

Table 1. Botanical details of important wild medicinal plants

S. No.	Botanical name	Family	Local name
1	<i>Acacia farnesiana</i>	Mimosaceae	Vilayati Kikar.
2	<i>Acacia nilotica</i>	Mimosaceae	Kikar
3	<i>Ajuga bracteosa</i>	Lamiaceae	Boti
4	<i>Berberis lyceum</i>	Berberidaceae	Kwarey
5	<i>Boerhavia procumbens</i>	Nyctaginaceae	Itsit
6	<i>Brassica campestris</i>	Brassicaceae	Sarsoo
7	<i>Calotropis procera</i>	Campanulaceae	Spalmai
8	<i>Cannabis sativa</i>	Cannabinaceae	Bhang
9	<i>Capsella bursa-pastoris</i>	Brassicaceae	Chambraka
10	<i>Centaurea iberica</i>	Celastraceae	Kareza
11	<i>Chenopodium botrys</i>	Chenopodiaceae	Skha Kharawa
12	<i>Chorozophora tinctoria</i>	Euphorbiaceae	Kuronda
13	<i>Cichorium intybus</i>	Asteraceae	Han
14	<i>Cotoneaster microphyllus</i>	Rosaceae	Mamanra
15	<i>Cymbopogon citrates.</i>	Poaceae	Lemon grass
16	<i>Daphne mucronata</i>	Thymelaceae	Leghone
17	<i>Dedonea viscosa</i>	Spindaceae	Ghwarhaskey
18	<i>Dhatura innoxia</i>	Datisceae	Dhatura
19	<i>Eucalyptus lanceolata</i>	Myrtinaceae	Lachi
20	<i>Euphorbia helioscopia</i>	Euphorbiaceae	Mandarro
21	<i>Filago Hurdwarica</i>	Fagaceae	Spentakai
22	<i>Fumaria indica</i>	Fumaricaceae	Shahtra/Krachy
23	<i>Convolvulus arvensis</i>	Convolvulaceae	Prewata
24	<i>Melia azedarach</i>	Meliaceae	Thora shandai
25	<i>Mentha arvensis</i>	Lamiaceae	Pudina
26	<i>Mentha longifolia</i>	Lamiaceae	Enaley
27	<i>Morus alba</i>	Moraceae	Bedana Toot
28	<i>Morus nigra</i>	Moraceae	Toot siah
29	<i>Olea ferruginea</i>	Oleaceae	Khuna
30	<i>Otostegia limbata</i>	Lamiaceae	Spin azghay
31	<i>Oxalis corniculata</i>	Oxalidaceae	Tharuky
32	<i>Plantago lanceolata</i>	Plantaginaceae	Ghwajabai
33	<i>Platanus orientalis</i>	Platanaceae	Chinar
34	<i>Rumex dentatus</i>	Polygonaceae	Shalkhey
35	<i>Rumex nepalensis</i>	Polygonaceae	Tharuky

Table 2. Ethno botanical use of Plant species in the local area

Botanical name	Habit	Part use	Application	Status of uses
1 <i>Acacia farnesiana</i> (L.)	T	Bark, pods Bulb Juice	Bark is useful in bleeding gums, and to treat prolapsed, rectum, leucorrhoea and spermatorrhoea	Common
2 <i>Acacia nilotica</i> (L.)	T	Bark, Gum, Seeds, Wood.	Bark is used in diarrhea, dysentery, as stomachic and as astringent; branches and twigs are used to make tooth brushes (Miswak), while seeds are expectorant.	Common
3 <i>Ajuga bracteosa</i> Wall.ex Benth	H	Whole Plant	Bitter astringent, aromatic tonic; used in fever as substitute for Cardiac stimulant, diuretic, and aperients very effectively used in hepatitis	Common
4 <i>Cannabis sativa</i> Linn	H	leaves	Plant is narcotic drug used for malaria, blood poisoning, anthrax and dysentery;	Rare

Botanical name	Habit	Part use	Application	Status of uses
			leaves used as substitute for opium, as pain killer in otitis; antidandruff; relieves pain in dysmenorrhea. Charas is valuable narcotic, appetizer and sexual stimulant.	
5 <i>Berberis lyceum</i>	S	Roots, fruits and shoot	Use in stomachic, liver disorders, heat loss (from body), diarrhea and fruit is edible.	Common
6 <i>Boerhavia procumbens</i> Bank.ex.Roxb.	H	Whole plant	The roots is diuretic; laxative; expectorant; stomachic; and antiasthmatic; infusion of the herb is mild laxative and useful in dropsy, menstrual flow regulation and gonorrhoea.	Common
7 <i>Brassica campestris</i> (Linn.) Clapham	H	Seeds, leaves	Oil used as rubefacient, counter irritant, hair restorers' facial acne and muscular skeletal relaxant. Leaves used as vegetables to improve digestive disorders, oil cakes given to cattle to increase milk flow.	Common
8 <i>Calotropis procera</i> (Wild) R. Brown.	S	Whole plant	Powdered flowers are used in cold, cough and asthma; roots bark is used in dysentery, as diaphoretic and expectorant; latex is irritant. The tincture of leaves is used in intermittent fever.	Common
9 <i>Capsella bursa-pastoris</i> (Linn.) Medic.	H	Aerial parts	Seed are stimulant, astringent, antiscorbutic, used in hematuria and dropsy, in diarrhea; due to the presence of acetyl choline it lowers blood pressure.	Common
10 <i>Centaurea iberica</i> Trevir ex. Sprengel	H	Seeds and Spines	Seeds; use in (body) weakness, Heart diseases, stomach pain. Spines are in sexual diseases.	Common
11 <i>Chenopodium botrys</i> L.	H	Whole plant	Used in coughs; as vermifuge; useful in hepatitis.	Common
12 <i>Chrozophora tунctoria</i> (Linn.) Raffin	H	Whole plant	Plant is poisonous, emetic and cathartic	Common
13 <i>Cichorium intybus</i> Linn.	H	leaves and roots	Increase bile secretion and used to promote digestion. The plant is tonic, astringent and very useful in asthma and spleen enlargement	Common
14 <i>Cotoneaster microphyllus</i> Wall. ex Lindley	S	Leaves and stolons	Leaves and stolon are used as astringent	Common
15 <i>Cymbopogon citrates</i> (DC.) Stapf.	G	leaves	Its main use is in the production of ionone, a synthetic perfume with the odour of violets, but recently it has become increasingly important as a starting point for the synthesis of vitamin-A. Infused leaves are used as herbal tea; oil is used as a relaxant in bath water and to clean oily skin.	Common

Botanical name	Habit	Part use	Application	Status of uses
16 <i>Daphne mucronata</i> Royle	S	Whole plant	Fruit are purgative, Bark and leaves are used as poultice for tumors, swellings and rheumatism; root is gastro-intestinal irritant.	Common
17 <i>Dedonoaea viscosa</i> (L.) Jacq.	S	leaves, bark and seed	Leaves are used to heal crack skill, wound, burn and swelling; fruit is used as fish poison; bark is astringent.	Common
18 <i>Datura innoxia</i> Mill.	H	Seeds and leaves	Seeds are highly poisonous, used as sedatives, anodyne, in gout, rheumatism, lumbago, leaves juice is used in otitis and gonorrhea.	Common
19 <i>Eucalyptus Lanceolata</i> L.	T	Dried gummy exudates	Used as astringent in pharyngitis and laryngitis, as antiseptic and mosquito repellent.	Common
20 <i>Filago Hurdwarica</i> (Wall.ex DC.)Wagenitz	H	Whole plant	Leaves and young branches are used in decoction form for treating skin allergies and itching.	Rare
21 <i>Fumaria indica</i>	H	Whole plant	Use in asthma, paralyses, cough	Common
22 <i>Euphorbia helioscopia</i> L.	H	Root, Areal parts	Milky juice is poisonous;causes skin scrofula;stem is use for constipation; oil from the seed has purgative properties;root are use as anthelmintic.	Common
23 <i>Convulvulus arvensis</i> (Linn.) Roth.	TW	Seeds, Root	Used as purgative; cause nausea; disturbances of Central Nervous System (CNS), like blurred vision, dilation of pupil and hallucinations	Common
24 <i>Melia azedarach</i> L.	T	Whole plant	Leaves, fruit, and bark used in scrofula and leprosy; leaves juice is useful diuretic, anthelmintic and emmenagogue; seeds are used in rheumatism	Rare
25 <i>Mentha arvensis</i> L.	H	Leaves	Used as antispasmodic, carminative, stomachic, stimulant and diuretic; its oil is invaluable anti-neuralgic and is applied externally in alcoholic solution.	Frequently
26 <i>Mentha longifolia</i> L.	H	Leaves	Used as carminative, in diarrhea, dysentery. It is also very valuable is colic.	Common
27 <i>Morus alba</i> L.	T	Bark and fruit	Fruit is refrigerant in fever and used as remedy for sore throat, dyspepsia and melancholia; excessive use cause diarrhea; bark is purgative and anthelmintic.	Common
28 <i>Morus nigra</i> L.	T	Bark and fruit	The bark is purgative and vermifuge; fruit is useful laxative, nutritive, refrigerant, chick thirst; used as diuretic, expectorant and lower decreases blood sugar and inhibit tumors formation.	Common
29 <i>Nerium oleander</i> L.	S	Whole plant	The plant is poisonous, used as substitute for Digitalis; very useful diuretic, rarely it acts as a cathartic.	Common

Botanical name	Habit	Part use	Application	Status of uses
30 <i>Olea ferruginea</i> Royle.	T	Fruit, bark and leaves	Leaves are used cure gonorrhea, in fever and debility; Oil from the fruit as rubefacient and taken for digestive disorders. Bark is astringent.	Common
31 <i>Otostegia limbata</i> (Benth) Boiss.	S	Whole plant	Used in gum diseases and cure wounds.	Common
32 <i>Oxalis corniculata</i>	H	Whole plant	Useful in high fever and stomachache	Common
33 <i>Plantago lanceolata</i> L.	H	Leaves and seed	Boiled leaves are used mainly for persistent bronchitis and as mild purgative; seed are drastic purgative.	Common
34 <i>Platanus orientalis</i> L.	T	Leaves and Bark	Fresh bruised leaves are applied in ophthalmic; boiled bark with vinegar is used in hernia, toothache, diarrhea and dysentery.	Common
35 <i>Rumex dentatus</i> L.	H	Root and leaves	Root are astringent, used in cutaneous disorders, while leaves are used as emollients	Common

Note: H= HERB, S=SHRUB, T= TRESS, TW= TWINER

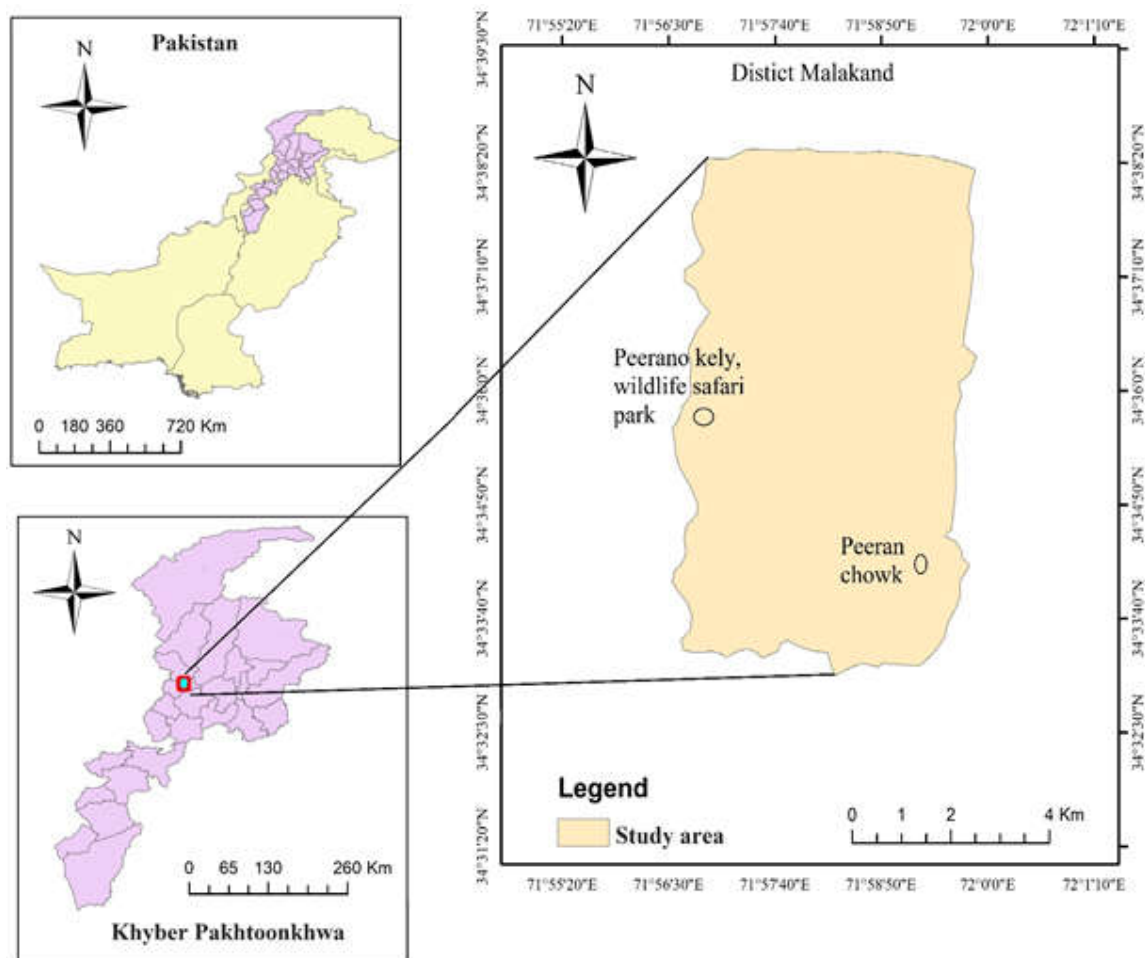


Fig. 1. Map of study area

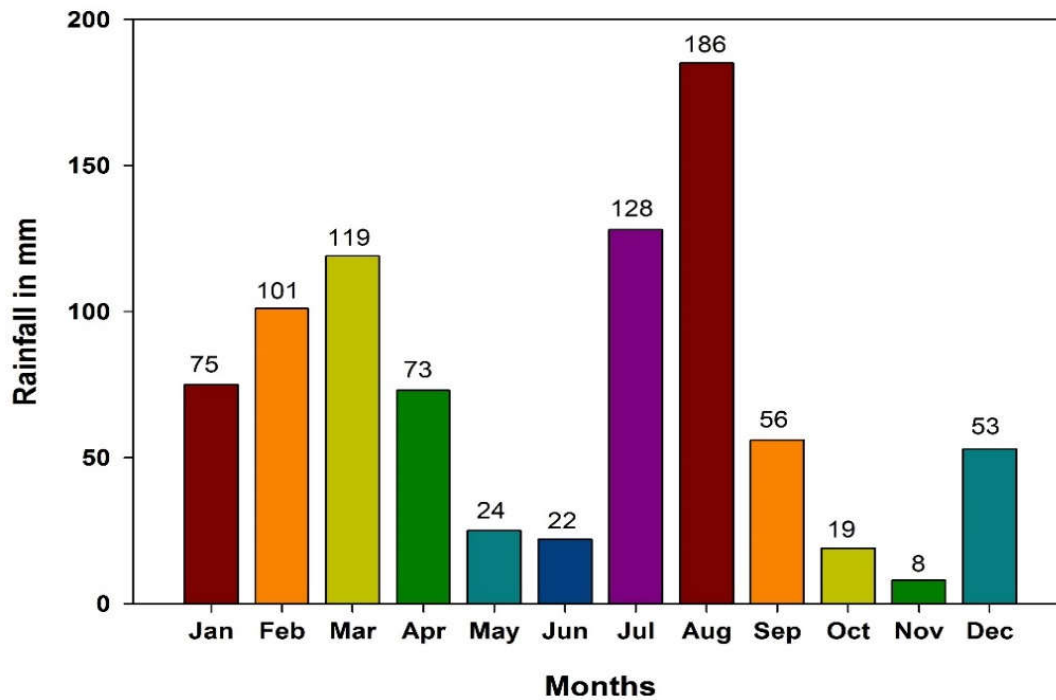


Fig. 2. Rainfall in district Malakand

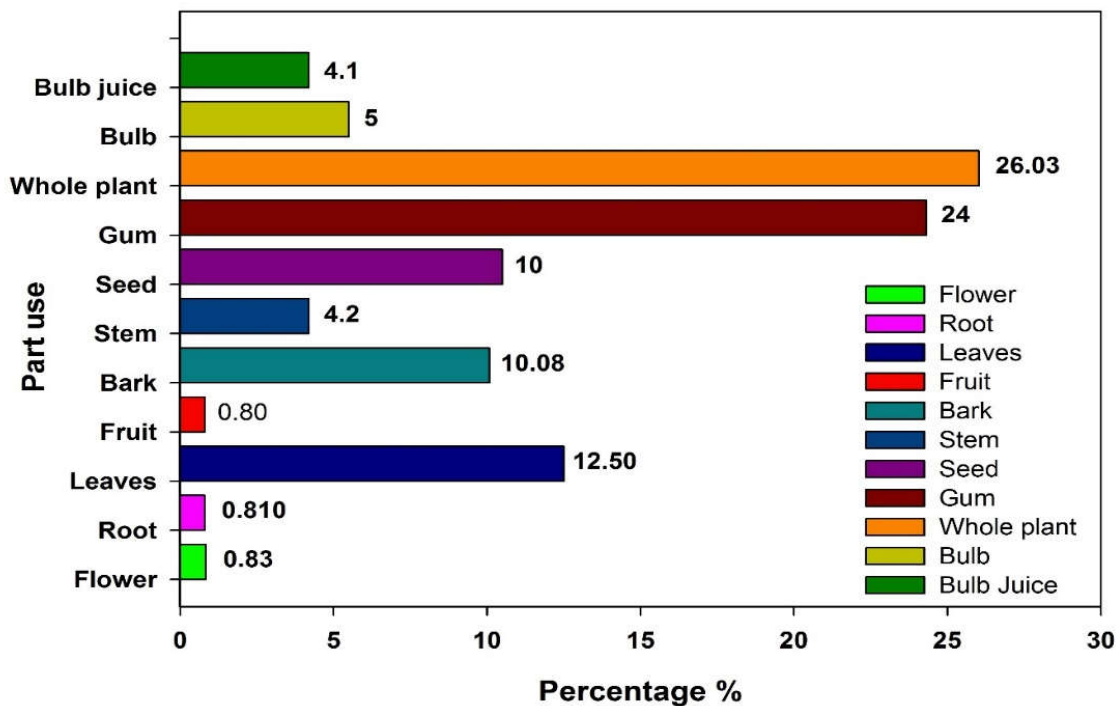


Fig. 3. Part use in the area

and anti-hair fall, 3 plants as thatching material (craft of building), 1 plant for ornamental purpose. Most of the species were found to be used for multiple purposes by the local

inhabitants of the area (Table 2). The most dominant part of plant were leaves and fruit with 26.1 and 21.5 respectively, followed by stem, whole plant, root and flower (Fig. 3).



Fig. 4. *Acacia farnesiana* (L.) wild



Fig. 5. *Cannabis sativa* Linn.



Fig. 6. *Calotropis procera* (wild) r. Brown



Fig. 7. *Datura innoxia* mill

4. DISCUSSION

Ethno botany deals with the collection of valuable medicinal plants by a group of people and describes their different uses [15]. Ethno botany is an integral part of indigenous/local knowledge of a particular society. People used several traditional medicines for the cure of different ailments. Our surrounding nature is the habitat of many unknown medicinal plants that indigenous people use for treating their ailments. Different societies or communities have their own knowledge about plants and their uses [16]. This study provided information on the ethno botanical uses of 35 plant species. Most of these species were, *Acacia farnesiana* L. *Acacia nilotica* L. *Berberis lyceum*, *Brassica compestris* L, *Calotropis procera*, *Dedonoaea viscose* L. *Rumex dentatus* L. *Morus nigra* L, *Morus alba* L. are common using as ant diabetic, dysentery, expectorant, diarrhea, antidiuretic, purgative, anthelmintic, antiasthmatic, carminative, stomachic for constipation, skin allergies, fever etc. The plant was also used in more than one type disorders for their medicinal properties [17]. Zaman et al. (2013) reported *Mentha longifolia* L used as carminative, diarrhea, dysentery and for colic, *Dedonoaea viscose* L. used for wounds and softening of wound and powdered flower of *Calotropis procera* are used for cough and asthma. The people of the area were mostly dependent on indigenous plants for the cure of ailments as *Melia azedarach* L, are frequently used for scrofula and leprosy; leaves juice is useful for diuretic, anthelmintic, *Morus alba* L. for fever and used as remedy for sore throat, dyspepsia and melancholia and *Dedonoaea viscose* were used for heal crack skill, wound, burn and swelling, fruit is used as fish poison, and bark is astringent [18]. Khan et al. (2015) reported that *Fumaria indica* is using for cough, *Morus alba* and *Morus nigra* L are used for throat sore, to treat constipation, dyspepsia [19]. Shah et al. (2020) reported *Convolvulus arvensis* L used as purgative, *Euphorbia helioscopia* L for skin diseases. Some species, *Cannabis sativa* L, *Filago Hurdwari*, *Melia azedarach* L, were rare their local uses less in the area and used for one type of disorders, diuretic, anthelmintic, rheumatism, skin allergies and itching. *Acacia nilotica* L. *Calotropis procera*, *Fumaria indica* and *Datura innoxia* species were found to be at high risk, and going to be extinct promptly due to certain abiotic and biotic factors. In Pakistan little attention has been paid to the ethno botanical values of medicinal plants [20,21]. The utilization of medicinal plants by residents, collectors and

herbal drug suppliers was increasing with increasing demand of medical industry. This caused extreme decrease in the existence and products of medicinal plants. Browsing, soil erosion and deforestation were mostly responsible for reduction in the medicinal plant species. So the most significant thing is that to protect the medicinal plants and promote consciousness between the local inhabitants.

5. CONCLUSION

The current survey conducted will generate widespread interest in exploring and preserving wild medicinal plants in Perano Valley, District Malakand. At present time transmission of such knowledge from herbalists to the public had been enormously decreased. However due to the involvement of ethnomedicinal research, awareness in the local community and overall global trend towards recovery of the transmission of knowledge from the herbalist to the public has been introduced. It is noted that Pansaries (local medicinal plant sellers), herbalist (Hakims), are reluctant in the prescription of medicinal knowledge to the local people. The present research in this area proved that most of the indications prescribed are related to the local society diseases like, diarrhea, diabetes, fever, asthma etc. which will be definitely helpful for the society members of developing country like Pakistan.

6. RECOMMENDATION

It is recommended that the more exploratory visit are needed to explore the hide medicinally important plants of the concern area. It is further recommended that biochemical assay should be developed to investigate the specific constituents present in plants to develop specific drugs using chromatographic techniques. Development of conservative strategies for the conservation of medicinally important flora the respective area. Peoples of the locality should be educated regarding the importance of Medicinal plants. Wise use of local resources is recommended. Hiring inspective committees are recommended.

CONSENT

As per international standard or university standard, participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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