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ETHNOMEDICINAL PLANTS USES FOR THE TREATMENT OF DIFFERENT AILMENTS BY LOCAL PEOPLE OF DISTRICT BHAKKAR, PUNJAB, PAKISTAN

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Abstract

Many human illnesses are addressed by plant-based medicines because medicinal plants are a rich source of bioactive chemicals. The major goal of this study is to compile information on the traditional uses of medicinal plants by indigenous groups in District Bhakkar, Punjab, Pakistan. Ethnobotanical data were collected from 130 local informants to document health problems prevalent in the region. The information was gathered through structured questionnaires and in-person interviews during field excursions. District Bhakkar, with its diverse habitat including the Thal desert and fertile lands along the Indus River, hosts 69 plant species across 36 families used by locals. Poaceae was the dominant family, represented by six species. Ethnobotanical data revealed that 52% of the species were used for medicinal purposes, 16% as food, 13% as fodder, 5% for wood, 6% as ornamentals, 2% for crafts, and 2% as insect repellents. Among the 69 documented species, 21 were trees, 26 were shrubs, and 22 were herbs. Poaceae dominates with 6 species. Ethnobotanical data shows 52% medicinal, 16% food, 13% fodder, 5% wood, 6% ornamental, 2% for crafts, and 2% as insect repellents. Of 69 species, 21 are trees, 26 shrubs, 22 herbs. The findings demonstrate that the indigenous population continues to rely on medicinal plants for treating various ailments in their daily lives. This study highlights the importance of ethnobotanical knowledge and can inform local government agencies in developing strategies to conserve these valuable natural resources.

Key words: Bhakkar, Indigenous knowledge, Medicinal plants, Punjab, Pakistan, Traditional medicines.

INTRODUCTION

Ethnobotany is necessary to protect the valuable traditional knowledge on usage of plants. Ethnobotany tells about the ancient usage of plants and it also provides useful information about various products of plants such as gums, tannins, resins, dyes, edible and non-edible oils, fiber and many other unknown usages of plans. Humans have very close relationships with nature and plants since their origin.

Humans extensively depend on plants to meet their daily requirements. So, there has been a very close relationship between people and plants remaining (Mustafa *et al*., 2023). Modern cultural, social and economic changes are damaging older culture rapidly. The people have enough knowledge and understanding about the useful products of local plants due to their close relationship with them. Ethnobotany has gained the progress as an emerging field during the last few decades. The interactions and relationships between people and plants come under the discipline of ethnobotany (Mahdi, 2020).

It can be summarized in a few words such as plants and people interaction and usage of different products of plants. (Jain and Mudgal, 1999). Ethnobotany also helps to preserve the age-old practices. Colonial and economic botany has also

strong interactions with ethnobotany. The importance of ethnobotany can be observed in culture through paintings, statues and remaining of plants. (Amjad *et al*., 2020).

Extensively increasing demand for plant products has urged the world to increase scientific and commercial interest on medicinal plants. Plants have major effect on the human civilization. On special equation and for specific purposes, specific plants are utilized by different cultural and ethnic groups in traditional practices in the whole world (Ahmad *et al*., 2013a). Study of human dealings with plants' lives and their ecological units are studied in today's ethnobotany (Mahdi, 2010).

The objectives of ethnobotany are at the edge of the extinction level and rapidly eliminated due to changing in the living styles and data gathering methods. Community advancement, protection and improvement in long establishment and development of wild plant species and useful plants are the most important benefits of this study. (Amjad *et al*., 2017). Since the origin of life, humans have utilized plants. Initially, plants were used primarily as sources of food, shelter, and medicine. However, over time, humanity has discovered numerous additional applications for plant-derived products, leading to an even greater dependence on plant resources.

With the origin of life man is being utilized the plants. In the beginning the plants are used only for sources of the food, shelter and medicines but now the world has found the other useful products of the plants for many more other purposes, thus their dependence on plants have improved (Ali *et al.,* 2015).

To cure different diseases the locally used common methods have been improved with passage of time. The plants based natural drugs have less side effects than allopathic medicines and these are also easily available. Almost 80% of people throughout the world utilized these locally made medicines which shows the significance of this system (Ahmad, 1999). Mostly in the inaccessible regions of the Pakistan plants are utilized by the local people for their different ailment (Ibrar *et al*., 2003).

Pakistan has rich plant diversity particularly the medicinal plants (Ali *et al.*, 2001). Near about 4000 species of fungi and 6000 plants species of advanced level are documented here. Almost more than hundred medicinal plants have been collected from Pakistan. (Baquar, 1989). Almost 600 plants species out of 1000 reported plant species are used in primary health treatment practices and almost 350 species are very expenses and had billions of trade money in the local and the world markets (Ikram and Hussain, 1978).

The study involves delving into the traditional knowledge of native plants within the district. It aims to create an inventory of these local plants and document data that holds significance for professionals in areas such as Ethnobotany, Ethnopharmacology, Plant conservation, plant ecology, and related disciplines (Qureshi *et al.,* 2007). District Bhakkar has a wide range of diversity in its flora as half of the area of District comes in Thal desert and half of its area is parallel to Indus River which is very fertile. So, both xerophytic and mesophytic plants are commonly in this region.as it is a back word and remote area of Punjab province so people of this District are still deprived of any kind of good Ethnomedical research and availability of an authentic literature about the use of their native medicinal plants for curing different diseases.

However, due to poverty people of this region depend on plants to meet their daily requirements. But unfortunately, the young generation has even forgotten the names of local plants due to changing of culture, economic, and social trends of the society. It can be easily observed from the literature, the ethnobotanical flora of this region was ignored when Flora of Pakistan was written. Due to these factors, the unique indigenous knowledge about these native plants of this region is restricted only to the drug dealers and old aged people (Panday and Chand, 2015).

MATERIALS AND METHODS

Study area and demographic data of informants

The ethnobotanical study was conducted to document the ethnobotanical knowledge of common people on the importance of natural resources and wide diversity of local plants of District Bhakkar. At present, District Bhakkar is present between two famous rivers of the Punjab, the River Indus and the River Chenab, District Layyah on southern side, Khushab on eastern side and Mianwali on north side of the district. On the west of district Bhakkar, Dera Ismail Khan is present.

The total area of the district is 2005659 acres. 1518675 acres are cultivated areas of the district, the irrigation system of the district depends on the canals and the major canal is Thal canal which originates from Jinnah barrage (Kalabagh). With the help of the canals 27% of the area is irrigated. The total population of the district is 1051454 (Pakistan census 2023). Extreme temperature occurs in District Bhakkar which is almost 50°Curing the summer season and below freezing point during the winter season. 150-350mm is the annual rainfall of the area.

The main language of the district is Saraiki while Punjabi and Urdu are also spoken by the people of the area. Foxes, hares, jackals and pigs are present in the wild life area of the district. While crow, eagle, fowl, king fisher, mina, pigeon and sparrow, nighten gale, owl and parrot are the major birds of the district. The common reptiles are snacks and lizards. Camel, buffalo, cats, cows, goat, dogs, hens and sheep are domestic animals.

Wheat (*Triticum aestivum*) and gram (*Cicer aretinum*) are the crops of the region and about 50% production of the Punjab takes place in the region of the district. And barley *(Hordeum vulgare*) are the key ruby crops. Sugar cane (*Saccaharum officinarum*), cotton (*Gossypium spp*.) moong (*Vigna radiata*) and guwara (*Cyamopsis trignowloba*) are the main kharif crops of the district Bhakkar.

District Bhakkar is a backward area of the Punjab province, but it has a large area due to Thal desert. So, it has great variety of ethno-medico plants. In present study an effort was made spread the valuable indigenous and useful medicinal knowledge of native plants so that further a scientific research on these plants can be Local villagers with expertise in indigenous herbal flora and their practical applications were selected as informants, with a maximum of 170 respondents (comprising 110 males and 60 females).

Interviewing the local inhabitants through questionnaire

A questionnaire was developed and filled by interviewing the local people drug dealers, shop keepers, hakeems, fuel wood sealer's, timber dealers, pansaris and household ladies in different villages of the research areas randomly and individually to know

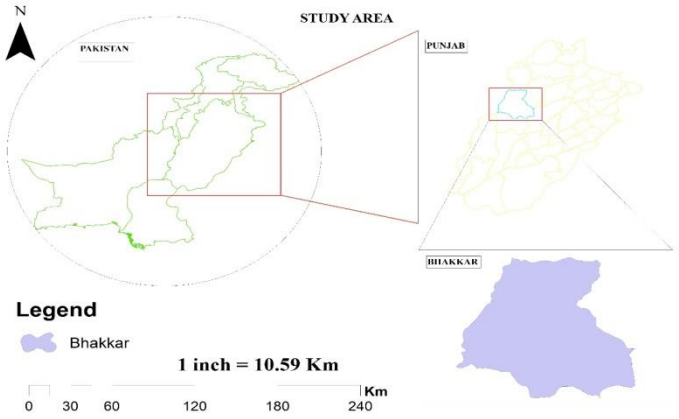
the ethnobotanical profile of the local people of district Bhakkar.

Aged people and hakims were given priorities as they have a lot of indigenous information about indigenous plants uses. About 170 people, including men and women were randomly interviewed at their homes and in fields. A friendly and informal atmosphere was maintained to gather maximum and factual information of the respondence. Structured and unstructured interviews were conducted.

During the collection of the indigenous knowledge, questionnaire method was used as the key method. The questions were simple, precise and to the point. Firstly, questions about age, occupation, income level and education were asked from the informant. To get information about plants resources and utilization, the qualitative and participatory approach was developed during the survey. Traditional uses of plants particularly medicinal uses and local names of the plants were documented through semi structured questionnaire (open and close end).

Plant sample identification

The process of identifying plant specimens was carried out in accordance with the Flora of Pakistan, which was published in 2001 by Ali *et al*., 2001. The information entered on the herbarium's provided forms included the plant's botanical name, family name, location, habitat, and other relevant details. Herbarium specimens that were verified to be voucher specimens were placed in the Dr. Sultan Ahmad Herbarium at the GCU Lahore university. Interviews were carried out with 170 persons for the purpose of this inquiry, with 110 males and 60 women participating. As part of the fieldwork for this study, interviews were conducted with dayiahs, shepherds, transporters, farmers, housewives, labourers, teachers, students (ranging from elementary school to college), merchants, pansari, herbalists, and hakims.



Map (1): Study area showing the sampling sites

RESULTS

Demographic characteristics of the study area:

Among the 170 informants we spoke with for this study, 110 were men and 60 were women. Dayiahs, shepherds, drivers, farmers, housewives, laborers, teachers, students (from elementary to university), merchants, pansaries, herbalists, and hakims were all questioned during the fieldwork for this study. Ten informants fell into the 25–35year age range, fifteen into the 35–45year range, twenty into the 45–55year range, twenty into the 55–65year range, twenty into the 65–75year range, thirty into the 75–85year range, and thirty-seven into the 85–95year range.

Most of the information was provided by the informants, whose ages ranged from 85 to 95. The level of informants' understanding of ethnomedicine declined between the ages of 25 and 35. (Table 1). The way that modern life encourages younger generations to select allopathic pharmaceuticals over alternative

therapies may be one factor contributing to knowledge loss (Sargin, 2015).

Additionally, a link was discovered between declining Ethnomedicinal knowledge and growing literacy rates. This may be due to educated individuals favouring the modern healthcare system (Jan *et al*., 2022; Heera *et al*. 2023).

Table. No.1 Demographic characteristics of the informants

Category	**Total Number**
Gender	
Male	110
Female	60
Age group	
25-35	10
35-45	15
45-55	20
55-65	25
65-75	30
75-85	33
85-95	37

Ethnomedicinal floral diversity

The current investigation discovered 69 medicinal plants from 38 distinct families. Table 2 includes a list of each medicinal plant's scientific name, family name, local name, ingredient, and usage. In our study, the Poaceae family (N=6) has the greatest number of therapeutic plant species. The three most common life forms in this investigation were trees (21 Sp.), shrubs (22 Sp.), and herbs (26 Sp.).

Members of these families are commonly used in medicine because they are easy to gather and have an abundance of bioactive compounds and related pharmacological characteristics (Jan *et al*., 2021). Herbs might be more suited to the topography and climate of the research area, which would account for their dominance. Herbs are also more potent and recover faster than trees and shrubs (Shah and Afzal, 2013; Jan *et al*., 2022). The availability of herbs is also widespread (Mahdi, 2010). Since they include a variety of bioactive compounds, herbs may easily adapt to any environmental circumstance (Jan *et al*., 2022). Herbs are also more potent as medications than shrubs and trees because they frequently contain higher quantities of various bioactive compounds than other living forms (Ullah *et al*., 2021). In contrast to shrubs and trees, high altitude locations frequently have a dominant herbaceous flora (Amjad *et al*., 2017).

Plants parts used in medicine and mode of medicine preparation

In the current study, leaves (42 Sp.) and the entire plant (12 Sp.) were found to be the most often used plant parts locally in the creation of herbal medications (Table 2). In this survey, the vast majority of the plants described were consumed internally. decoction (N1) (40%) and Infusion (20%) N2 were the two preparations that were utilised the most frequently. This usage pattern is extensively used throughout the rest of Pakistan and the world. The decoction was made by cooking the plant materials. While 16% was recommended for topically application as a paste (N3), other recommendations

were 08% extract (N4), 6% oil (N5), 3% powder (N6), and 2% latex (N7) (Fig. 3).

When preparing herbal treatments, fresh plant material is typically used rather than dried plant material. The extensive use of leaves in herbal medicines may be related to their quantity of different types of metabolites since they are the plant's primary photosynthetic organ (Ullah *et al*., 2021). In addition, the leaf is the component of the plant that is generated in huge quantities and is simple to gather (Ahmad *et al.*, 2013b).

From the standpoint of conservation, using leaves is safe for plant life and sustainable (Jan *et al*., 2020). The use of entire plants in herbal medicine can be influenced by factors such as ease of harvesting, accessibility, and the presence of diverse bioactive compounds. The use of entire plants in herbal medicine may be influenced by factors such as ease of harvesting, accessibility, and the presence of a diversity of biochemical (Hassan *et al*., 2020; Wali *et al*. 2019).

Ethnobotanical flora of District Bhakkar

The plants of District Bhakkar were divided into 3 different categories i.e., single usage plants, two usage plants and multi-functional plants.

Single usage plants

One particular purpose can be achieved by using such plants. Out of total 69 plants species which were reported in the present ethnobotanical research, 16 were the single usage plants. These single usage plants were used by local inhabitants for fodder, medicines, or for insect repellent. Out of 16 single usage plants, 12 are medicinal plants, 3 are used as source of fodder and 1 is used as insect repellent plant. The plants which are used as a fodder are mostly belonging to monocots while medicinal and insect repellent plants are of dicot families shown in (Figure 1).

Two usage plants

These plants are useful for two specific purposes like *Rosa indica* is used as an ornamental plant as well as its petals are utilized to make medicines. Out of total reported plants, 26 were used as two usage plants. These plants have two properties in the form medicinal and fodder plant, medicinal and ornamental plants, medicinal and toxic plants, and medicinal and fuel plants. The medicinal and fodder plants are mostly belonging to dicot families while medicinal and flavoring agents, ornamental and flavoring agents and food and fodder plants are mostly belonging to monocots families shown in (Figure 2).

Multi-usage plants

The plants which are being utilized in more than two different functions come under the category of multi-usage plants. For example, *Raphanus sativus*, used as vegetable, raw fruit and in medicines. 27 plants were the multi-usage plants of District Bhakkar out of 69 reported plants. These plants have multiple usage as they are used in medicines, food and as fodder.

These plants are also used to make different local products like hand fan, Jae Namaz, baskets, and many other decoration items. Out of 27 multi-usage plants, 22 were belonging to dicot families and 5 species were of monocot families. In present study, it was observed that 52% plants were used as medicinal plants, 13% as fodder, 16% as food, 6% as ornamental, 9% as wood, 2% as hand fan and basket making plants and 2% as insect repellents shown in (Figure 3).

Life form of medicinal plants in study area:

Among all the plant species recorded, i.e. 69, 21 are trees, 22 shrubs and 26 herbs. This distribution highlights the ecological diversity of medicinal flora in the region, with herbs being the most prevalent, followed closely by shrubs and trees.

DISCUSSION

Specific ailments and diseases are commonly cured with the help of medicinal plants. Generally, these plants are very beneficial in the human health care system in providing herbal medicines, or natural medicines which are used for prevention and treatment of human and domestic animal's ailments and diseases. Herbal medicines can be used in many different forms like syrup, powder, decoction, and ointments. In the present study area, i.e. District Bhakkar, the use of herbal medicines is a traditional heritage (Mustafa *et al*., 2023).

The herbal medicines are used by most of the local people as a home remedy preferably used by most to avoid the sides effect of allopathic drugs. Herbal medicines are also much cheaper than allopathic treatment. Many qualified hakims and herbal healers are working in different areas of the city. (Ramzan *et al*., 2024). The indigenous medicinal plants are found growing as wild or cultivated in District Bhakkar along roads, canals, railway lines, and in the peripheral parts of the district. Generally, the elderly people of the study area were observed having the traditional knowledge and information on the ethnopharmacological uses of plants.

According to this present ethnobotanical research, 69 plant species of 64 genera and 38 families were used by the local community of District Bhakkar. A total of 16 plants were recorded as single usage plants in this study area. Single usage plants were found medicinal, fodder and insect repellent. 26 plants were noticed to be categorized as two usage plants. There are many combinations of two usage plants of this area like medicinal and ornamental, medicinal and fodder, medicinal and food and ornamental.

Similarly, 27 plants species were observed as multi-usage plants of the study area, e.g. medicinal, food and fodder, medicinal food and insect repellent and food, fodder ornamental (Ali *et al*., 2012). The people of District Bhakkar are still very traditional and use plants for making their houses. Species of *Opuntia* plants are used for fencing purposes. Baskets and hand fans are made by using the leaves and branches of *Phoenix dactyfera.* Some local plants are traditionally used as an antidote to snake and scorpion bites. *Calotropis procera* is a good example of these plants. Agricultural tools are made by using the wood of *Acacia nilotica* (kikar). The natural vegetation of District Bhakkar is under heavy stress because of deforestation, urbanization, cutting, heavily exploitation of medicinal plants, and conversions of forests into lands for agricultural purposes.

Table 2. The ethnobotanically important flora of District Bhakkar

Family	Botanical name	Vernacular name	Plant part used	Ethnobotanical Uses
1) Alliaceae	*Allium sativum* Linn.	Thome	Bulb	It is used as flavoring agent in cooking. Cardiovascular diseases can be reduced by using garlic. It is also useful in reducing the risk of cancer.
2) Anacardiaceae	*Mangifera indica* Linn.	Amb	Fruit, leaves	It has edible fruits, and its leaves used as fodder. Pickle can be made from unripe fruits. It has pharmacological properties like antiseptic, astringent, laxative and diuretic agent.
3)Apiaceae/Umbelliferae	*Coriandrum sativum* L.	Dhania	Leaves, seed, juice	Plant juice is used to treat various disorders like typhoid fever, vomiting and smallpox. It is also used to treat ulcers. In cooking it is used as a flavoring agent. Various skin diseases like blackheads and pimples can be cured by using this plant.
4) Apocynaceae	*Nerium indicum* Mill.	Kaneer	Leaves	Its seeds and leaves are used to make different medicines. Asthma, epilepsy, cancer and malaria can be cured by using oleander.
5) Asclepiadaceae	*Calotropis procera* (Willd.) R.Br.	Ak	Latex, roots, leaves, and flowers.	Chest diseases, cough and asthma can be cured by using its latex and flowers. Local inhabitants also used it for the treatment of their animals.
6) Asphodelaceae	*Asphodelus tennuifolius*	Cavan Piazzi	Whole plant	Used as a condiment. It can also be cooked with maize. An ornamental plant. It acts as a diuretic agent and used for wound healing.
7) Asteraceae / Compositae	*Carthamus oxycantha* Linn.	Tukham, Poli.	Roots, flowers, leaves.	Used for wound healing as it is anti-inflammatory and anti-microbial.
	Helianthus annuus Linn.	Suraj mukhi	Roots, flowers, seed.	Major source of edible oil, sun flower oil is good for health. Also used in soaps, lamination and in lubrication. Its flowers are used for the treatment of Malaria. It also provides the beauty of aesthetics to local people.
	Sonchus oleraceus Linn.	Doda	Leaves and stem	Used for the treatment of common diseases like headache, pain, diarrhea and fever. It is edible and cool tonic.
	Silybum marianum Linn.	Kandyari	Roots, leaves and seeds	Hepatitis and liver problems can be treated by using leaves and seeds.
8) Boraginaceae	*Cordia obliqua* Willd	Lasura	Gum, bark, leaves and fruit.	Its bark, leaves, and fruits are used to cure stomachache. Its fruit is used in pickles. Fruit is also edible. Its gum is used for adhesion purposes.
9)Brassicaceae/cruciferae	*Coronopus didymus* Linn.	Water-crush	Whole plant	In powdered form, it acts as insect repellent. It is also used for treatment of respiratory problems like asthma, bronchitis, and emphysema.
	Brassica napus/rapa Linn.	Ghangloo	Fruit and leaves	It is eaten as raw fruit. It is also used as a vegetable. Its leaves are used as fodder for animals.
	Raphanus sativus Linn.	Mooli	Root and leaves	It is used in salad. It is also eaten as raw fruit. It is used to treat various diseases like indigestion, abdominal bloating and acid regulation.

	Brassica compestris Linn.	Sarsoo	Leaves, flowers and seeds.	Its seeds contain oil which is brain tonic. Local people also used it as a vegetable. It is a favorite fodder of animals. This herb has therapeutic action, and it is used for joint related issues.
	Eruca sativa Linn.	Tira-mira	Leaves, flowers and seeds.	Its oil is very famous and is called tira mira oil. It has many pharmaceutical properties like it is diuretic, digestive, tonic, laxative and stimulant agent.
10) Cactaceae	*Opuntia monocantha* (Willd.) Ham.	Thohar	Whole plant	It is an ornamental plant. Skin diseases can be cured by using its leaves. It is also used for fencing purposes.
11) Caesalpiniaceae	*Bauhinia variegata* Linn.	Kachnar	Leaves, flowers and wood.	In homeopathy, Yunani and Ayurveda systems of medicines, Bauhinia variegate has been extensively used as medicinal plant. It has anti-microbial and anti-inflammatory properties.
12) Chenopodiaceae	*Chenopodium murale Linn*.	Bathu	Fruit, leaves and roots.	Its leaves are used for fodder of cattle. Leaves are laxative. Urinary problems and jaundice can be cured by using its leaves. Local people used their roots for the treatment of liver. It is also used as an antidote against snake bite.
13) Cucurbitaceae	*Citrullus colocynthis* (Linn.). Schrad.	Kurtuma.	Leaves, fruit, and roots.	It is used to cure many diseases like diabetes, leprosy, jaundice, joint pain and cancer. It is also used for curing cholesterol diseases and blood fats problem. It is also good for preventing diseases of liver and gallbladder.
	Momordica charantia Linn.	Karela	Fruit, fruit juice	It is used as vegetable. Its juice is good for diabetic patients.
14) Cuscutaceae	*Cuscuta reflexa* Roxb	Loot boti	Whole plant	It is analgesic agent for cattle. It acts as purgative and its juice is useful for the treatment of eyes. It also gives relief in muscle pain. It also acts as a blood purifying agent. Traditional medicines of labor pain and bone fracture are made from *Cucuta reflexa*.
15) Euphorbiaceae	*Euphorbia helioscopia* Linn.	Dhodak	Roots, seeds and milk	It is used to cure cancer. For skin eruption, its milky sap is used. In combination with roasted pepper, its seeds are used to cure cholera by local people.
16) Fumariaceae	*Fumaria indica (Hausskn.)* Pugsley.	Pit-para	Whole plant	It is used to cure common diseases like fever, vomiting, constipation, blood purification and pain. It is also anthelmintic and diuretic agent. Local people used it to cure jaundice in combination with black pepper.
17) Lamiaceae / Labiatae	*Ocimum basilicum* Linn.	Niazbo	Leaves	It is a traditional medicine for common diseases like headache, cough, diarrhea, constipation, and kidney malfunctions. It is also used as a flavoring agent in foods and cooking.
	Ocimum sanctum Linn.	Tulsi	Leaves, roots and leaves.	All parts of this plant (leaves, roots, stem and flowers) are used to cure diseases like bronchitis, bronchial asthma, diarrhea, dysentery and skin diseases. It is an anti-aging. It fights against acne and gives oral and eye health.
	Mentha piperata Linn.	Podina	leaves	It contains the calming effects. It is a traditional remedy for the treatment of muscle and nerve pain, nausea, diarrhea and common colds. It primarily

				treats nausea. It is rich in nutrients and can be easily added in a diet. It is a good flavoring agent.
18) Liliaceae	*Allium cepa* Linn.	Wasal	Bulb	It is the main ingredient of cooking. Farmers also cultivate it at large scale and sell it in the market. It contains bioactive compounds. It acts as anti-inflammatory, anti-diabetic and anti-microbial agent.
19) Malvaceae	*Gossypium hirsutum* (Linn.) Smith	Kapas	Whole plant.	Pillows and mattresses are stuffed with the help of its fiber. Paint can be produced by using its seeds. Unique clothes are made from its fiber in Pakistan. It is also used for fever cough.
	Abelmoschus esculentus Linn.	Bhindi.	Whole plant	Lady finger is the favorite vegetable of local inhabitants of this region. Gonorrhoea and dysuria can be treated by using it. Its seeds have property of anti-spasmodic and stimulant. The stem fiber of the ladyfinger can be a substitute for jute. It is a source of good fiber.
20) Meliaceae	*Melia azedarch (Linn.)* Pers	Dhareek	Wood and leaves	It repels the insects. It has anti-malarial properties. The extract of media tree contains anti-aging properties. The extract of its seeds also smoothens the skin.
	Azadirachta indica Juss.	Neem	Leaves	The leaves of neem are used to cure many common diseases like eye disorder, skin ulcers, heart disease and blood vessels, fever, stomach upset and loss of appetite. Leaves of this plant are also useful for diabetes
21) Mimosaceae	*Acacia nilotica* (Linn.) Delile	Keekar	Wood, bark and leaves	Its wood is used to clean teeth. Its wood is used to make agricultural tools. It is a good source for the treatment of hepatitis C virus. Prosopis cineraria Linn.
	Albizia lebbeck (Linn.) Benth.	Shareen.	Wood and fruit	It is used to cure many common diseases like cough, flu, and eye related diseases. It is also used for lung problems. It reduces the problems of depression and insomnia. It is used on skin to cure insect bites and skin infections.
22) Moraceae	*Ficus religiosa* Linn.	Peepal	Latex and wood	It is a religious plant of Hindus. Food poisoning can be cured by using it. Its bark is useful to cure skin problems, ulcers, diabetes and bone fracture.
	Ficus benghalensis Linn.	Burh	Leaves and latex	It is used for the treatment of diseases like ulcers, leprosy, and fever. It is also good for vomiting and vaginal complains
	Morus alba Linn.	Shahtoot	Leaves, stem and fruit.	It has edible fruit. Its leavers are a source of fodder. Its branches are used to make different products, i.e., containers for keeping the fodder of animals. Its wood is used for hockey sticks.
23) Moringaceae	*Moringa oleifera* Linn.	Sohanjna	Roots, leaves, stem, and flowers.	It is called doctor plant, miracle plant and plant of the century. The whole plant, including roots, stem, leaves, fruit and flowers, have significant medicinal properties. It is used to cure diabetes, asthma, and mesopause. Its dose is given through mouth to cure cancer, joint pain, constipation, ulcer, blood pressure and stomach problem.

24) Myrtaceae	*Syzygium cumini* Linn.	Jamman	Fruits and leaves.	Its fruit is edible. It is used for the treatment of respiratory problems like throat, asthma, bronchitis and ulcer. It is also useful for blood purification. The extract of its fruit is used to cure cold, cough and flu
	Eucalyptus lanceolata Linn.	Sofaida	Leaves, bark, and wood	The leaves and leaves oil are very in medical point of view. Its oil is used to prevent hair fall. Its leaves are used in medical teas. Leaf's extract is also used in tooth pastes and in cold and cough.
25) Oxalidaceae	*Oxalis corniculata* Linn.	Khati boti	Leaves	The leaves extract is used to cure the scorpion bites. Warts can be removed by using its juice
26) Palmae	*Phoenix dactylifera* Linn.	Pind	Fruit, leaves	Fruit is edible. Its leaves are used to make different products like hand fans, Jae Namaz, mats, baskets and different other products.
	Phoenix sylvestris Roxb.	Dhakki	Fruit and leaves.	Its dates are very delicious. Leaves are utilized to make different local products like hand fans and bread containers and baskets.
27) Papiloinaceae	*Alhagi maurorum*	Medic ont-katra	Whole plant	Its leaves are used for animal fodder and stem for fuel It is used by local people to cure piles and warts. This plant has wide therapeutic properties
	Cicer arietinum Linn.	Chana/ Choley	Whole plant	More than 50% grams of country are produced in Bhakkar. Its dried and crushed leaves are used as fodder of domestic animals. It is also used as food and it acts anti-microbial agent and anti-oxidant agent.
28) Piperaceae	*Piper nigrum* Linn.	Kali March	Fruit	Black pepper is prepared by crushing its fruits. It is a very tasty spice and make food more delicious. It has much medicinal importance as it is an anti-oxidant and anti-thyroids.
29) Poaceae / Graminae	*Avena sativa* Linn.	Javi	Whole plant	It is a good tonic agent. It decreases the cholesterol level and reduces the heart diseases. It is also a source of fodder.
	Hordeum vulgare Linn.	Jau	Straw and grain	The seeds of barley help in digestion and very nutritive and febrifuge. It helps in healing of wounds and burns. It also decreases the cholesterol level and help in reducing bowel cancer.
	Oryza sativa Linn.	Chawal	Fruit and leaves.	It is also cooked as favorite food of local inhabitants. It is a diuretic agent and used to cure urinary tract problems. Its seeds are used to treat the problems like poor appetite.
	Sorghum vulgare Linn.	Jowar	Grain and stem	It reduces inflammation. It also act as anticancer. It is good for kidney, weight loss and blood pressure. Good source of nutrition. It also act as antioxidant and source of phenolic compounds.
	Triticum aestivum Linn.	Kanak	Whole plant	It is a very useful medicinal plant and local people used it as staple food. It has pharmacological properties like laxative, diuretic, anti-microbial and anti-oxidant. Sex hormones are present in the seeds of wheat. It is complete nutritive food.
	Pennisetum gluacum (Linn.) R.Br.	Bajra	Whole plant	It is a good food for diet conscious people as it is non glutinous. It is also easily digestible. It is a rich source of both soluble and insoluble dietary fiber.

30) Polygonaceae	*Rumex dentatus* Linn.	Jangli palak	Roots	It is diuretic and laxative agent. Its roots can be used for the treatment of skin diseases.
31) Rhamnaceae	*Ziziphus jujuba* Lamk.	Sew beer	Leaves, fruit and bark	Fruits are edible. Its leaves are source of fodder. Its medicinal values are very high. The fruit is helpful in digestion. To cure dysentery, its boil bark is used. The seeds are sedative and helpful for insomnia.
	Ziziphus mauritiana Linn.	Beeri	Fruits, leaves and bark	Fruits are edible. Leaves are also used as fodder. It is used to cure constipation and hypertension.
32) Rosaceae	*Rosa indica* Linn.	Gulab	Flowers	It is an ornamental plant. Gulkand is produced by keeping petals of rose and sugar in pot for 3 to 4 days which is used to cure constipation and abdominal pain.
33) Rubiaceae	*Gallium aparine* Linn.	Chitta gha	Whole plant	Different skin diseases are treated by using the extract of this plant. It is a diuretic agent.
34) Salvadoraceae	*Salvadora oleoides* Dence	peelo/Jaal	leaves, bark, fruit, and wood	It is the key plant of the region. A 50, 60 years ago, whole community were dependent on this plant for food and shade for themselves and for their animals as well. Local people used its bark to clean their teeth. It also contains good quality wood.
35) Solanaceae	*Datura innoxia* Mill.	Datura	Whole plant	It is used for criminal purposes as it is a poisonous plant. It also repels the insects.
	Solanum nigrum Linn.	Makko	Leaves, fruit and shoots	It has edible fruit. It is used to cure different common diseases like flu, cough and fever. It helps in wound healing. Its boiled leaves are used to cure gas problems.
	Solanum surratense Burm.	Kandyari	Fruit and roots	To treat the abdominal pain and gas troubles, its fruit in powdered form is given to the patient. It is also good for cough and asthma.
	Withania somnifera Dunal.	Asgund	Leaves and fruit	It is used to treat insomnia, reproductive health, fatigue, anxiety and asthma. It is also insulin resistant.
36) Tamaricaceae	*Tamarix aphylla* Willd	Khagal	Wood and leaves.	It has good quality wood. Its needle shape leaves are a favorite food for camels. Small pox and chicken pox are treated by exposing the patient to the smoke of its scale leaves.
37) Typhaceae	*Typha angustata* Pers.	kundr	Leaves	Dried leaves are source of fodder. It is used to treat bleeding disorder and urine passage difficulty problems.
38) Zygophyllaceae	*Fagonia indica* Burm.f.	Dhamsa	Whole plant	It is a famous medicinal herb which is used to cure diabetes problems. It is also a good source of fodder for domestic animals like goat and camel.
	Fagonia graveolens Linn.	Jawab lae	Whole plant	This herb has potential to act as anti-cancer agent. It is also a favorite food for camels, goats, and sheep.
	Tribulus terristris Linn.	Bakhra	Seeds, leaves and fruit.	Extract of its seeds is very useful to remove kidney stones. Its fruit powder is mixed with sugar and then given to the patient to treat their urinary disease. Its leaves are source of fodder for domestic animals.

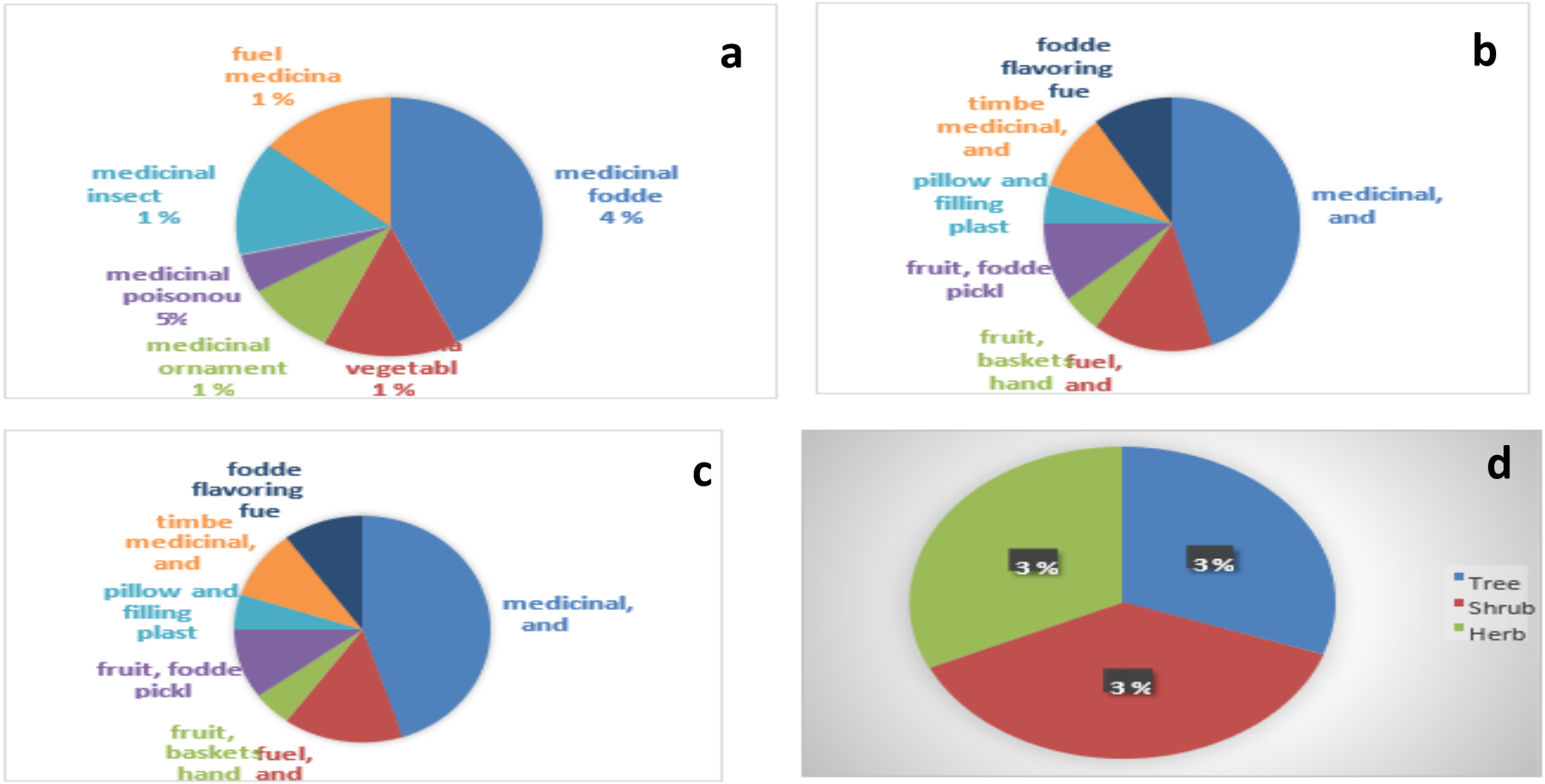


Figure. 1 a) single uses plants **b)** two uses plants c) Multiple uses plants d) life forms of plants

The number of endangered species are increasing because of environmental degradation, over grazing, and over exploitation reported by (Bhatia *et al.,* 2014).

The people of peripheral regions of District Bhakkar are illiterate. To earn their daily commodities, they depend on the local vegetation. They cut the forests to sell the wood as timber and fuel wood. They even sell their medicinal plants in the local markets. They also over exploit their natural flora for other purposes such as fodder, agricultural tools, and household utensils. A rich honeybee species is found in District Bhakkar and honey of *Ziziphus jujuba*, *Acacia nilotica* and *Salvadora oleoides* is very famous among local people and hakims for its medicinal values, quality and taste.

There is a wide potential of growing honeybees in this district, but people generally depend on wild resources for harvesting honey as they are poor, and they don't have necessary gadgets which are used to cultivate honeybees. If the government gives subsidies to poor local farmers for this business, it will bring very positive effects in the region. It will not only commercially help them but also help in keeping the flora alive. Some plants are unique for attracting honeybees (Aziz *et al*., 2023).

CONCLUSION

The present study results showed that 69 plant species belonging to 36 families are used by the local inhabitants of study area for different purposes. Poaceae were in abundance with 06 species. Hopefully, this research work will play a vital role to take the intension of both local inhabitants and concerned government departments for the protection of these natural assets and indigenous ethnobotanical flora of the district and it will also prove a good catalog of indigenous uses of local plants for various uses for young and future generations.

In this research an effort was made to gather maximum indigenous and unique knowledge about medicinal plants so that it can be secured for young and coming generations. It is hoped that this research will help to spread this indigenous knowledge among a lot of people. The Indigenous use of medicinal plants in District Bhakkar, Punjab, Pakistan, provides several socio-economic benefits to the local people, while also promoting sustainable agriculture, biodiversity conservation, and the preservation of traditional knowledge and practices.

DECLARATIONS

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AUTHORS' CONTRIBUTIONS

All authors declare to have made equal, direct, and intellectual contributions and have approved the current work for publication in this journal. All authors have read and agreed to the published version of the manuscript.

CONFLICT OF INTERESTS

No competing interests or conflicts of interest in this article.

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