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Research

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Ethnobotanical study on the medicinal plants in khosh Yeilagh rangeland, Golestan province, Iran

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Abstract

Background: Iran is of the species-rich areas in diversity of plants, especially medicinal plants being renowned worldwide as crucial for people's health. Ethnobotany is the information retrieval science of unwritten experiences and is one of the valuable ways to develop the science of medicinal plants and herbal medicine.

Objective: This present study aims to identify medicinal plants used widely by local people in Azad Shahr (Golestan province), collect information about diseases treated by using these plants, and boost indigenous knowledge concerning medicinal plants used by local people.

Methods: An ethnobotanical survey was conducted to document indigenous knowledge on medicinal plants uses among local people in Khosh Yeilagh rangelands within 2 years (2018-2020). The data were collected by using field observation, participatory and semi-structured interviews with 41 people (11 male, 30 female). A snowball sampling technique was used to select the interviewees. The collected information were categorized based on local names, parts consumed, medicinal properties, consumption habits, and other uses of wild edible plants, WEPs.

Result: Eighty-four plant species belonging to 27 families were identified in the study area. Most plant species in the region were respectively Lamiaceae (20 species), Compositae (12 species) and Leguminaceae (6 species). The results showed that the most frequent medicinal plants were used for gastrointestinal problems (34%), cough and colds (18%), and respiratory disease (13%).

Conclusion: The presence of various species of medicinal plants and vast indigenous knowledge in Khoshyilagh rangelands indicate the richness of this area. Research on these plants can pave the way for discovering new medicine in the field of treatment and for preserving these valuable reserves as well as preventing the disappearance and destruction of herbs.

Key words: Ethnobotany, Medicinal Plants, Participatory Interviews, Snowball Method, Khosh Yeylagh Rangeland

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Background

Indigenous knowledge of the medicinal plants consumption has gained significance because of its considerable importance in human societies, especially in urban communities in both developing and industrialized countries. The widespread use of plant-based drugs as well as the negative effects of chemical medicines due to their side effects, have led to more consideration of traditional knowledge of local people about medicinal plants. Traditional knowledge, if written, can provide information on medicinal plants and their healing properties to traditional medicine professionals, researchers, pharmaceutical companies, and others. The popularity of traditional medicine to maintain health and cure diseases requires comprehensive information and understanding the properties of medicinal plants. One way to introduce and further understand medicinal plants is to use the empirical knowledge and traditions of elders in each ethnicity and region [1]. According to the World Health Organization (WHO), traditional medicine is a set of knowledge, skills, and practices based on theories, beliefs, and experiences of indigenous cultures, whether it is described, can be used in health as well as in prevention, diagnosis, recovery and treatment of physical and mental illnesses. The world is turning to traditional medicine and natural remedies [2]. Nowadays, in industrialized societies, many developed and developing countries, the use of traditional medicine and plants is very significant to maintain health due to the increase people's trust in these plants [3]. Iran is a high-ranking country in terms of vegetation richness and diversity where there are 11 climates out of 13 known global climates. According to geologists and researchers, the number of Iranian plant species is about 8,000, which is at least twice as diverse as the European continent. Research has shown that more than 2,300

species of plants have medicinal, fragrant, spice and cosmetic properties [4]. In addition to conservation, rangelands are important for recreational, environmental, genetic factors, and so on; there are special places in the production of medicinal and industrial plants. In natural rangelands, many species are found with medicinal properties being rich in secondary metabolites. In fact, medicinal plants are of plant species whose type, number and variety vary according to the geographical location of each region [5]. Identifying various plants existing in nature, as well as studying their properties, opens up a new world for scientists and researchers in various disciplines and provides the basis for the treatment of many diseases. In many areas there are still unknown species that have been used for many years as a remedy for diseases [6]. All communities interact with their surrounding plants in different ways, but local communities are interested in using the plants because this is what sometimes guarantees their survival [7]. Indigenous knowledge, the knowledge of a group of local people about life, livelihood, is in relation to the social, natural environment through trial and error over time and is mostly oral and unwritten [8]. In the scientific literature, various terms and expressions such as "traditional knowledge", "lay beliefs" and "common sense beliefs" have been mentioned for indigenous knowledge. All these words and phrases seek to explain the knowledge that is formed in the social context and its main purpose is to solve the problems of everyday life of human societies. Regarding the fact that ethnobotany interprets the traditional knowledge as sorts of logical use of nature, gathering information of local people can play an important role in plant production. Therefore, the study, identification, preservation and maintenance of plant species, especially useful and rare medicinal species by local

people is of particular importance. These studies can provide valuable achievements for finding new medicinal plants and herbal medicines [9]. Local people's indigenous knowledge, having been collected for hundreds of years, is rapidly being forgotten and disappearing. Although today scientific

information about medicinal species has grown remarkably, such information is about a limited number of species. Therefore, the aim of this study is to identify important medicinal plants widely used by local people of Khoshyilagh rangeland to treat diseases.

Methods

Introducing the area

Khosh Yeylagh rangeland, an area of 2705 hectares and 55 km southeast of Azadshahr city, is located in Golestan province. The geographical position is "14, '18 ° 55 to" 17, '28 ° 55 east longitude and "59, '48 ° 36 to" 20, '54 ° 36 north latitude (Figure 1). In general, Khosh Yeylagh rangeland can be divided into two parts: plain and mountainous, which has a cool and temperate climate and the average minimum and maximum annual rainfall is 208 and 367 mm, respectively, which occurs in November to May. The wind direction is from southwest to northeast and blows mostly in autumn and winter. The altitude is between 1600 and 2700 meters above sea level and the average annual temperature varies from 10.7 to 17.9 degrees Celsius. The region is classified as

cold semi-arid in climate patterns of Embereger and De Martonne Methods (Figure 2). Ecologically, it is considered a summer pasture, the plants are most in forms of grass, shrubs, and trees with a relatively different distribution; overall, it is a plain and mountainous region. According to the surveys, the dominant plant species were in Type 1 (*Poa bulbosa* + *Artemisia aucheri*), Type 2 (*Artemisia aucheri* + *Stachys inflata*) and Type 3 (*Artemisia aucheri* + *Bromus tomentellus*). The language of the people is Turkish belonging to Ghezelbash clan. The total population of the region is 400 people (150 households). The family livelihood is provided through animal husbandry and agriculture [10].

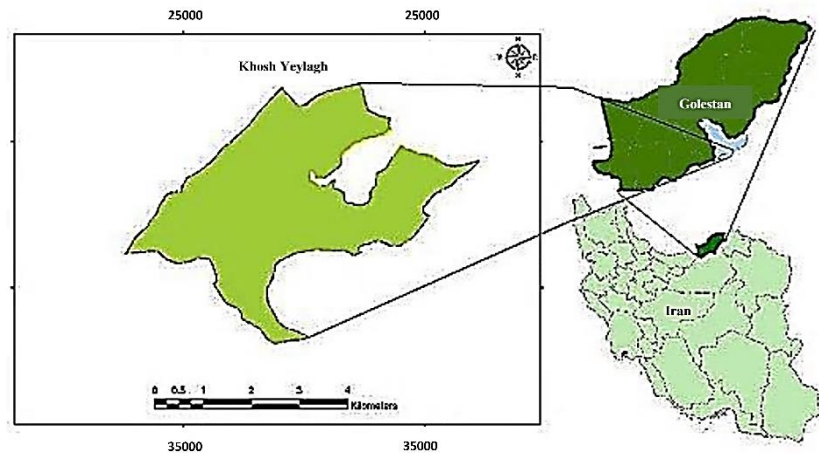


Figure 1: Location of the study area in Iran and Golestan province

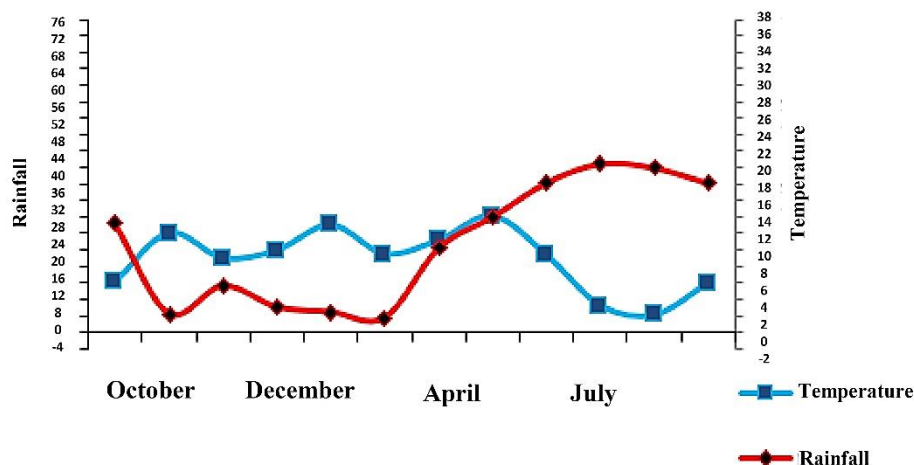


Figure 2: Amperometric curve of the study area

Research Methodology

In order to investigate ethnobotany or indigenous knowledge of medicinal plants, free interviews and participatory observation were applied. Data collection was done in four stages of field operations with several field visits of the study area. First, local experts and elders were asked to complete a questionnaire and an interview concerning local lists of plant species. Accordingly, local names of the plant species were identified by collaborative observations. Secondly, with the help of natural resource staff, local experts were selected from among the residents, and then information was collected via snowball method. In the last stage, four experienced people were selected from among the interviewees being familiar with most of the medicinal species in the region. Required information for each plant was then elicited from at least 4 people. Of course, it should be noted that the qualification of these selected participants must be approved by the people of the region. In this study, the selected participants were traditional shepherds, elderly people and shepherds. In general, the information collected from

medicinal plants included the local name of the plant, the vegetative form, the time of collection, the method of harvesting, the healing properties, the useful medicinal organs and other uses of the plant. An indigenous knowledge research will be successful when a friendly and cordial relationship is established with the local people. Therefore, in order to build trust, an ethnobotanical researcher must be similar in appearance, behavior and morality to the natives' in order to establish a greater sense of intimacy and friendship with the interviewees. It should be noted that the researcher's interviews continued to the extent that the repetitive answers provided the researcher with the stability and accuracy of the interview. Forty-one people were interviewed in this study (11 males; 30 females). Thirty-five individual interviews and four group-interviews (3-6 person interviews within one to three sessions) were conducted. The age range of interviewees was from 25 to 85. In this regard, individuals were divided into 6 classes (Figure 3).

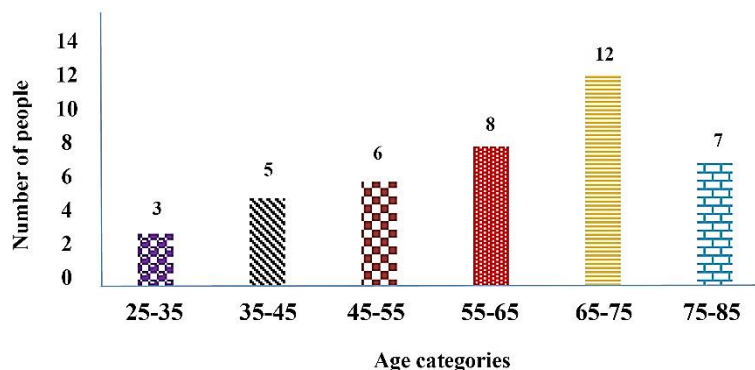


Figure 3: Age categories of interviewees

Results

Categorizing the number of people and their level of education indicates that elderlies were more than the younger generation and these people were often illiterate (Table 1). Finally, plant samples were collected during the spring and summer seasons of 2018-19

and after initial preparations, using reliable botanical resources [11], identified by professional masters of botany and medicinal plants in Gorgan University of Agricultural Sciences and Natural Resources.

Table 1: Specifications of the respondents in the area

Level of Education	illiterate	The third guide	Diploma	AA	BA
man	12	3	0	12	2
woman	14	8	1	14	1

The list of medicinal plants is shown in table 3. In general, 84 species of medicinal plants belonging to 27 plant families were identified in the study area, including Lamiaceae with 20 species, Compositae with 12 species,

Leguminaceae with 6 species, Brassicaceae with 5 species, Rosaceae and Apiaceae, with 4 species, had respectively the highest range of rangeland species in the study area (Figure 4).

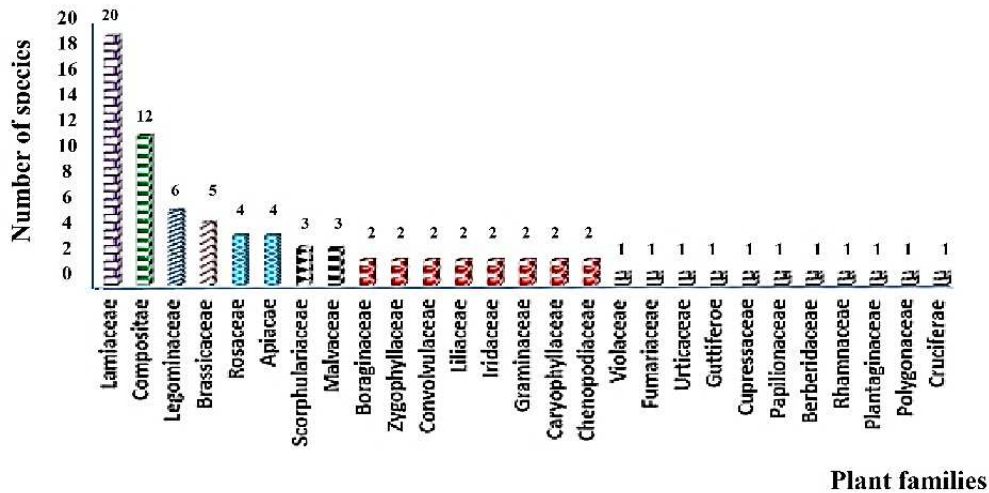


Figure 4: The abundance of plant genus in the study area

In addition to medicinal, some species have edible properties, like *Rumex elbursensis*, *Lepidium latifolium*, *Allium ursinum*, *Satureja mutica*, *Camphorosma monspeliaca*, *Tragopogon collinus* are often eaten as fresh vegetable with food. A group of plants such as *Bunium cylindricum* and *Glycyrrhiza glabra* are dried and powdered, and then the plant powder is used differently depending on the application. Plant species such as *Thymus kotschyanus*, *Ziziphora*

clinopodioides, and *Glycyrrhiza glabra* are also used as herbal tea to treat colds, cough, sore throats, and as a condiment. Regarding the use of medicinal plants in this study, the most common uses were related to gastrointestinal problems (34%), cough and cold (18%) and respiratory tract disorders (13%). The lowest uses were related to antiseptic (4%) and treatment of skin inflammations (5%) (Figure 5).

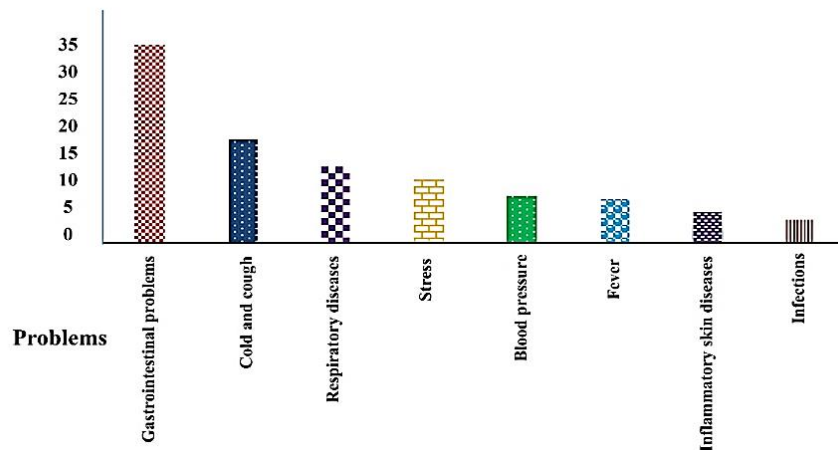


Figure 5: Frequency of use of medicinal plants in the region for all kinds of diseases in terms of percentage

Local people used various organs of medicinal plants (e.g. the leaves 28%, the flowers 16% and the roots 14%) (Figure 6).

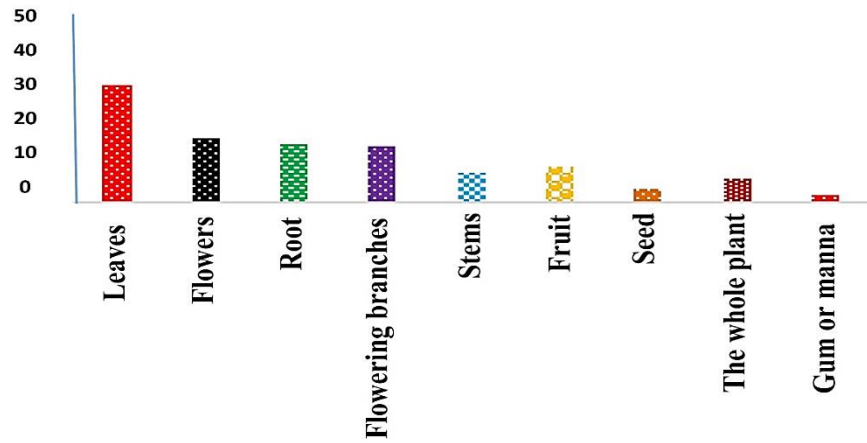


Figure 6: Frequency of use of medicinal plants in the pleasant region for a variety of diseases by percentage

The biological forms of the most medicinal plants in the region belong to the group of Hemicryptophytes, Trophy, Geophyte, and Comfit, respectively. In terms of vegetative form, forbs (73%) ranked first followed by

shrubs (14%) and, wheat with the lowest percentage. Also, regarding biological period, most of them are perennial (67%) (Table 2).

Table 2: Percentage of biological form, vegetative form and biodiversity of plant species in the region

	Variable	Number	Percentage
Biological form	Therophytes	25	30
	Geophyte	12	14
	Comfit	12	15
	Hemicryptophyte	26	31
	Cryptophyte	2	2
	Phanerophytes	7	8
Vegetative form	Forb	61	73
	Bush	12	14
	Wheat	2	2
	Trees and shrubs	9	11
Biological period	one year	26	31
	Biennial	2	2
	Perennial	56	67
	Total in each variable	84	100

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
Apiaceae	<i>Heracleum persicum</i> Desf. ex Fisch., C.A. Mey. & Avé-Lall.	Fruit	Anti-flatulence, stomach tonic, memory booster	powder, herbal tea, poultice, food flavoring and use in pickling (edible, medicinal)
	<i>Eryngium billardieri</i> Delile	Roots and fruits	Diuretic, urea repellent and shortness of breath, relieve facial acne and diabetes	pharmaceutical
	<i>Bunium cylindricum</i> (Boiss. & Hohen.) Drude	Fruit	Anti-flatulence, regularizer, sedative and anti-nausea	flavor, herbal tea, pharmaceutical (edible, medicinal)
	<i>Falcaria vulgaris</i> Bernh.	Plant limbs	Stomach tonic, astringent, and treatment of skin diseases	topical application (powder), edible (brewed)
Boraginaceae	<i>Caccinia macranthera</i> Brand).Banks & Sol)	Leaves branched, flowers and roots	Anti-cough, sedative and analgesic	poultice, herbal tea (medicinal)
	<i>Onosma dichroanthum</i> Boiss.	Leaves, stems and flowers	Anti-inflammatory and antiseptic of wound and burns, Anti cough and shortness of breath, anti-depression and insomnia treatment	herbal tea (medicinal, edible)
Berberidaceae	<i>Berberis integerrima</i> Bunge	Leaves, fruits, roots and bark	Anti-inflammatory, lower blood pressure and blood fat	barberry juice, syrup, jam (medicinal, edible)
Brassicaceae	<i>Descurainia Sophia</i> Webb ex prantl(L.)	Seeds	Diuretic, febrifuge, wound healing, treating kidney inflammation, treating acne	Juice

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Family	Scientific name	organ used	Medicinal properties	How to use
Brassicaceae	<i>Sisymbrium officinale</i> (L.) Scop.	Seeds	Diuretic, febrifuge, wound healing, treating kidney inflammation, treating acne, relieve sore throat and laxative	Juice
	<i>Lepidium latifolium</i> L.	Leaves	Treatment of constipation and food digestion	food (soup and rice)
	<i>Lepidium sativum</i> L.	Roots, leaves and seeds	Relieving bloody diarrhea, indigestion, asthma and cough	raw vegetables
	<i>Thlaspi stenocarpum</i> (Boiss.) Hedge.	Flower, branches and seeds	Anti-inflammatory, antiseptic and diuretic	decoction and raw
Cupressaceae	<i>Juniperus communis</i> L.	Fruit and wood	Improving stomach operation, anti-flatulence, diuretic and antiseptic and treatment of rheumatism	Plant extract, chewing fruit and the crushed fruit in water (Medicine)
Convolvulaceae	<i>Ipomoea purpurea</i> Roth (L.)	Flower	Anti-inflammatory, anti-cough and wart removal	poultice, syrup, juice (pharmaceutical)
	<i>Ipomoea purpurea</i> Roth (L.)	Flower	Anti-colds, sore throats, relieving measles	dried flowers in a glass of water (medicine)
Caryophyllaceae	<i>Dianthus Caryophyllus</i> L.	seeds	Relieving toothache and headache, strengthens the liver and kidneys, appetizer, and helping break fever	boiled
	<i>Acanthophyllum squarrosum</i> Boiss.	Hard and bony roots	root of the plant reduces sneezing and hiccups	washing clothes
Cruciferae	<i>Alyssum minutum</i> Schltld. ex DC	seeds	kidney stones removal, treating dry coughs	decoction

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Family	Scientific name	organ used	Medicinal properties	How to use
Chenopodiaceae	<i>Camphorosma monspeliaca</i> L.	Flowering branches	Treatment of respiratory disease, anti-asthma and phlegmatic	spice, fragrant and flavoring
	<i>Chenopodium botrys</i> L.	All aerial parts	Relieving shortness of breath, lower blood sugar and appetizer	boiled and decoction
Compositae	<i>Taraxacum montanum</i> (C.A. Mey.) DC.	Flowers, roots and leaves	Stomach, liver and kidney tonic, urinary excretion, kidney stones removal, cleansing the liver, and purifying the blood	root herbal tea, jam from its flowers, leaves in a combination of salad and food (edible and medicinal)
	<i>Achillea millefolium</i> L.	Leaves, flowers	Antidiarrheal, digestive and stomach pain treatment	Herbal tea (edible)
	<i>Anthemis rhodocentra</i> Iranshahr.	flowers	sedative, improving digestion, stomach ulcers and gastritis treatment, diuretic and regularizing	herbal tea and in food (medicinal)
	<i>Artemisia aucheri</i> Boiss.	Leaves	Treatment of stomach pain, relieves toothache	dried and raw (medicinal)
	<i>Artemisia sieberi</i> Besser	Roots, leaves, flowers and stems	Treatment of diabetes, relieves toothache	dried, raw and boiled (medicinal)
	<i>Carthamus oxyacantha</i> M.Bieb	flowers	Treatment of bruising, treatment of gastritis, blood purifier	decoction, food coloring (medicinal and edible)
	<i>Cichorium intybus</i> L.	Leaves, roots	Lowering blood sugar and blood lipids, treating jaundice disease, strengthening the liver	Plant extract, cooked (edible and pharmaceutical)
	<i>Echinops orientalis</i> Trautv.	Leaves, flowering branches	Cough relief, treatment of frequent urination and reducing fever	powder (medicinal)

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
Compositae	<i>Centaurea iberica</i> Trevir. ex Spreng.	flowers	Treatment of infections and swollen eyes, removing pimples	Decoction (medicinal)
	<i>Cirsium echinus</i> (M. Bieb.) Hand.-Mzt.	Stem	diuretic	Decoction (medicinal)
	<i>Arctium lappa</i> L.	Stems, leaves, roots and fruits	Lower blood sugar, treating coughs and colds, and lowering blood pressure	Prepare pickles, decoctions, brew and powder (edible and pharmaceutical)
	<i>Tragopogon collinus</i> DC.	The whole plant	Treatment of gastric ulcer, eliminate warts, and treating infections	Raw and cooked vegetables (edible)
Fumariaceae	<i>Fumaria parvi flora</i> L.	Aerial parts, flowers and leaves	Appetizing, removing facial pimples, and purifying the blood	Decoction (medicinal)
Guttiferoe	<i>Hypericum scabrum</i> L.	Flowering branches	sedative, disinfectant, intestinal worm removal	Brew, boiled (edible)
Graminaceae	<i>Hordeum vulgare</i> L.	seeds	Eliminating fever, reducing anemia, diarrhea, blood sugar and fat	Decoction, barley sprouts
Iridaceae	<i>Iris drepanophylla</i> Aitch. & Baker	Flowers and roots	Anti-cough, diuretic, expectorant, liver stimulant	Lily flower tea
	<i>Iris kopetdaghensis</i> (Vved.) B. Mathew & Wendelbo	Flowers and roots	Anti-cough, diuretic, expectorant	Lily flower tea
Legominaceae	<i>Astragalus verus</i> Olivier.	Flowers, gums	treating toothache	Water-soluble gum, decoction (pharmaceutical, industrial)
	<i>Astragalus gossypinus</i> Fisch.	The leachate inside the stem	Respiratory disorders and animal paralysis	Raw (pharmaceutical)
	<i>Acantholimon bodeanum</i> Bunge.	flower and bush	-	Industrial, used in the preparation of honey (pharmaceutical)
	<i>Medicago lupulina</i> L.	Flowering leaves and branches	Wound healing, fattening, anti-inflammatory blood purification	Plant extract, alfalfa soup (edible, medicinal)

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
Leguminaceae	<i>Glycyrrhiza glabra</i> L.	Root	Treatment of stomachache, sore throat, cold	Drink, powder, use in curd and cranberry (medicinal, edible)
	<i>Onobrychis Cornuta</i> (L.)Desv.	Nectar - pollen	-	Preparation of honey (medicinal)
Liliaceae	<i>Allium ursinum</i> L.	Leaves, onions	Abdominal laxative and shortness of breath treatment	bread, cutlet
	<i>Alium helicophyllum</i> Vved.	Leaves, onions	Treatment of rheumatism, bile cleanser	Eat as a vegetable (edible and pharmaceutical)
Lamiaceae	<i>Hymenocrater calycinus</i> (Boiss.) Benth	Flowering branches	Anti-rheumatic, anti-spasm, anti-cold, anti-flatulence and skin diseases including pimples	Decoction (Edible)
	<i>Marrubium astracanicum</i> Jacq.	Flowering branches	Eliminating gallstones, regulates gastric function, blood purifier	Plant extract, dried (medicinal)
	<i>Marrubium parviflorum</i> Fisch. & C. A. Mey	Flowering branches	Eliminating gallstones, regulates gastric function, purifies the blood	Plant extract, dried (medicinal)
	<i>Marrubium Vulgare</i> L.	Flowering branches	Eliminating gallstones, regulates gastric function, blood purifier	Sweat, dried (medicinal)
	<i>Thymus Kotschyanus</i> Bioss. & Hohen	Leaves, flowering branches	Relieving bloating, inflammation of the airways and gastric diseases	Drink, plant extract, powder (Edible, medicinal)
	<i>Stachys byzantina</i> C. koch.	Flowering leaves and branches	Sleeping, sedative, lowering blood pressure, wound healing, stopping bleeding, increasing bile secretions, antitussives and sore throats, kidney infections	Drink, plant extract (medicinal)
	<i>Stachys inflata</i> Benth.	Flowering leaves and branches	Relieving colds, sore throats, skin injuries, sedatives, and lowering blood pressure	Decoction, dried and fresh leaves (medicinal)

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
Lamiaceae	<i>phlomis cansellata</i> Bunge	Flowering leaves and branches	Eliminating toothache and head lice, anti-nausea, treats diabetes	Raw, boiled (medicinal)
	<i>Nepeta menthoides</i> Boiss.& Buhse	Leaves and flowers	Anti-flatulence, nausea and menstrual cramps	Drink, dried and eating vegetables (edible, medicinal)
	<i>Onopordum heteracanthum</i> C.A.Mey.	Fruits, roots, leaves and stems	Treatment of fever, warts, stomach ache and liver disease	Decoction, dried, poultice (medicinal)
	<i>Tanacetum Polycephalum</i> schultz- Bip.	Flowering branches	Anti-infective, antibacterial, antitussive, anti-inflammatory and bile cleanser	Dried (medicinal)
	<i>Teucrium polium</i> L.	Flowering branches, aerial parts	Colds, heartburn and diarrhea, diabetes treatment	Herbal tea, plant extract, making honey (edible, pharmaceutical)
	<i>Melissa officinalis</i> L.	Leaves, flowering branches and essential oils	Soothing and calming, treating headaches and treating stress	Drink, eating vegetables (edible, pharmaceutical)
	<i>Savia officinalis</i> L.	Roots, stems, leaves and flowers	Reducing blood sugar, sedatives, colds and liver disorders	Decoction, dried (medicinal)
	<i>Stachys acerosa</i> Boiss.	Flower nectar	-	Making honey (edible)
	<i>Stachys annua</i> (L)	Leaves and flowers	Relieving colds, sleep relax	Dried, boiled (medicinal)
	<i>Stachys lavandulifolia</i> Vahl	Aerial parts	Relieving fatigue, sedative, treating colds, and eliminating diarrhea	Dry, drink (medicinal)

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
	<i>Ziziphora clinopodioides</i> Lam.	Aerial parts (leaves and flowers)	Antitussive, anti-inflammatory, treatment of diarrhea and heartburn, prevention of nosebleeds, gastrointestinal treatment	Herbal tea, food flavoring, spice, dried and eaten leaves in dough (medicinal)
Lamiaceae	<i>Salvia Sclarea</i> L.	Flowering leaves and branches	Febrifuge, regulating, lowering blood pressure and blood sugar and nerve comforting	Herbal tea, food flavoring, used in the perfume industry (pharmaceutical, edible, industrial)
	<i>Satureja mutica</i> Fisch.	leaves	Treatment of diabetes, heart disease, Alzheimer's and cancer	Eating vegetables, dried (edible)
	<i>Althaea officinalis</i> L.	root	Relieving respiratory and gastrointestinal problems, relieving inflammation of the mouth and throat, anti-cough	Decoction (edible)
Malvaceae	<i>Alcea rosea</i> L.	flowers	Relieving respiratory and gastrointestinal problems, relieving inflammation of the mouth and throat, anti-cough	Decoction (edible)
	<i>Malva microcarpa</i> Pers.	Leaves, fruit	Eliminating infections and colds	Raw and boiled (edible and pharmaceutical)
Polygonaceae	<i>Rumex elbursensis</i> Boiss.	Leaves and stems	Appetizing, blood-purifying, digestive and diuretic properties	Boiled, used in bread and food, eating vegetables (edible and pharmaceutical)
Papilionaceae	<i>Alhagi camelorum</i> Fisch.	Roots, leaves	Treatment of rheumatism, treatment of kidney stones	Plant extract, leaf oil, white leachate, flavoring and sweetener in food (medicinal)
Plantaginaceae	<i>Plantago major</i> L.	Roots, leaves and seeds	Antipyretic, antitussive, antihypertensive, anti-inflammatory, anti-fever and anti-rheumatic	Drink, syrup and drops (edible and medicinal)

Table 3: Ethnobotany of medicinal plants in the study area

Family	Scientific name	organ used	Medicinal properties	How to use
Rhamnaceae	<i>Rhamnus pallasii</i> Fisch. & Mey	Fruit, wood, bark	Treatment of hyperlipidemia, diabetes, prostatitis and kidney stones	Decoction and poultice (edible and pharmaceutical)
Rosaceae	<i>Cotoneaster nummularioides</i> Poark	Fruit, manna	laxative	manna
	<i>Cotoneaster discolor</i> Pojark	Fruit, gum or manna secreted from the plant	Eliminating neonatal jaundice, relieve fever, dry cough	Soluble in water
	<i>Mespilus germanica</i> L.	Leaves, seeds, fresh stems and roots	Treatment of sore throat, dental plaque and fever	Decoction, raw fruit, syrup and paste
	<i>Rosa canina</i> L.	Leaves, flowers, fruits, roots and seed oils	Treatment of eye inflammation, gout, bloating, cough and cold	The oil and raw fruit
Scrophulariaceae	<i>Verbascum speciosum</i> Sachrid	Leaves and flowers	Eliminating infection, treatment of wounds	Boiled and crushed (medicated)
	<i>Verbascum blattari</i> L.	Leaves, flowers and stems	Eliminating infection, treatment of wounds	Boiled and crushed (medicated)
	<i>Verbascum Thapsus</i> L.	Leaves, flowers and stems	Eliminating infection, treatment of wounds, disinfects	Making honey, herbal tea (edible, pharmaceutical)
Urticaceae	<i>Urtica dioica</i> L.	Leaves, flowers and flowering branches	Anti-diabetic, chest pain, gynecological disorders, skin disorders and hemorrhoids	In food preparation, dried and boiled (edible, medicinal)
Violaceae	<i>Viola odorata</i> L.	Flowers, leaves and seeds	Laxative, expectorant, anti- inflammatory and anti- cough	Syrup, jam and ointment (edible and pharmaceutical)
Zygophyllaceae	<i>Zygophyllum atriplicoides</i> Fisch. & C.A. Mey.	Leaves, seeds	Treatment of rheumatism, treatment of asthma, ointment for skin diseases	Plant extract (medicinal)
	<i>Peganum harmala</i> L.	Flowering leaves and branches, seeds	Treatment of stomach pain and gastric acidity, disinfectant	Smoking (medicinal)

Discussion

Iran has a long history of traditional medicine and the use of medicinal plants in the treatment of diseases. The richness of the flora in Iran and the high knowledge of Iranians in the use of medicinal plants, the existence of reputable scientific centers in the cities of Isfahan, Shiraz, Rey, and also sources and famous scientists such as Abu Ali Sina and Razi who practiced medicine with medicinal plants, have doubled the need for attention to this science [12]. Khosh Yilagh village, with a history of 400 years, has a valuable treasure of indigenous knowledge. In the present study, 84 regional plant species belonging to 27 families were identified. According to Figure (4), the most frequent plant species include Lamiaceae (20 species), Compositae (12 species) and Leguminaceae (6 species), respectively. [13] in the results of their research included the collection and identification of selected traditional uses of plants in Babol, and reported that the largest consumption of medicinal plants used by local communities belonged to Lamiaceae, Compositae and Leguminaceae. The studies of [14] in Ardestan located in Isfahan province, [15] in Zabarkhan rangelands in Neishabour, [16] in Shazand, Markazi province, [17] in Behbahan, Khuzestan province, [18] in forest-rangelands of Tuskistan, Golestan province and [19] in Azad Jammu and Kashmir, Pakistan, also, supported this statement. According to the research of [14] 120 species belong to 41 families, [15] 70 species belong to 29 families, [16] 56 species belong to 23 families, [20] 61 plant species belong to 29 families and [21] 119 species belong to 43 families.

The results of the interview attributed the highest use of medicinal plants to gastrointestinal, antitussive and cold problems, respiratory tract, painkillers and sedatives, respectively. Also, it was found that the most widely used organs of plants included leaves, flowers, roots and flowering branches. [14] also attributed the most widely used organs of the medicinal plants being mostly used to eliminate gastrointestinal disorders. Khorasan is consistent. The use of medicinal plants in different places depends on different customs, traditions, and methods. Also, the methods and uses of these medicinal plants are different in different regions, so that women are more knowledgeable than men in cases such as how to dry and maintain plants and to make use of them. It should be noted that, not only are most of them used for medicinal reasons but also for other ones. For instance, barberry (*Berberis integerrima*) is used in cooking, making syrups, and jams. It is also used as an anti-inflammatory, lowering blood pressure and lowering blood lipids, which is consistent with the results of [16]. According to locals, *Juniperus communis* is chewed and pounded with water to improve the stomach operation, acts as an anti-flatulence, diuretic, disinfectant, and treats rheumatism. *Echium amoenum* is used as an antitussive, sedative and analgesic. In local community, thyme (*Thymus Kotschyanus*) acts as a remedy for flatulence, inflammation of the airways, and diseases of the intestines and stomach; it is, also, used as a flavoring agent in foods, buttermilk, and other dairy products. *Phlomis cansellata* is used to relieve dandruff and head lice. Decoction of *Achillea millefolium* acts as an anti-nausea and helps treat diabetes, supported by [15], [22] and [23].

Conclusion

According to the findings of this study, indigenous knowledge about medicinal plants is very extensive. The results of this study indicate the diverse use of medicinal plants in the summer village. People experience contributes largely to collecting information. Medicinal plants with a long

history are recently seen as a kind of biological innovation in medicine and can be a good alternative to chemical medicines. One of the main reasons for this is that herbal compared to chemical medicines have fewer side effects.

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Author's contribution:

All authors listed on the title page have contributed significantly to the work. Conceptualization, designing the study and involving in data collection: MRF. Data collection and writing: YK. Helping in data analysis: SZM and HNG. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

The authors asked for permission from the local people interviewed to carry out the study.

Competing interest:

There is not competing interest to declare

Consent for publication:

We confirm that all authors have read the manuscript, attest to the validity and legitimacy of the data and its interpretation, and agree to its submission.

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Figures

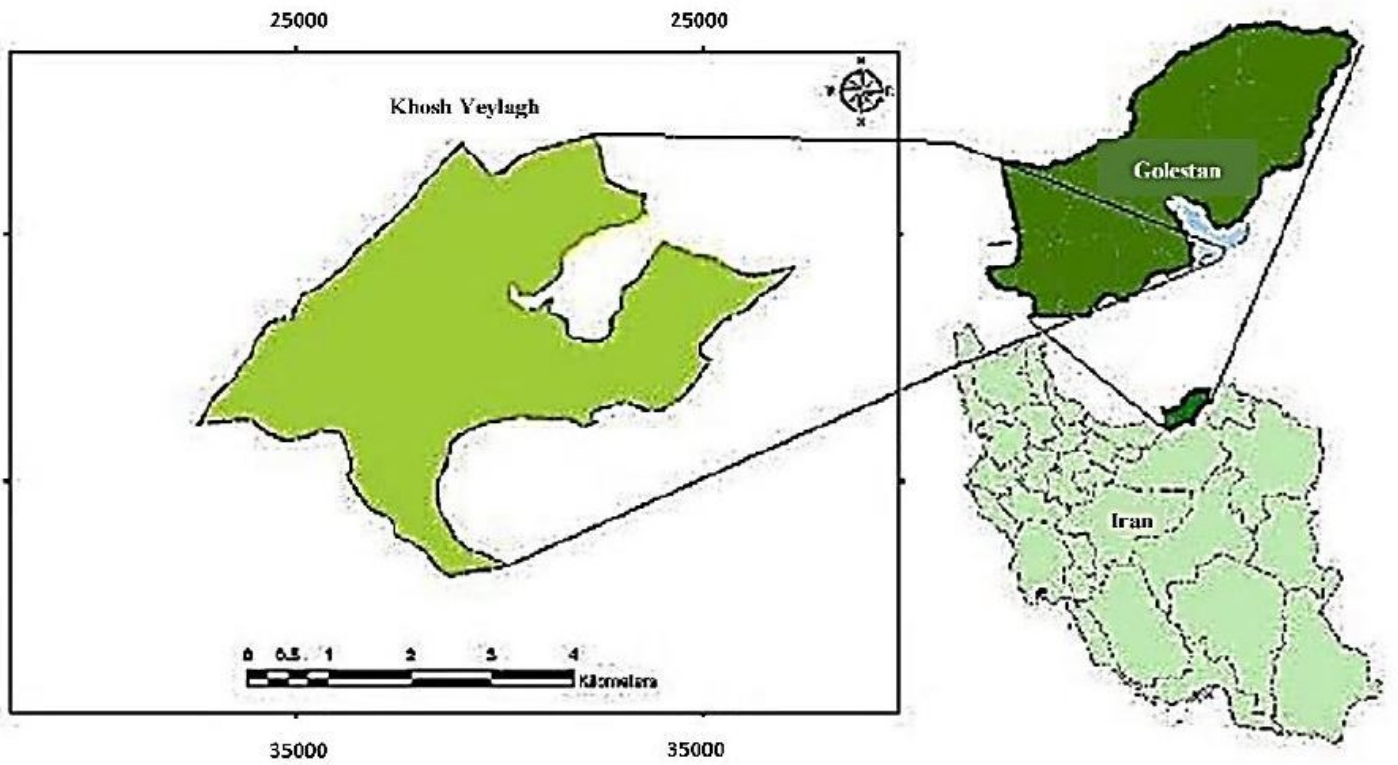


Figure 1

Location of the study area in Iran and Golestan province

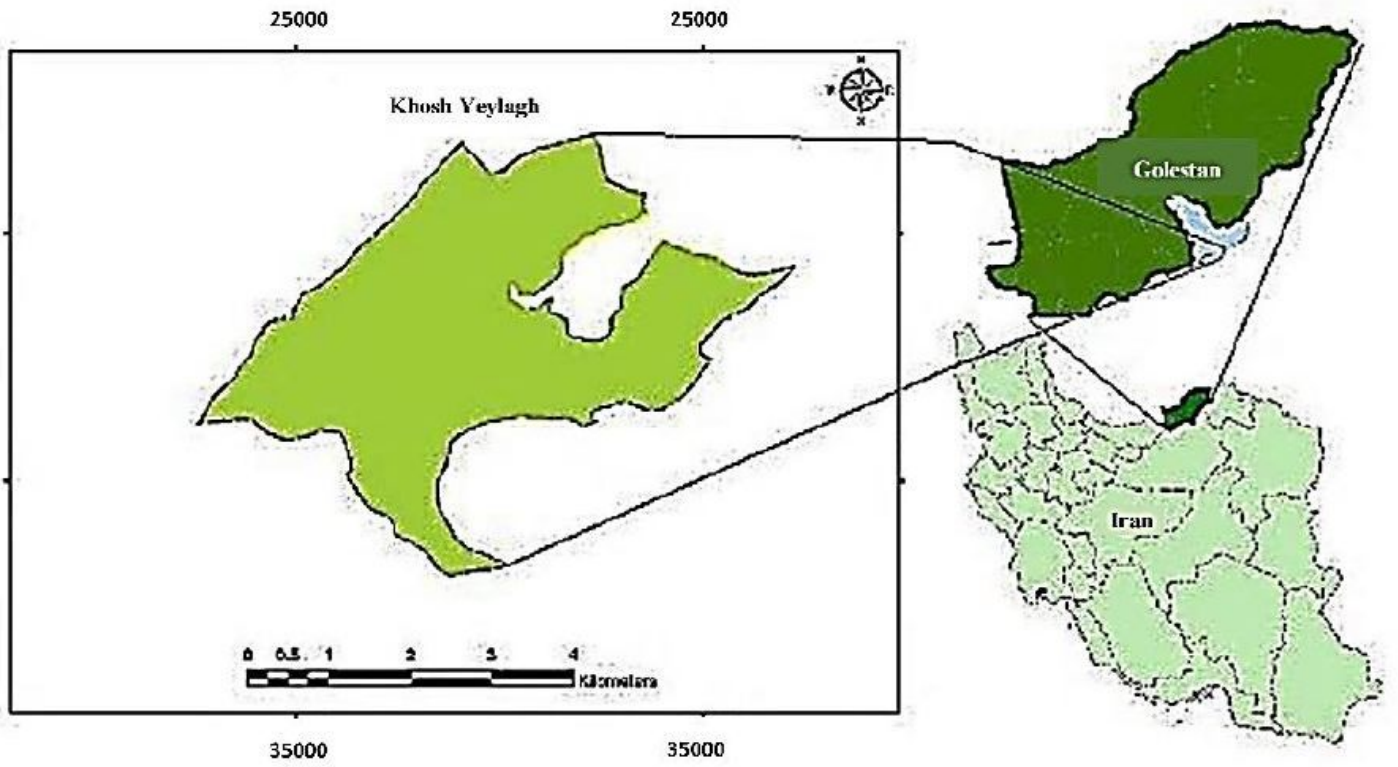


Figure 1

Location of the study area in Iran and Golestan province

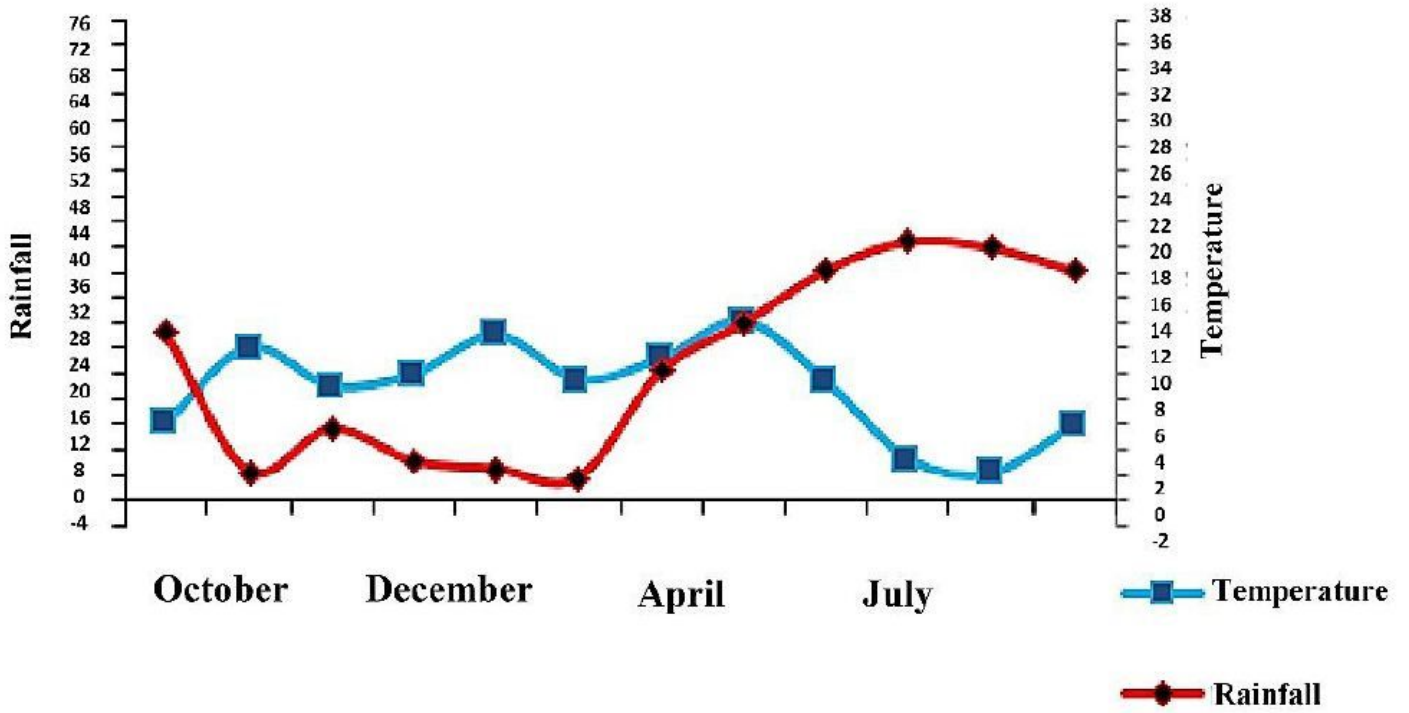


Figure 2

Amperometric curve of the study area

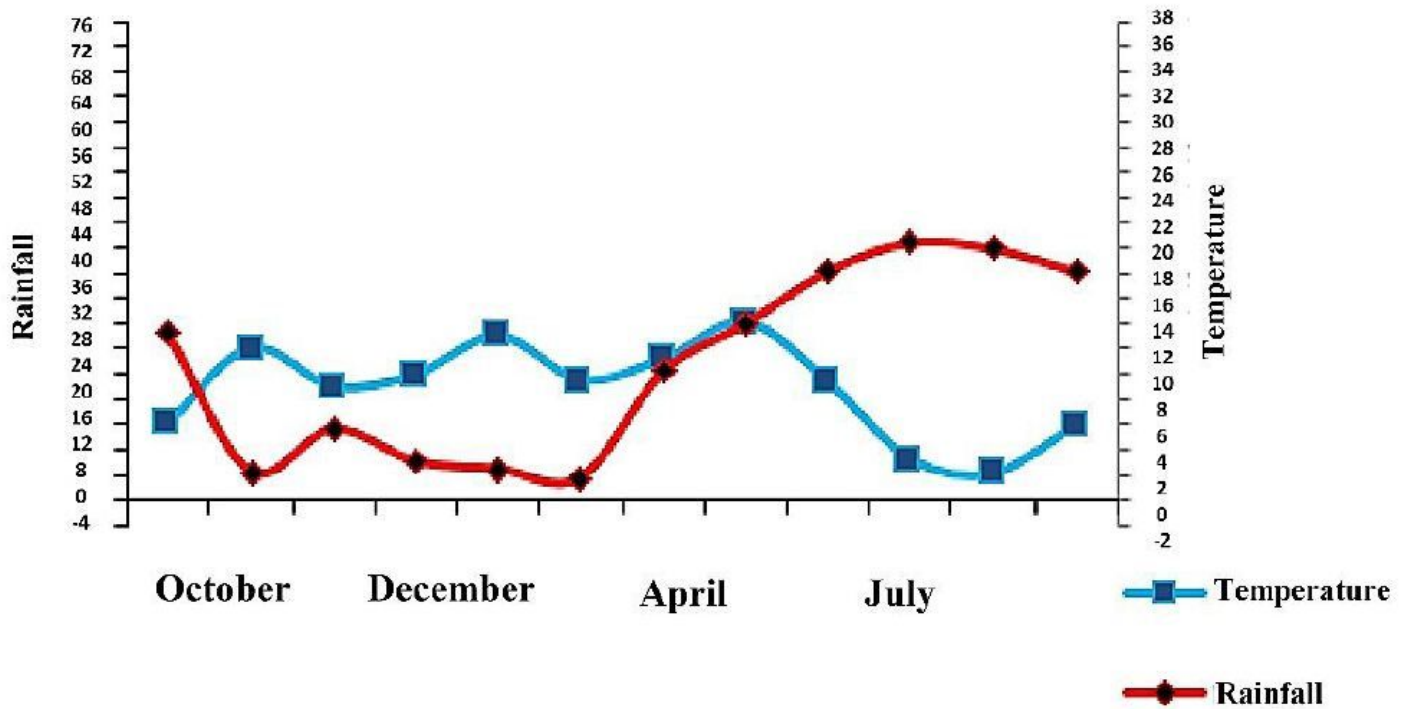


Figure 2

Amperometric curve of the study area

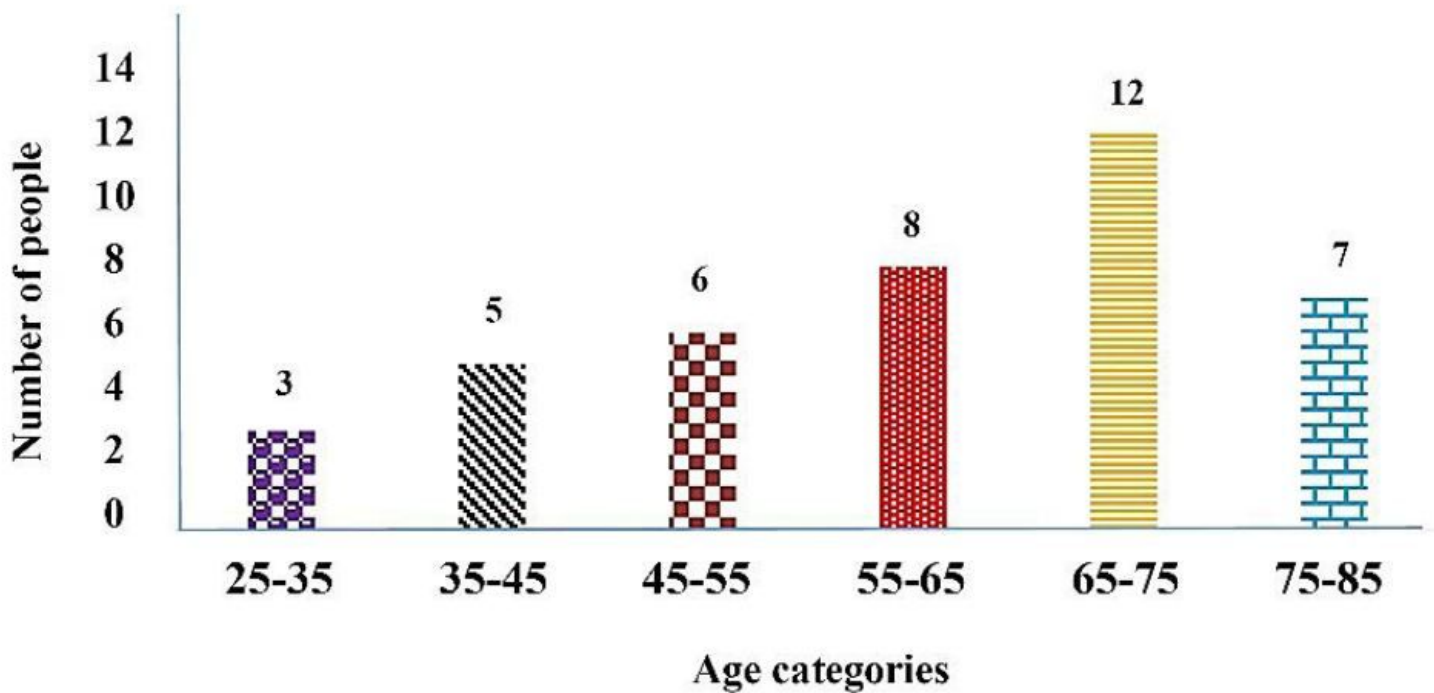


Figure 3

Age categories of interviewees

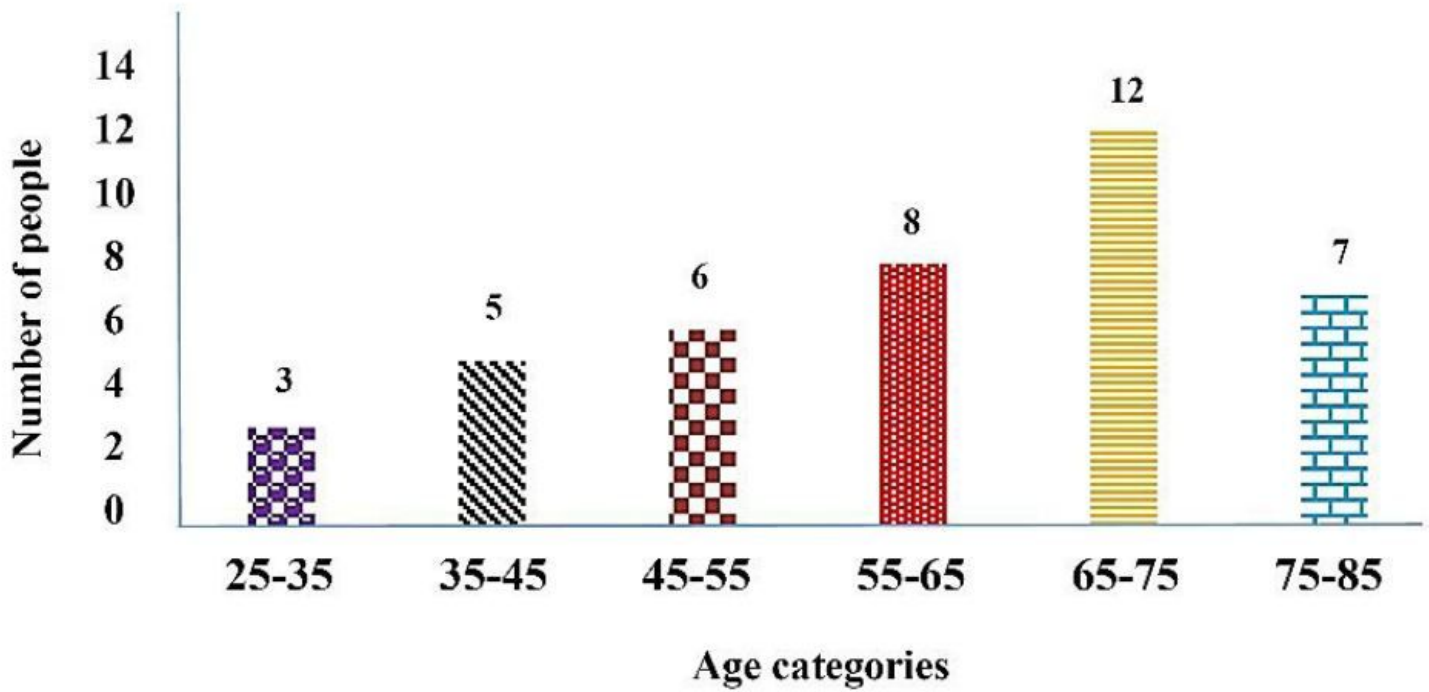


Figure 3

Age categories of interviewees

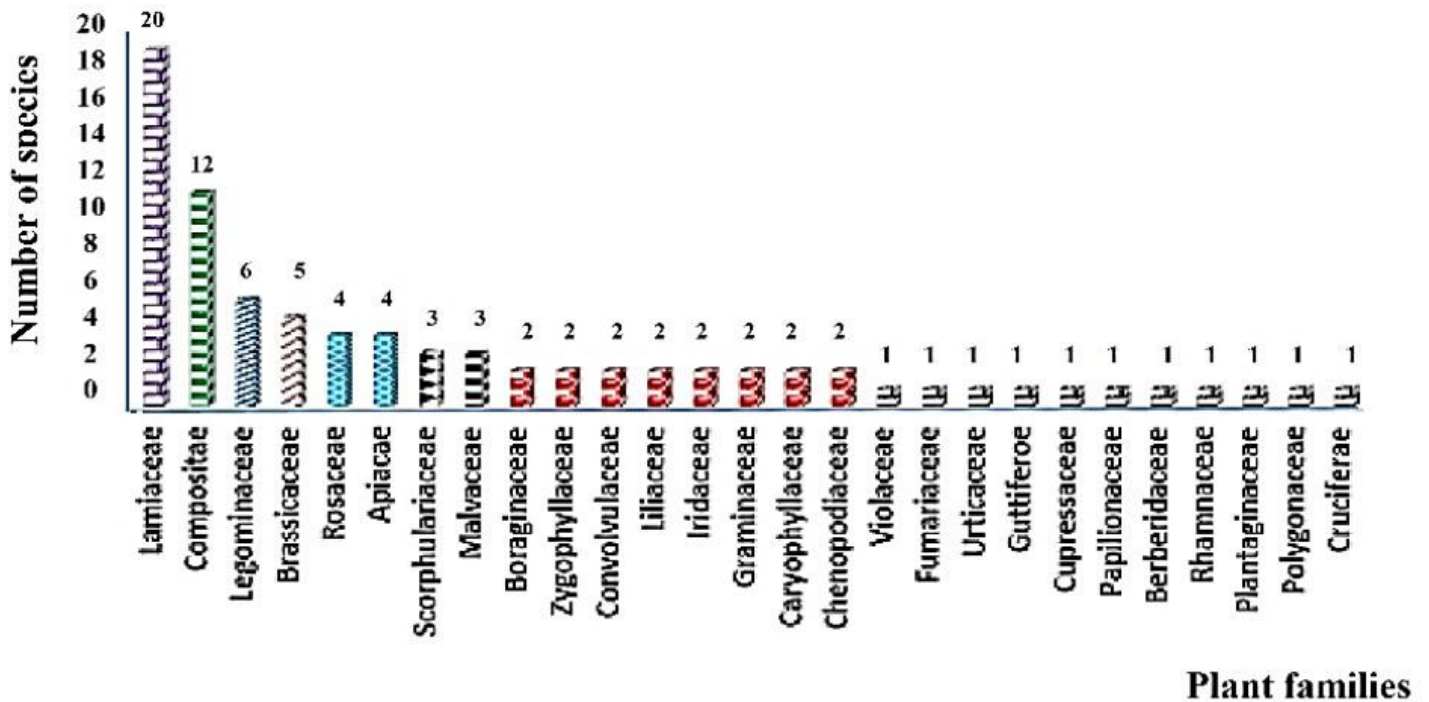


Figure 4

The abundance of plant genus in the study area

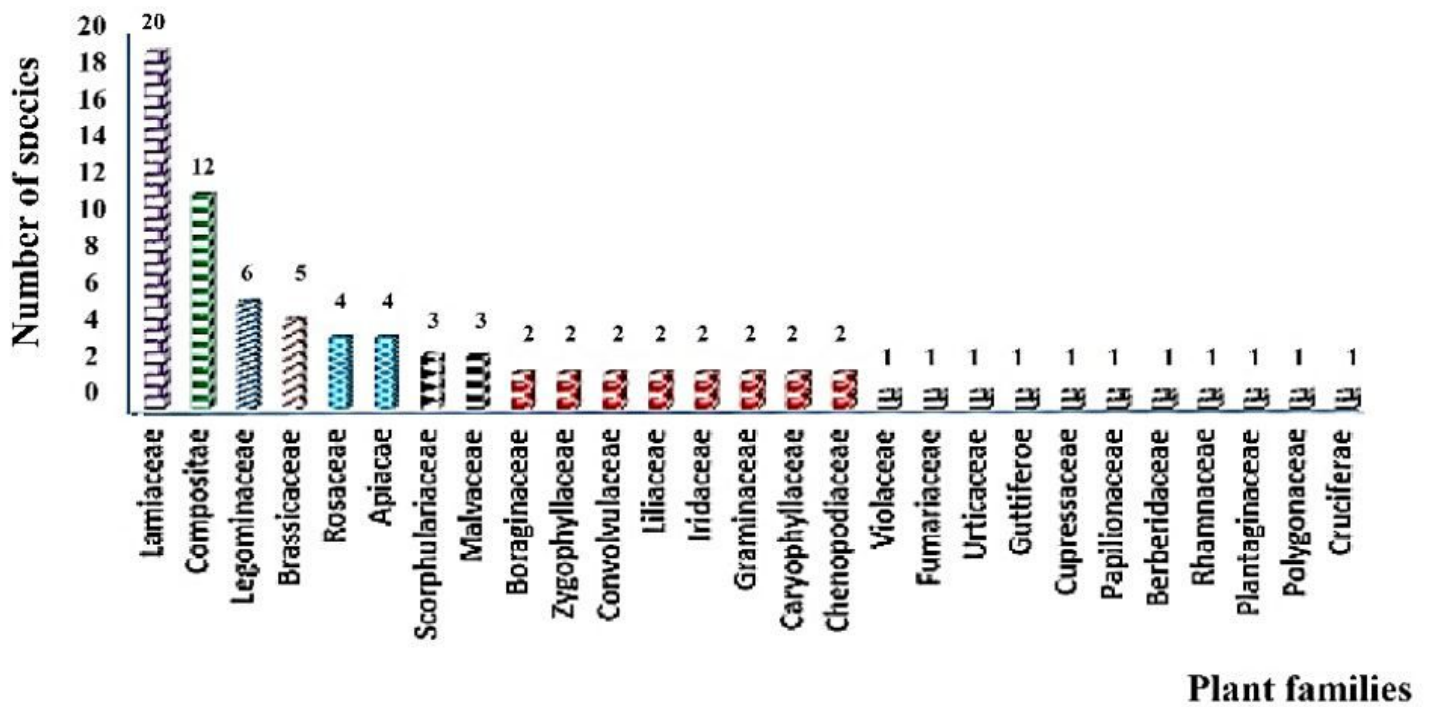


Figure 4

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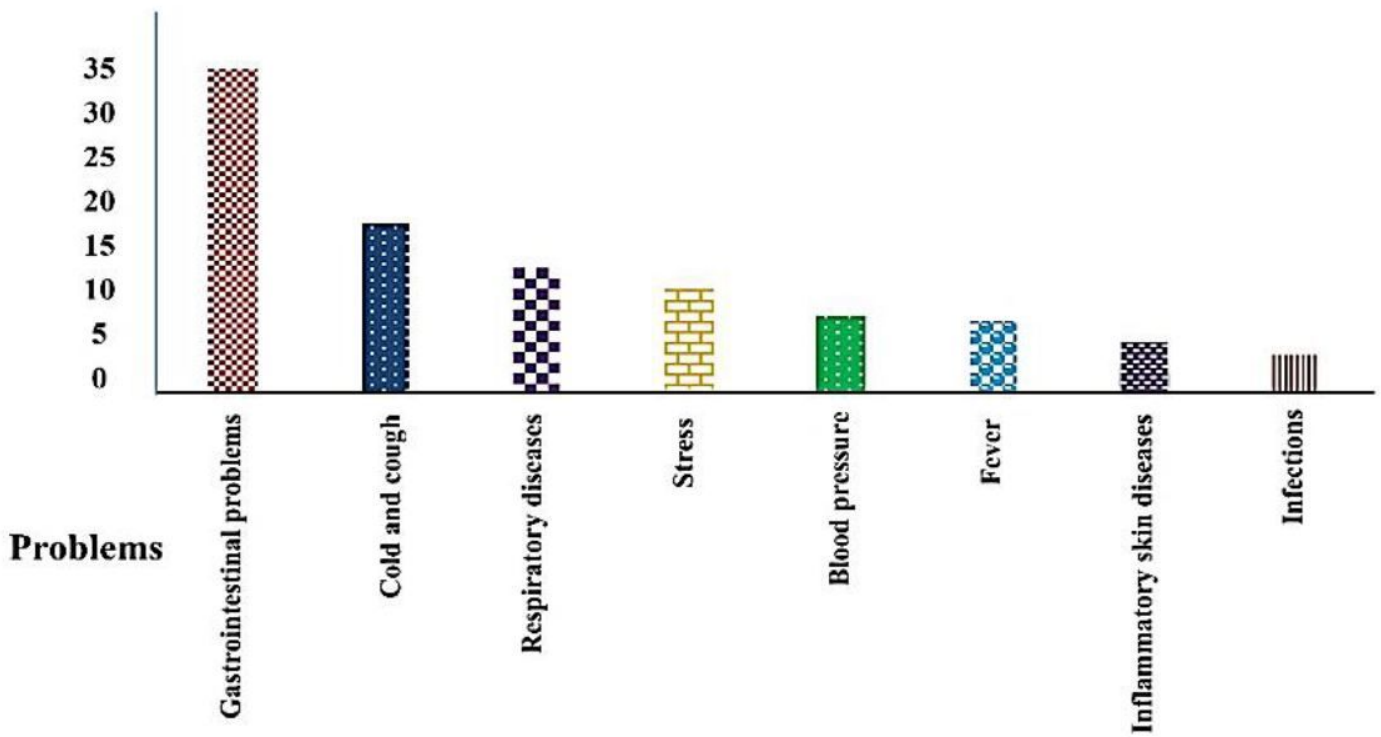


Figure 5

Frequency of use of medicinal plants in the region for all kinds of diseases in terms of percentage

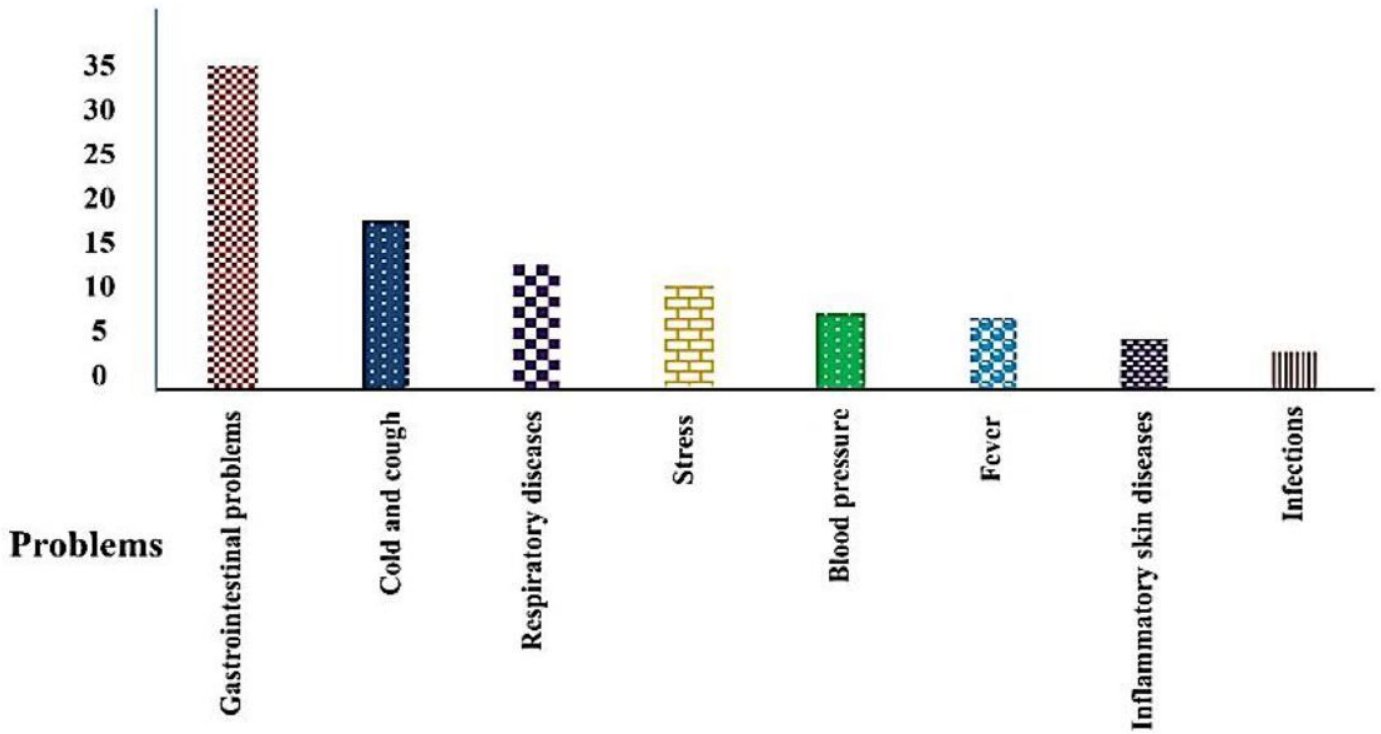


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Frequency of use of medicinal plants in the region for all kinds of diseases in terms of percentage

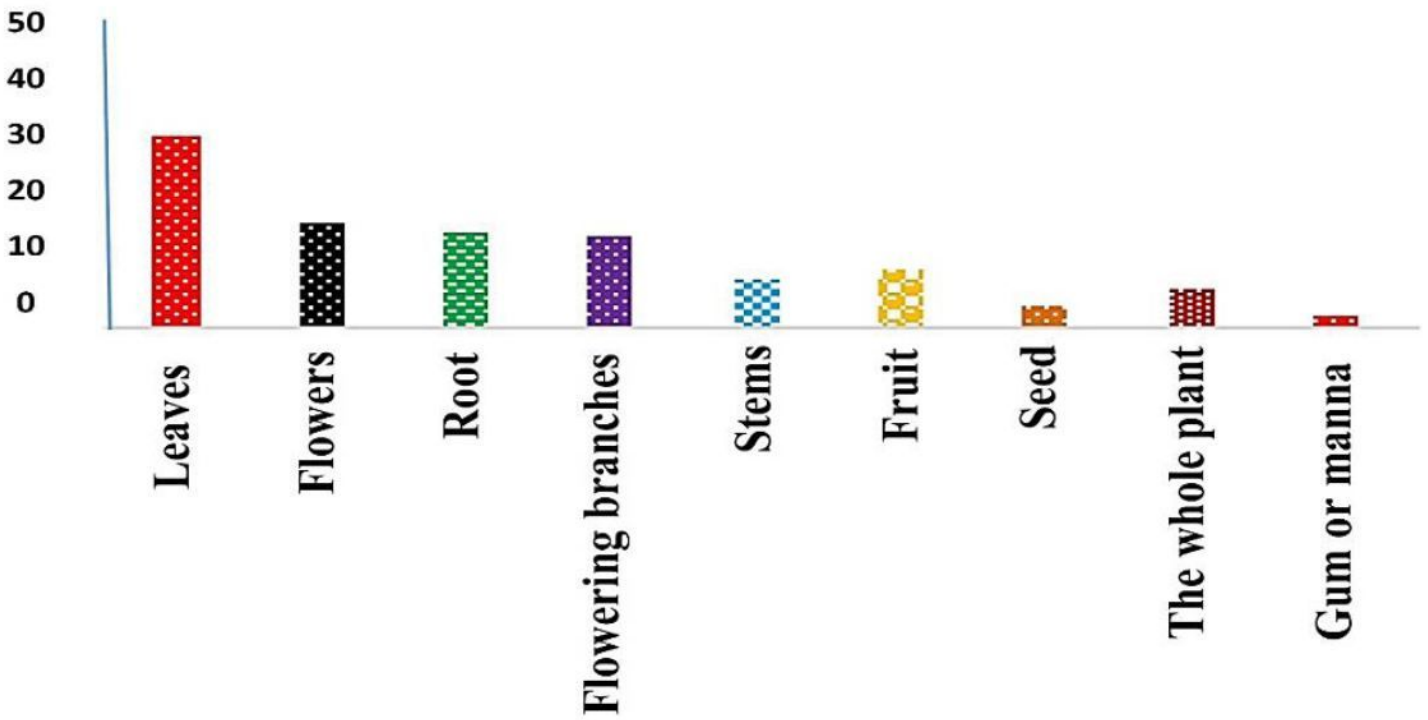


Figure 6

Frequency of use of medicinal plants in the pleasant region for a variety of diseases by percentage

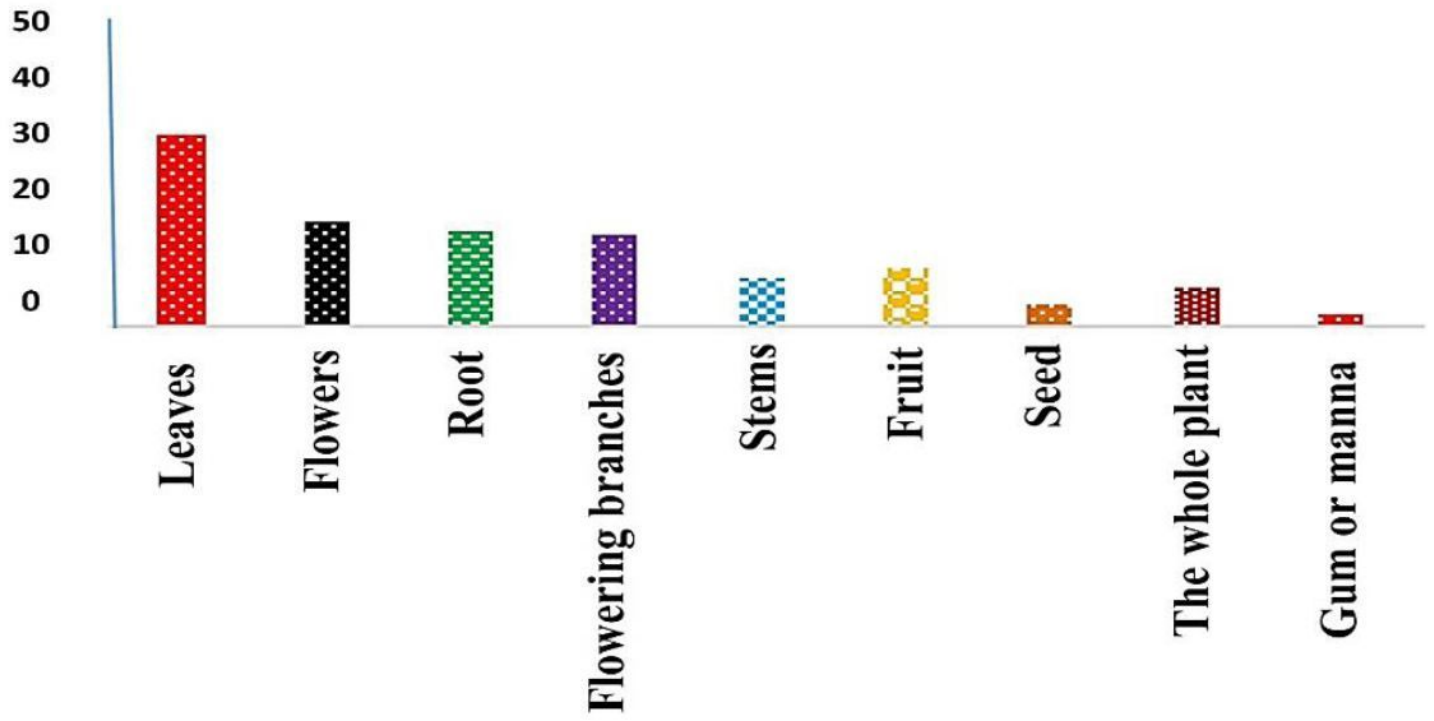


Figure 6

Frequency of use of medicinal plants in the pleasant region for a variety of diseases by percentage