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Ethnobotanical study of medicinal plants in the central district of the Zanjan county, Zanjan province, Iran

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ABSTRACT

Background & Aim: The aim of this study was to document the medicinal uses of plants in the central district of Zanjan county.
Experimental: In the frequent field trips, plants species were collected, and their ethnopharmacological importance were reported by personal visits to a total of 32 informants.
Results& Discussion: 77 plant species belonging to 32 families were reported. Results revealed that from the total of 32 families, Asteraceae with 14 species was the largest medicinal plant family. The most frequently used plant parts were shoot (27%). Among the 77 species, *Achillea millefolium*, *Achillea tenuifolia*, *Achillea wilhelmsii*, *Alcea transcaucasica*, *Anchusa strigosa*, *Cichorium intybus*, *Cichorium pumilum*, *Descurainia sophia*, *Elaeagnus angustifolia*, *Falcaria vulgaris*, *Fumaria asepala*, *Glycyrrhiza glabra*, *Juglans regia*, *Malva neglecta*, *Mentha longifolia*, *Nasturtium officinalis*, *Peganum harmala*, *Rosa canina*, *Stachys lavandulifolia*, *Thymus kotschyanus*, *Tragopogon graminifolius*, with 32 number of informants was the highest which showed that they were well known and therefore used by most residents. FIC were calculated for each of the 14 categories of disease, and the values revealed that Cold & Pulmonary problems had the highest agreement with an FIC value of 0.92.
Recommended applications/ industries: Considering the great variety of medicinal plants in the region, ethnobotany studies is essential to preserving a valuable treasure of medical experience, preservation and conservation the existing herb resources, cultivating and developing medicinal plants that are adapted to the ecological conditions of the region, acquiring new drugs and advancing the pharmaceutical industry and developing employment plans.

1. Introduction

From the very beginning of human existence, humans have familiarized themselves with plants and have used them in various ways throughout the ages. This relationship has grown between plants and humans, and many plants have been utilized as drugs. Medicinal plants have a rich history of utilization in all cultures. The utilization of medicinal plants in modern medicine

is due to the fact that although plants are used to cure diseases, scientific evidence in terms of modern medicine is lacking in many cases. Different societies utilize plants based on their beliefs, knowledge, and previous experiences. Their knowledge about the use of the plants is usually not known to other societies or to scientists (Abbasi *et al.*, 2012). Ethnobotany and ethnomedicine involve the collection of useful medicinal plants by a group of people and describing their different usefulness to them (Safa *et al.*, 2013). Nowadays, almost 80% of world population uses medicinal plants for their primary healthcare needs because they are effective, cheap, and available (WHO. 2007). Iran which is located in southwest Asia, in the northern hemisphere, contains rich ecosystems and biodiversity due to the various climatic conditions and geographical characteristics (Mirdeilami *et al.*, 2011). Ethnobotany and ethnopharmacology surveys were carried out in the other parts of Iran (Dolatkhahi *et al.*, 2014; Ghollassi Mood, 2008; Ghorbani, 2005; Iranmanesh *et al.*, 2010; Khajoei Nasab and Khosravi, 2014; Mardani-Nejad and Vazirpoor, 2012; Mosaddegh *et al.*, 2012; Rajaei and Mohamadi, 2012; Sharififar *et al.*, 2010). People of Zanjan countyhave good knowledge about plants and they always use plants for various medicinal purposes. The existence of active herb shops and traditional physicians in the city and villages implies the need to perform ethnobotanical study in this county. The aim of this study, which is the first to be carried out in this area, is the identification and collection of plants known as medicinal plants in the central district of Zanjan county.

2. Materials and Methods

2.1. Studyarea

Zanjan county with a history that dates back to the late second millennium BC according to recent studies, is situated at 37°15` north latitude and 48°55` east longitude. It occupies an area of 6763 km^2 and comprises 3 districts. The study area is the central district of this county (Fig. 1). Central district comprises Zanjan city and 6 rural districts.

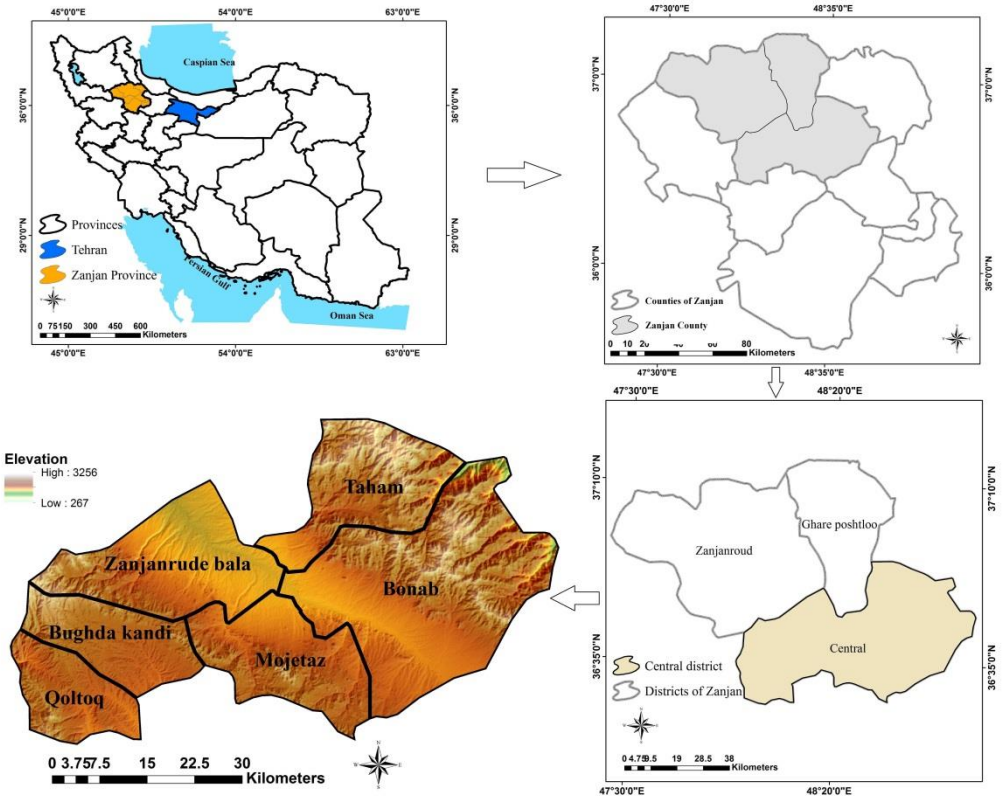

Fig. 1. Map of the study area in central district of the Zanjan county, Zanjan province, Iran.

2.2. Data collection

In the frequent field trips to city and villages between January 2013 and January 2014, medicinal plants species were collected during their flowering and fruiting seasons and their ethnopharmacological importance were reported by personal visits to a total of 32 informants (17 men and 15 women) who were aged local people, traditional physicians, medicinal plants shop owners and other individuals that uses the plants in their daily life.

2.3. Data analysis

F_{IC} (informant consensus factor) is one of the most popular indices in quantitative ethnobotany which is calculated by the following formula to find out the homogeneity in the information given by the informants (Trotter and Logan, 1986).

$$F_{IC} = N_{ur} - N_t / (N_{ur} - 1)$$

Where Nur is the number of usage reported in a particular category of illness by informants and Nt is the number of taxa or species used to treat that particular category by informants.

3. Results and discussion

In this study, information containing scientific names, local names, parts used, ethnopharmacological uses and other application of 77 plant species were collected (Table 1).

Table 1. Medicinal plant species (sorted alphabetically) of the Zanjan county.

Scientific name	Local name	Locality	Part used	Ethnopharmacological uses	Other application
Achillea millefolium L. (Asteraceae)	Boymadaran	Zanjan rud	Whole plant	Used for stomach ache and diarrhea via several methods: first, drinking steeped flowering branches in water. Second, eating cooked cuckoo using fresh or dried plant, egg and flour. Third, used tea from steeped flowering branches.	Edible, spices and condiment
Achillea tenuifolia Lam. (Asteraceae)	Boymadaran	Zanjan university	Whole plant		
Achillea wilhelmsii C. Koch. (Asteraceae)	Boymadaran	Zanjan-tabriz road	Whole plant		
Acroptilon repens (L.) DC. (Asteraceae)	Kakirah	Payin kuh	Root	Shoot is very bitter but root is sweet. Poultice made from crushed root is helpful for pain and ecchymosis of feet or hands. The tea from root is a tonic for the eyes and is called "anti-glasses".	Cures vermin
Alcea transcaucasica (Iljin ex Grossh.) Iljin. (Malvaceae)	Khitmi	Payin kuh	Flower	Flower tea used for purulent sputum and constipation. Steeped flower in mother milk treats sore eye.	
Alhagi persarum Boiss. & Buhse. (Fabaceae)	Dava yandakhi	Zanjan-tabriz road	Root, flower	Boiled flower is used to remove gall and hemorrhoids and boiled root is used for the treatment of prostate and kidney stones. Latex from the leaves and stems, called "toranjabin" is a laxative and can be used for the strengthening of kids' stomach of.	
Alyssum linifolium Steph. ex Willd. (Brassicaceae)	Ghapakhlija	Koshkan	Seed	Soaked seeds are mucilage and mucus. It can be used for cough, hoarseness and angina.	
Amygdalus lycioides Spach. (Rosaceae)	Aji badam	Gaveh zang	Fruit	Soaked fruit expels body worms.	
Anchusa strigose [Soland.] (Boraginaceae)	Gule guzaban	Noghteh bandi	Flower	Flower tea with lemon can be used as heart tonic, it is sedative and exhilarating. It can be helpful for cold and catarrh when mixed with other plants.	

Arctium lappa Kalm (Asteraceae)	Kaldar, dovus yarpaghi	Noghteh bandi	Root, leaves	Putting big leaves on abdomen, reduce the temperature of body. The tea from root helps relieve liver problems and inflammation of the kidneys.	
Artemisia oliveriana J.Gay ex Besser (Asteraceae)	Yoshan	Zanjan university	Whole part	The tea from steeped flowering branches is tonic, appetizing, vermicidal and useful for flatulence.	Fuel
Atraphaxis spinosa L. (Polygonaceae)	Agh chali	Noghteh bandi	Whole plant	Crushed fruit can be used to remove moles or skin rash.	Fuel
Capparis spinosa L. (Capparidaceae)	Dagh gharpizi	Tarum road	Whole plant	Extract from the whole plant, has cathartic, anti-bacterial and anti-virus properties. It is effective in the treatment of diabetes and cancer.	Edible
Carthamus oxyacantha M.Bieb. (Asteraceae)	Sari tikan	Valarud	Shoot	Boiled steeped flowering branches have diuretic effect and can be used for remissions of kidney infectious and stones.	
Centaurea depressa M.Bieb. (Asteraceae)	Boughda otu	Zanjan university	Whole part	Extract of plant, helps relieve sore eye and conjunctivitis.	
Cichorium intybus L. (Asteraceae)	Chitdikh	Zanjan rud	Whole part	Sweat chicory or boiled part of the plant, can be used for acne, freckle, lowering of blood sugar & fat and drinking it before meals, helps in liver purification. Ash from burning plant can be used externally for infected wounds.	Chewing, It can be used for vegetable or fodder wrapping
Cichorium pumilum Jacq. (Asteraceae)	Chitdikh	Zanjan university	Whole part		
Conringia orientalis Andrz. Ex Dc. (Brassicaceae)	Tukhlu bash	Valarud	Shoot	Pottage made of young shoot, can be used as lubricant.	
Crataegus pontica C.Koch. (Rosaceae)	Yemishan	Zanjan city	Fruit, shoot	Fruit can be used for cataract.	Edible, It can be used for making sweep
Cuscuta epithymum Murray (Convolvulaceae)	Aftimun	Zanjan university	Whole plant	It can be used as a detoxifying agent, antibile and blood thinners and for the treatment of psychosis. It has acquired properties e.g if it stick to *Alhagi* sp., it can be useful for the kidneys and if it stick to *Ocimum* sp., it can be useful for the heart.	
Cynodon dactylon (L.) pers. (Poaceae)	Chayir	Koshkan	Whole plant	Boiled part of the plant is useful for the heart.	It can be used for Making rope
Descurainia Sophia (L.) Prantl (Brassicaceae)	Shuvvaran	Zanjan-tabriz road	Seed	The syrup made of cleaned seed, sugar and water is called "shekarshuvaran". Drinking this syrup in warm months, especially in "sahar" and "eftar" during Ramadan, can help in treating heat stroke and thirst. It is a skin softener. Because of its humidity, it dilutes blood. Drinking soaked seeds for several days in the mornings, helps relieve stomach disorders and diarrhea and can be used for cough and mange throat when mixed with some other plants.	

Dianthus orientalis Adams (Caryophyllaceae)	Moukhak	Bijar road	Flower	Compressed mixture of flowers and honey reduces toothache. Poultice of burnt flower can be used to treat corns. Boiled part or tea from flowers can be used as appetizer and also as a tonic.	Spicy
Echinophora platyloba DC. (Apiaceae)	Torogh otu	Noghteh bandi	Shoot	Tea or boiled of the shoot is helpful for ileus, hemorrhoid and flatulence. It can also be used for joints pain.	
Echinops ritrodes Bunge (Asteraceae)	Toppuz	Koshkan	Shoot	"Shekartighal", collected from stem and leaves can be dissolved in water and used for children as laxative and anti-cough.	Edible
Elaeagnus angustifolia L. (Elaeagnaceae)	Edah	Parke eram	Whole plant	Powdered fruit with seeds can be used to relieve pain, prevention and treatment of osteoporosis, arthrosis, it can be used to treat diarrhea and also used as appetizer. Tea from the leaves can be used to relieve fever. Tea from flower can be used as a nerve tonic.	It can be used in the construction, industry, dyeing yarn
Ephedra major Host (Ephedraceae)	Burukh	Noghteh bandi	Shoot	The fruits can be used to relieve toothache. Herbal tea is good for the spleen.	It can be used for Dyeing "tulukh" (an animal skin that is used to make butter)
Ephedra sarcocarpa Aitch.et Hemsl. (Ephedraceae)	Burukh	koshkan	Shoot		
Equisetum arvense L. (Equisetaceae)	At gulu	Zanjan rud	Whole plant	Boiled part of the plant can be used to lower blood sugar. It is useful for menstruation and kidneys.	
Eryngium billardieri F.Delaroche (Apiaceae)	Zola	Taham	Stem	It is helpful for hernia.	Edible
Euphorbia seguieriana Neck. (Euphorbiaceae)	Suttukan	Zanjan-Tabriz road	Shoot	Extract from the stem can be used externally to relieve hives, freckle and skin irritation. It can also be used to stop bleeding caused by saddle on the horse and mule body.	It can be used for dyeing yarn
Falcaria vulgaris Bernh. (Apiaceae)	Ghaz ayaghi	Zanjan rud	Leaves	It is appetizing. Crushed fresh leaves can be helpful for insect bite and sting.	Edible
Ferula gummosa Boiss. (Apiaceae)	Barijah	Taham	Whole plant	Resulting gum can be used for malignant and cancerous lesions. Tea from crushed or powder plant is helpful for nerves.	
Foeniculum vulgare Mill. (Apiaceae)	Mayana	Zanjan rud	Whole plant	It is good for problems in the stomach and intestines and helps relieve problems associated with colic. Fennel-water is rich in phytoestrogens and increases lactation. Extract is a good tonic for the eyes and can be used to treat eye irritation and inflammation. The tea made from these fruit mixed with *Nigella* sp. is helpful for pulmonary illnesses.	
Fumaria asepala Boiss. (Papaveraceae)	Sha tarasi	Zanjan-Tabriz road	Whole plant	Crushed plant can be used externally to treat itching, scorch and skin allergy. Sweat from the plant is useful for the liver. When mixed with henna, it can be used for	It can be used for Hair color

				chilblain of palms or sole.	
Gladiolus atroviolaceus Boiss. (Iridaceae)	Ghilayol	Zanjan-Tehran road	Flower	Tea from flower strengthens hair and nails.	
Glycyrrhiza glabra L. (Fabaceae)	Shirin beyan	Zanjan rud	Root	Boiled or powdered root is useful for the treatment of pain or peptic ulcer and chewing the root cures thirst.	
Hibiscus trionum L. (Malvaceae)	Hasba otu	Valarud	Shoot	Boiled plant is useful for typhoid fever and can be used as chest softener.	
Hordeum glaucum Steud. (Poaceae)	Arpa	Zanjan university	Whole plant	Tea from seed is used for lowering of blood fat.	It can be used for dyeing yarn
Hyoscyamus reticulatus L. (Solanaceae)	Bat bat	Zanjan university	Seed	Seed can be used to treat liver and intestinal worms. It can be used as a narcotic and painkiller. Crushed plant can be used for cancerous and malignant wound.	
Hypericum perforatum L. (Hypericaceae)	Alafe chay	Zanjan rud	Shoot	Tea from flower is antispasmodic and antistress and antianxiety.	
Juglans regia L. (Juglandaceae)	Girdakan	Zanjan city	Whole plant	Boiled or leaf poultice can be externally used to heal wounds, eczema and skin infections. Fruit can be used to lower blood cholesterol.	It can be used for hair color and dyeing yarn, it can repel vermin, and it is edible
Linum usitatissimum L. (Linaceae)	Bazarak	Payin kuh	Seed	Crushed or powdered seed can be used to cure pain or treat wound. Oil from plant can be used for body aches.	
Malva neglecta Wallr (Malvaceae)	Aman kumaji	Payin kuh	Shoot	Tea from shoot or boiled shoot can be used to treat cough, respiratory and gastrointestinal infection and female genital infection.	
Melilotus officinalis Lam. (Fabaceae)	Sari yonja	Zanjan-Tabriz road	Shoot	Boiled plant can be used as an anticoagulant.	Feed
Mentha longifolia (L.) Huds. (Lamiaceae)	Yarpiz	Valarud	Shoot , root	Tea from shoot is antiseptic, anti-nausea, carminative and anti-headache. Sweat from the plant is useful to strengthen the stomach. Tea from root improves dysentery. Boiled plant in rice with yogurt is appetizing and can act as intestinal antiseptic.	Edible
Nasturtium officinale W.T. Aiton (Brassicaceae)	Bulagh otu	Zanjan rud	Shoot	It is used in the treatment of diabetes and knee pain. It can be useful in skin irritation. Some people are allergic to it. For it to be effective, it should be eaten at least three times.	Edible
Peganum harmala L. (Zygophyllaceae)	Ouzarrik	Noghteh bandi	Fruit, seed	Seed smoking causes disinfection of the environment and if inhaled causes disinfection of olfactory system. Eating seeds can be used to relieve cough and body worms.	It can be used for hand made
Plantago lanceolata L. (Plantaginaceae) *Plantago major* L. (Plantaginaceae)	Damarrija Damarrija	Koshkan Zanjan rud	Seed, leaves Seed, leaves	Boiled seed can be used to treat cough, peptic problems, parturition infection and dysentery. Leaves can be used externally for uveitis.	
Portulaca oleracea L. (Portulacaceae)	Parpinah	Zanjan	Seed, shoot	The seed is useful for nerve.	Edible

		university			
Reseda lutea L. (Resedaceae)	Sari gul	Eskand	Leaves, root	Root is diuretic, laxative and tonic. Chewing the leaves have a cooling effect and removes thirst.	
Rheum ribes L. (Polygonaceae)	oshghun	Tarum road	peduncle	Raw peduncle is appetizing, exhilarating and can be used as a blood purifier.	
Rosa canina L. (Rosaceae)	Gul burnu	Noghteh bandi	Fruit, flower, shoot	Tea from the fruit or boiled fruit can be used to treat kidney stone, fatty liver, skin tag around the eyes, dandruff and regulate blood sugar and pressure. Tea from the flower can be used for pain and stomach cramps.	Edible, It can be used for building hedge and fence
Rosa persica J.F.Gmel. (Rosaceae)	Varak	Zanjan-Tehran road	Fruit, flower	Tea from the flower can be used to remove thirst and diarrhea.	Edible, It can be used for dyeing
Rumex chalepensis Mill. (Polygonaceae)	Avalik	Gaveh zang	Whole plant	Powdered or tea from the fruit can be used to treat diarrhea, flatulence. Bathing with boiled fruit is useful for relieving itching. Cooked root poultice can be used to treat swollen glands in the neck. Leaves have a cooling effect and are anti-inflammatory.	Edible
Salix acmophylla Boiss. (salicaceae)	Sooud	Zanjan university	Stem, leaves	The leaves can be used to reduce body temperature and fever.	It can be used for making fruit boxes
Salix elbursensis Boiss. (salicaceae)	Ghizyl sooud	Zanjan university	Stem, leaves	The leaves can be used to reduce body temperature and fever. Leaves extract can be used to relieve itching and dysentery.	It can be used for crafts such as basket weaving
Salvia nemorosa L. (Lamiaceae)	Ghazan gharasi	Eskand	Flower	Tea from flower can be useful for the teeth and also as nerve tonic.	
Scrophularia variegata M.Bieb. (Scrophulariaceae)	Sim otu	Kushkan	Shoot	Boiled plant can be used as disinfectants and can also be used for strengthening of the stomach.	
Silybum marianum (L.) Gaertn. (Asteraceae)	Khuja bashi	Zanjan university	Fruit	Sodden fruit helps relieve problems associated with liver and hemorrhoid.	
Solanum nigrum L. (Solanaceae)	Ghush ouzumi	Baghlojeh bayat	Fruit	Smoke from burning fruits can be useful for tooth infection and decay. Boiled fruit can be used in relieving itching skin.	
Sophora pachycarpa Schrenk ex C.A.Mey. (Fabaceae)	Aji beyan	Zanjan rud	Shoot	Crushed shoot can be used for the treatment of wound.	
Stachys lavandulifolia Vahl (Lamiaceae)	Tukluja	Gaveh zang	Shoot	Tea from this plant when used with *Ziziphora tenuior* can be useful for cold and can also be used for stomach ache, genital infection and for moisturizing of female genital.	
Tamarix ramosissima Ledeb. (Tamaricaceae)	Yulghun	Zanjan rud	Shoot	Oil from the burning branches can be used externally to remove fungal skin scars. Boiled stem bark is useful for diarrhea.	It can be used for building hedge and fence, and for building roof
Taraxacum syriacum Boiss. (Asteraceae)	Khabarak	Zanjan university	Fruit	The tea from fruit is liver tonic and helps relieve problems associated with liver.	

Thalictrum minus L. (Ranunculaceae)	Ghaytaran	Zanjan rud	Shoot	Crushed plant with *Hyoscyamus* reticulates can be used in treating cancerous wounds.	
Thymus kotschyanus Boiss. & Hohen. (Lamiaceae)	Kahlik otu	Gaveh zang	Shoot	Tea from shoot can be used as disinfectant, carminative and can strengthen the stomach. Powdered from dry plant has this property and can be used in dough and in some foods.	Spice or condiment
Tragopogon graminifolius DC. (Asteraceae)	Yemlik	Zanjan university	Leaves	Fresh plant is rich in minerals and is appetizing.	Edible
Tribulus terrestris L. (Zygophyllaceae)	Damir tikan	Zanjan university	Whole plant	Tea from plant can be used to remove kidney stones, prostate and chest pain.	Feed
Urtica dioica L. (Urticaceae)	Josh josh	Zanjan rud	Whole plant	Tea from the plant or boiled plant can beused for the treatment of joint pain, rheumatism, diabetes. It is known as herbal physiotherapy.	
Vaccaria pyramidata Medik. (Caryophyllaceae)	Chakhi – gharghadunduki	Eskand	Seed	Boiled seed has diuretic, sudatory, anticough properties and it can be used as a blood purifier.	
Verbascum cheiranthifolium Boiss. (Scrophulariaceae)	Gadma – sighir ghuyreghi	Araziye sabt	Whole plant	Leaf can be used to reduce joint pain. Boiled plant can be used as a painkiller. Mucilage flowers can be used as breast softener.	It can be used for dyeing "tulukh" (an animal skin that is used to make butter), fuel
Ziziphora clinopodioides Lam. (Lamiaceae)	Dagh marzasi	Noghteh bandi	Shoot	Its herbal tea is useful for lowering of blood sugar and is also useful for flatulence and peptic problems. It is appetizing and can be used as body tonic.	Spice or condiment
Ziziphora tenuior L. (Lamiaceae)	-	Gaveh zang	Shoot	Its herbal tea is useful for strengthening of the stomach and it acts as intestinal antiseptic. It can also be used for the treatment of diarrhea and stomach cramps.	
Zygophyllum fabago L. (Zygophyllaceae)	Eet ouzarrik	Zanjan city	Whole plant	Crushed plant can be used to reduce knee pain.	

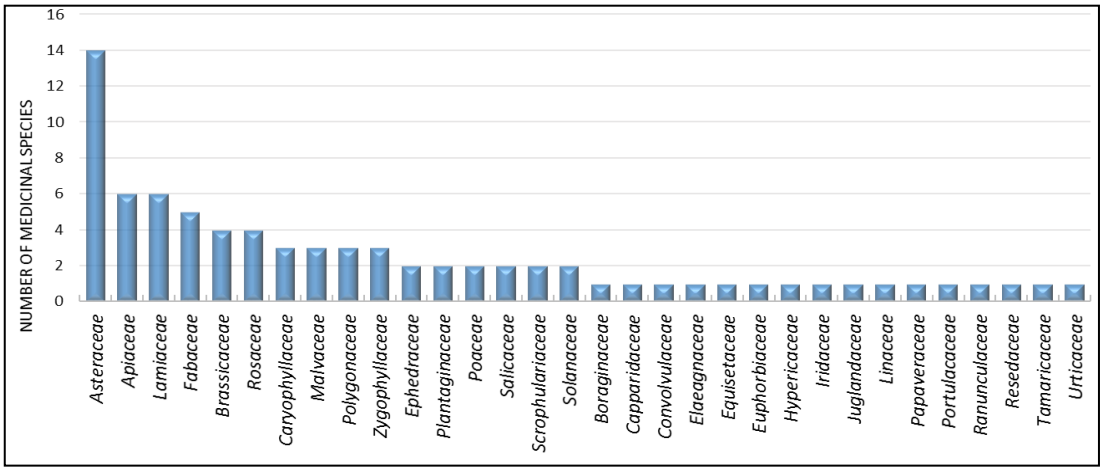

Fig. 2. The number of medicinal species in each family.

Results showed that from a total of 32 families and 77 species, Asteraceae with 14 species has the largest medicinal plant family as demonstrated in other medicinal study in this province (Mousavi, 2004); it was followed by Apiaceae with 6 species and Lamiaceae with 6 species (Fig. 2).The most frequently used plant parts were shoot (27%) and whole plant (26%) (Fig. 3).

Different diseases were classified into 14 category (Table 2) and FIC values for each category were presented. The results of the FIC values revealed that the Cold & Pulmonary problems and Digestive problemscategories had the greatest agreement with an FIC of 0.92; it is followed by Pain & Fever and Skin & Hair & Nails problems categories with 0.87(Table 3). Due to the cool and dry weather in this area, the high FIC value for Cold & Pulmonary problems category can be predicted.

Among the 77 species, *Achillea millefolium*, *Achillea tenuifolia*, *Achillea wilhelmsii*, *Alcea transcaucasica*, *Anchusa strigosa*, *Cichorium intybus*, *Cichorium pumilum*, *Descurainia Sophia*, *Elaeagnus angustifolia*, *Falcaria vulgaris*, *Fumaria asepala*, *Glycyrrhiza glabra*, *Juglans regia*, *Malva neglecta*, *Mentha longifolia*, *Nasturtium officinalis*, *Peganum harmala*, *Rosa canina*, *Stachys lavandulifolia*, *Thymus kotschyanus*, *Tragopogon graminifolius*, with 32 informants bear the largest number of informants. This showed that they were well known and thus they are using by a great number of the local residents.

Due to the high distribution of these species in the most parts of Iran and especially in this area, the number of informants is reasonable and such similar results are taken in the majority of ethnobotany studies in the other regions. Sophora pachycarpa with 30 numbers of informants followed them (Table 4).

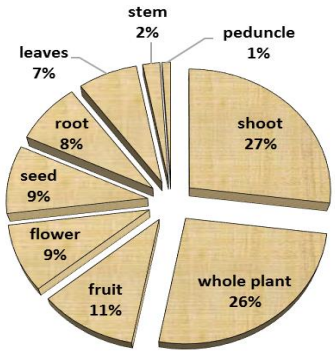

Fig. 3. Percentage of plant parts used.

Table 2. Categories of disease

Disease category	Types of Disease
Blood problems & Cancer	Glucose, fat and pressure of blood , diabetes, cancer.
Cold & Pulmonary problems	Cold, catarrh, angia, cough, hoarseness, purulent sputum, parturition infection, pulmonary problems.
Digestive problems	Stomachache, diarrhea, dysentery, hemorrhoid, flatulence, ileus, colic, ulcer, constipation, nausea.
Eye problems	Soer eye, conjunctivit, ataract, uveitis, inflammation.
Heart & Nerves problems	Anxiety, stress, tonic.
Kidney problems	Kidney stones, inflammation.
Liver problems	Liver problem, bile, spleen, gall.
Other problems	Chilblain, heat stroke, thirst, coagulation, bleeding, Body worms.
Pain & Fever	Ecchymosis of foot or hand, body pain, joints pain, knee pain, arthrosis, osteoporosis.
Prostate & Genital problems	Prostate stones, hernia, menstruation, genital infection.
Skin & Hair & Nails problems	Mole, rash, freckle, irritation, acene, fungal skin scars, hives, eczema, itch, bite, skin allergy, brittle hair & nails, con.
Tooth problems	Infection, decay, ache.
Wounds & Infection	Swollen glands, septic, infection, wounds.

Table 3.Informant consensus factor (FIC) by categories of diseases.

Disease category	Use reports (N_{ur})	Number of taxa (N_t)	FIC
Cold & Pulmonary problems	270	23	0.92
Digestive problems	404	32	0.92
Pain & Fever	98	13	0.87
Skin & Hair & Nails problems	122	16	0.87
Blood problems & Cancer	112	16	0.86
Eye problems	38	6	0.86
Other problems	89	14	0.85
Wounds & Infection	66	11	0.84
Kidney problems	45	8	0.84
Tooth problems	32	6	0.83
Heart & Nerves problems	34	8	0.78
Liver problems	34	11	0.69
Prostate & Genital problems	15	6	0.64

Table 4. Species with the number of informants

Name of medicinal plants	Number of informants	Name of medicinal plants	Number of informants	Name of medicinal plants	Number of informants
Achillea millefolium	32	*Atraphaxis spinose*	23	*Rheum ribes*	10
Achillea tenuifolia	32	*Echinophora platyloba*	23	*Ziziphora tenuior*	10
Achillea wilhelmsii	32	*Ephedra major*	23	*Conringia orientalis*	5
Alcea transcaucasica	32	*Ephedra sarcocarpa*	23	*Salvia nemorosa*	5
Anchusa strigose	32	*Rosa persica*	23	*Alhagi persarum*	4
Cichorium intybus	32	*Euphorbia seguieriana*	22	*Echinops ritrodes*	4
Cichorium pumilum	32	*Solanum nigrum*	21	*Eryngium billardieri*	4
Descurainia Sophia	32	*Taraxacum syriacum*	21	*Hordeum glaucum*	4
Elaeagnus angustifolia	32	*Urtica dioica*	21	*Silybum marianum*	4
Falcaria vulgaris	32	*Capparis spinose*	20	*Arctium lappa*	3
Fumaria asepala	32	*Dianthus orientalis*	20	*Carthamus oxyacantha*	3
Glycyrrhiza glabra	32	*Hibiscus trionum*	20	*Centaurea depressa*	3
Juglans regia	32	*Hyoscyamus reticulatus*	20	*Ferula gummosa*	3
Malva neglecta	32	*Linum usitatissimum*	20	*Scrophularia variegata*	3
Mentha longifolia	32	*Plantago lanceolata*	20	*Zygophyllum fabago*	3
Nasturtium officinale	32	*Plantago major*	20	*Amygdalus lycioides*	2
Peganum harmala	32	*Rumex chalepensis*	20	*Cuscuta epithymum*	2
Rosa canina	32	*Thalictrum minus*	20	*Foeniculum vulgare*	2
Stachys lavandulifolia	32	*Ziziphora clinopodioides*	20	*Gladiolus atroviolaceus*	2
Thymus kotschyanus	32	*Alyssum linifolium*	14	*Hypericum perforatum*	2
Tragopogon graminifolius	32	*Crataegus pontica*	14	*Melilotus officinalis*	2
Sophora pachycarpa	30	*Portulaca oleracea*	13	*Reseda lutea*	2

Salix acmophylla	25	*Tamarix ramosissima*	13	*Tribulus terrestris*	2
Salix elbursensis	25	*Acroptilon repens*	12	*Vaccaria pyramidata*	2
Verbascum cheiranthifolium	25	*Equisetum arvense*	12	*Vaccaria pyramidata*	2
Artemisia oliveriana	23	*Cynodon dactylon*	10		

4. Conclusion

This study deals with the diversity and uses of ethnomedicinal plants, indicating the importance of the plants to the people living in this area. Although use of herbs and their related traditional knowledge is declining among the urban and rural young people and there is a tendency that this knowledge might be forgotten with the death of the elderly; however, residents of Zanjan use plants for different medicinal purposes, from past to the present. Certainly, in addition to these 77 species, there are more species in this area that are used by its residents. Recognition of these species needs more research and further studies.

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