



# Beliefs of herbal therapies of the community of the Ilam city of Ilam province, Iran

[Creencias de las terapias herbales de la comunidad de la ciudad de Ilam de la provincia de Ilam, Irán]

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## Abstract

**Context:** Documenting folk uses of wild medicinal plants provide an important baseline for the future novel drugs development and pharmacological evaluation.

**Aims:** To document the traditional ethnomedicinal knowledge of Ilam city of Ilam Province, Iran.

**Methods:** Semi-structured interviews were carried out in the study area from 190 informants to document the ethnomedicinal knowledge during 2008-2014. The collected data were assessed with quantitative tools viz. medicinal use value (MUV), family use value (FUV) and relative frequency of citation (RFC).

**Results:** A total of 132 plant species distributed in 116 genera and 51 families were revealed to be used in herbal-based therapy. The highest medicinal plants diversity was shown by *Compositae* (19 species). A total of 13 types of plant parts were reported to be used in different recipes dominated by leaf (31%). Highest MUV were shown by *Alhagi maurorum* Medik. (0.87) and *Cannabis sativa* L. (0.85). In case of RFC, the highest RFC were expressed by *Lycium depressum* (0.95) followed by *Pistacia khinjuk* (0.94), *Nasturtium officinale* (0.93) and *Portulaca oleracea* (0.90). Highest FUV among small families was shown by *Cannabaceae* (0.85) and among the large families by *Leguminosae* (0.55).

**Conclusions:** The study revealed a high medicinal plant diversity that is utilized for long time by the local communities of Ilam to resolve their health-based problems. The plants marked in the present paper could be brought under pharmacological evaluation to further exploit their efficacy. This paper could be an important document for the future generations of the Ilam province, Iran.

**Keywords:** ethnobotany; family use value; Ilam; Iran; medicinal plants; medicinal use value; relative frequency citation.

## Resumen

**Contexto:** La documentación del uso de la gente de las plantas silvestres produce una base importante para el desarrollo futuro de nuevos medicamentos y su evaluación farmacológica.

**Objetivos:** Documentar el conocimiento tradicional etno-medicinal de la ciudad de Ilam de la provincia de Ilam, Irán.

**Métodos:** Se realizaron entrevistas semiestructuradas en el área de estudio de 190 informantes para documentar el conocimiento etno-medicinal durante el 2008 - 2014. Los datos recolectados fueron evaluados con herramientas cuantitativas, valor de uso medicinal (MUV), valor de uso familiar (FUV) y frecuencia relativa de citas (RFC).

**Resultados:** Se reveló que 132 especies de plantas, distribuidas en 116 géneros y 51 familias, eran usadas en la terapia con base herbolaria. La mayor diversidad de plantas medicinales fue mostrada por *Compositae* (19 especies). Fueron reportados 13 tipos de partes de plantas para ser usados en diferentes recetas, principalmente las hojas (31%). Los mayores MUV fueron mostrados por *Alhagi maurorum* Medik (0.87) y *Cannabis sativa* L. (0.85). Los mayores RFC fueron alcanzados por *Lycium depressum* (0.95), seguido por *Pistacia khinjuk* (0.94), *Nasturtium officinale* (0.93) y *Portulaca oleracea* (0.90). Los mayores FUV entre las pequeñas familias se mostraron para *Cannabaceae* (0.85) y entre las grandes familias para *Leguminosae* (0.55).

**Conclusiones:** El estudio reveló una alta diversidad de plantas medicinales que han sido utilizadas durante un largo tiempo por las comunidades locales de Ilam para resolver sus problemas de salud. Las plantas señaladas en este artículo podrían ser llevadas a evaluación farmacológica para el aprovechamiento de su eficacia en el futuro. Este artículo podría ser un documento importante para las generaciones futuras de la provincia de Ilam, Irán.

**Palabras Clave:** etnobotánica; frecuencia relativa de citas; Ilam, Irán; plantas medicinales; valor de uso familiar; valor de uso medicinal.

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## INTRODUCTION

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Ethnopharmacology consists of the investigation of plants used by the traditional communities and further understand the pharmacological basis of these culturally important medicinal plants. In the prehistoric era, medicinal plants were the only source of treatment of various diseases (Jalali et al., 2009; Mozaffari Nejad et al., 2013a; 2013b; Bhatia et al., 2015). Traditional medicine plays a key and important role in the health care systems of many countries, which is based on herbal remedies. World Health Organization (WHO) reported that, about 80% of primary medical care in developing countries depends on traditional medicines, due to their advantages such as safe, low cost and easily affordable. Besides this, modern treatment facilities are not accessible for the people who live far away from the towns. Approximately 25% of the medical drugs are produced from herbal ingredients and their derivatives in the developed countries (Mozaffari Nejad et al., 2013a; Ullah, 2014).

In the recent years, the ethnomedicinal information of indigenous plants has been taken into a huge consideration. Medicinal herbs have the ingredients and antioxidants have apply their therapeutic effects. Also, the researchers demonstrated that plant species used in popular medicine are a promising source for antimicrobial and other effects (Kamkar et al., 2013; Mozaffari Nejad et al., 2014; Eslami et al., 2016; Karimi et al., 2016; Rahimi-Madiseh et al., 2017). Due to the rising cost of allopathic drugs for the maintenance of personal health of human wellbeing and biomedical benefits and accessibility of medical plants, the use of these natural plants in producing drugs has been considered as a suitable alternative (Morvin Yabesh et al., 2014; Ullah, 2014). Moreover, resistance shown by to the present prevalent medicines in clinics is also complicating the picture. So, switching towards alternative medicines is a need of the hour (Shah et al., 2014).

The knowledge on medicinal plants and their use is obtained by experiences, trial and error, and handed on from generation to generation. However, due to the presence of a gap between older and younger generations this field of medical sciences is in danger. Iran has a long history in the field of traditional medicine (Ghorbani, 2005). The traditional

pharmacopeia and medicinal plants have been studied in different areas of Iran (Jalali et al., 2009; Ghasemi et al., 2013; Mozaffari Nejad et al., 2013a). However, no information is available on the medicinal plants of Ilam province (Ilam city). Therefore, the aim of the study was to explore the ethnomedicinal potential of the area with the help of ethnobotanical quantitative tools.

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## MATERIAL AND METHODS

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### Area of study

Ilam province is one of the western provinces of I.R. Iran and is located in the mountainous and semi-warm area. The capital of the province is Ilam city. Ilam province is neighbor from west with Iraq, from south with Khuzestan province, from east with Lorestan province and from north with Kermanshah province. This province is one of, more or less, forested provinces of Iran. Prior to Reza-shah period, this area was called Poshtkoh Lorestan. But in 1931 M.d at the time of Reza-shah kingdom under the act of Ministers 'Council and to recall the glory of ancient Ilam civilization, name of Hossein-Abad village was changed to Ilam and this village was selected as city and provincial capital with Ilam name. The ancient civilization of Ilam was centralized in today Fars and Khuzestan provinces, but apparently decision of Reza-shah period for naming of Ilam back to this topic that Poshtkooch area also in the periods was part of the ancient Ilam. Its population is 155285 according to 2006 census.

### Topography and climate

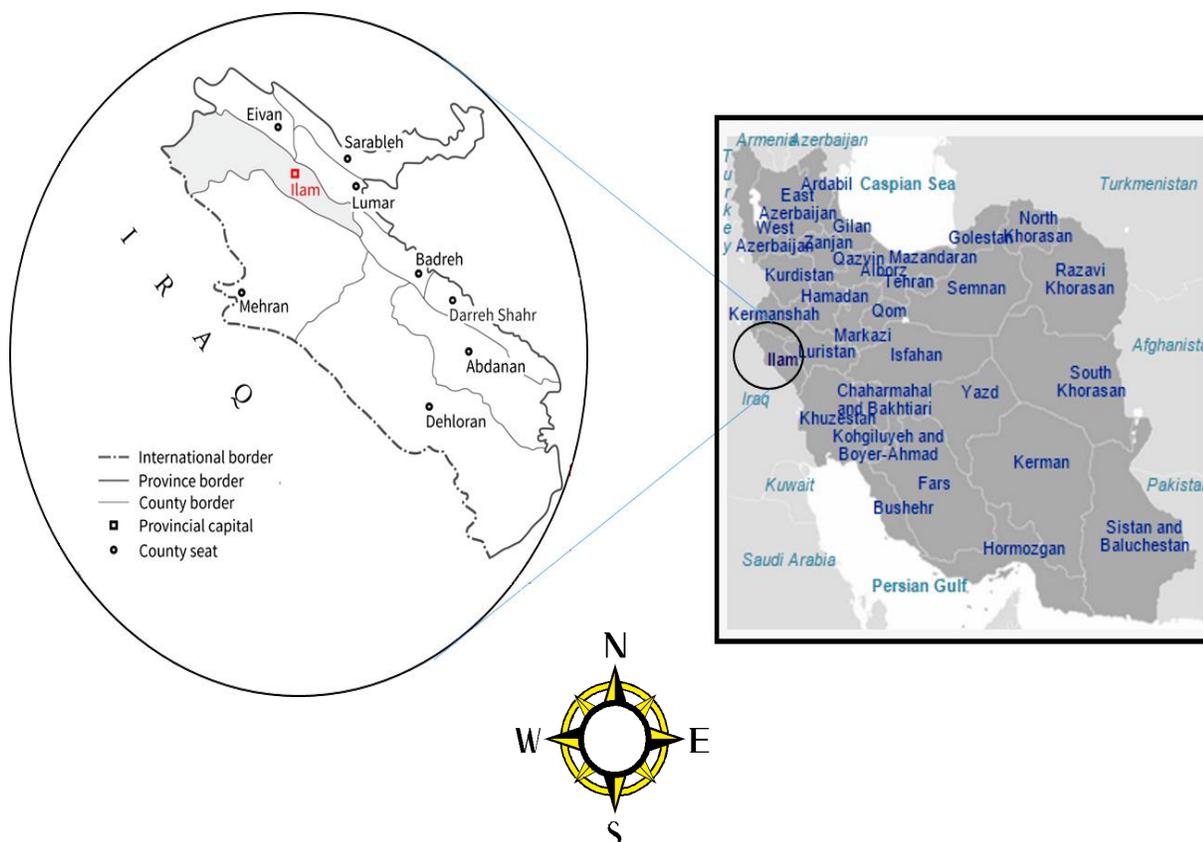
Ilam province especially Ilam city, known as the thyme land and the rising sun land, is located in west of Iran. The geographical location of the province is visible in Figure 1. Geologically, the lowland plain and hills of the province are composed mostly of gypsum and calcareous soils, and the mountainous parts are composed mostly of calcareous, sandstone or conglomerate materials supporting fertile agricultural soils. Ilam city is located at 33° 38' north latitude and 46° 26' east longitude. The highest mountains of the province are Kabir kuh (Kanseifi climax), which stretches from the north-west to the south-east between the lowland and the

mountainous parts of the province and reach a height of 2790 m. Gachan, Manesht, Ghalarang and Reno around Ilam city is a continuation of the Zagros mountains and the lowlands are a continuation of the Mesopotamian plains, which have a warm and frost-free climate. A big part of the province is more or less a semi-arid region, and other parts have a temperate climate and a very short period of winter frost. The average annual precipitation of Ilam city is about 500 mm.

*Socio-demographic information*

Kurd tribes are the main residents of Ilam city, and Kurdish is the leading language. A common Kurdish dialect in Ilam province is Ilami Kurdish. It is also called Fili. Kurdish is common in most areas of the region. Fili word is not known among the people of Ilam. This word comes from Iraq's Kurds

due to domination of Lorestan governors known as Fili to Ilam. Alireza Asadi in his book brings "from comparison of Middle Iranian's words (Parthian Pahlavi and Sassanid Pahlavi) with Ilami Kurdish words you can reach to the conclusion that many Parthian Pahlavi and Sassanid Pahlavi have the same root with these words. This unison can be seen in many verbs, political concepts, religious, social, employment, proper names, common names and even slangs. In Ilam, most of economic activities are focused on agriculture and livestock and also have fertile fields for bee keeping. Opening of joint border with Iraq in Mehran city brings new hopes to develop business, trade and tourism with expansion of Mehran's border terminal. Mineral resources mainly consist of non-metallic minerals and are rich of oil and gas reserves.



**Figure 1.** Geographical position of Ilam in Iran.

**Data collection**

This ethnobotanical survey of Ilam was carried out from August 2008 to October 2014. The data of native herbal plants were obtained from 190 individuals comprised of herbal practitioners, young and elders (60% men and 40% women) in 23 villages (1. Arkouazi, 2. Dehpaein, 3. Mish khas, 4. Alishervan, 5. Keshvari, 6. Anarak, 7. Avareh, 8. Aveza, 9. Ban oureh, 10. Ban ziarat, 11. Ban sero, 12. Ban vizheh, 13. Banghelan, 14. Pagol gerab, 15. Chamezhieh, 16. Chenar bashi, 17. Haji bakhtiar, 18. Heidar abad, 19. Ghale doleg, 20. Dartout, 21. Shirinab, 22. Soltan abad, and 23. Hasan abad). The informants were between 25 to 67 years age. A questionnaire, interviews and discussions were used for collecting information from the tribal practitioners in their local language (Kurdish). In order to extract information a semi-structured questionnaire (Table 1) was applied based on the types of ailments treated by the use of medicinal plants and plant parts used

in treating the respective ailments. The interviews were carried out with prior consent from all the informants following the ethical code of the international society of ethnobiology. Information was taken from the native community about each local medicinal plant, vernacular name, uses (particularly medicinal uses), route of administration and plant part used to treat. All the ethnomedicinally important plants were collected from the area and pressed, dried, labelled and mounted on herbarium sheets and preserved in Medical Plants Research Center, Shahrekord University of Medical Sciences, Iran. Plant samples' identity was authenticated from the Flora Iranica. Meanwhile, herbalists and traditional healers to believe the special effects of herbs they saw and witnessed these effects on the human health. Also, information was gathered through observation of the present use of traditional plant pharmaceutical or uses that are at least still alive in the remembrances of the oldest population.

**Table 1.** Semi-structured questionnaire corresponding to ethnobotanical survey of Ilam.

Demographic information			
Age:	Gender:	Education:	Date:
Village name:	Nationality:	How to learn knowledge:	Language:

Ethnobotany information				
Local name:	How to use traditional (boiled, ointment, pastille and etc):	Part (s) used (flowers, aerial parts, leaves, root, berries, stem):	Uses in the local popular medicine:	Plant name:

Apart from the plants mentioned in the questionnaire, are there any other plants that can be used to treat various types of diseases? (Please mention some):

What kind of plants do you use to treat various types of pain? (Headache, toothache, kidney pain, back pain, antidotes, etc.) (please name some):

What plants do you use as an antiparasitic? (Please mention some):

What kind of plants are used to treat diabetes? (Please mention some):

What plants do you use to treat high blood pressure? (Please name some):

What are the plants used to treat blood cholesterol? (Please mention some):

What plants do you use to treat kidney and bladder stones? (Please name some):

What are the plants used to treat diabetes? (Please mention some):

What are the plants used to repair burns and cuts? (Please name some):

What plants are used to treat cold and influenza? (Please name some):

## Data analysis

The data collected through interviews of the informants was analyzed using different statistical quantitative tools i.e. medicinal use value (MUV), family use value (FUV) and relative frequency citation (RFC).

Medicinal Use value indicates the relative medicinal importance of plants known locally. MUV is actually modification of the use value (UV). The medicinal use value was calculated with little modifications of Tardío and Pardo de Santayana (2008) method according to the following equation:

$$MUV = \sum MU_i / N$$

Where  $MU_i$  denotes the number of the mentioned medicinal uses by each informant for a given plant species and  $N$  denotes the total number of informants included in the survey. MUV ranges from 0-1. MUVs are high when there are many use-reports for a plant making the sense that the plant is important and approaches zero (0) when there are a few use reports related to its use.

Family use value (FUV) determines the importance of a family reporting various plants for their therapeutic potential. Family use value is determined by Ghasemi et al. (2013) as:

$$FUV = \sum UV_s / ns$$

Where "FUV" is the family use value of family reporting plants for their medicinal purpose, " $\sum UV_s$ " is the use values of all the species reported by respected family and "ns" is the total number of species within a given family.

Relative Frequency of Citation (RFC) is an index that is used to demonstrate the local importance of each plant species. It is calculated based on the frequency of citation (FC is the number of informants in relation to the use of plant species) divided by the total number of informants (N) participated in the study without used categories for consideration (Tardío and Pardo-de-Santayana, 2008).

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## RESULTS AND DISCUSSION

Ethno-medicine (traditional medicine) consists of a set of traditional practices, which obtained

from the implicit knowledge of a social group, transmission through the generations and targeted at solving health related problems. The traditional practices have been obtained by hundreds of years of observations and approved with the consequent development of modern medicines. In the past decade, the traditional medicine has been taken into a huge consideration worldwide (Upadhyay et al., 2010). According to the latest, in most parts of the developing countries, large proportion of the population uses the traditional practitioners and medicinal plants to treat their primary health problems. Although modern medicine is available in developed countries, but there is a growing tendency among the people to use herbal medicines due to their cultural, religious and historical reasons (Rehman et al., 2015).

A total of 132 medicinal plant species were reported by the local community to treat a plethora of ailments (Table 2). These plants were distributed among 116 genera and 51 families, which indicate that the study area has got plenty of plant diversity. Only one species *Adiantum capillus-veneris* belonged to Pteridophytes. Among the angiosperms, only 10 plants belonged to monocotyledons while the remaining 124 were exclusively dicotyledons justifying the general as well as medicinal dominance of the dicotyledons over the globe. The highest number of species and genera were possessed by *Compositae* i.e. 19 and 13, respectively (Table 3). Thirty-one families were composed of one species only.

In a similar study by Ghasemi et al. (2013) reported that 122 medicinal plants belonging to 49 families from district Behloran and Abdanan of the same province suggesting the higher diversity of medicinal plants and their usage in this area. Ghasemi et al. (2013) and Moerman et al. (1999) also reported *Compositae* as the most dominant family of medicinal plants and it is in line with the claim that the best-represented floristic family of the region is the most used one, in fact *Compositae* is the largest family of flowering plants globally. Ghorbani (2005) also approximately reported the similar dominance in the Turkmen Sahara community of north of Iran. A set of families encapsulating *Compositae*, *Lamiaceae*, *Rosaceae*, *Leguminosae*, *Apiaceae*, *Brassicaceae*, *Chenopodiaceae*, *Solanaceae*, and *Apocyc-*

*naceae*, among others. would probably be found in most ethnobotanical studies from Iran e.g. (Miraldi et al., 2001; Ghorbani, 2005; Nasab and Khosravi, 2014) and allied countries e.g. (Kargioğlu et al., 2008; Jamila and Mostafa, 2014; Singh et al., 2014; Ullah et al., 2014; Bhatia et al., 2015), suggesting that these are the major medicinal plant families in this region. The dominance of medicinal

plant species from these families can be related to their wide distribution, abundance and easy availability. Moreover, the wide consumption of species from these families may be attributed to the presence of effective bioactive ingredients against ailments (Gazzaneo et al., 2005).

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province.

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Amaranthaceae</b>	0.44							
<i>Atriplex leucoclada</i> Boiss.		Remt	Saltbush	Leaf	0.62	142	0.75	Softeners chest, cough and sore throat
<i>Chenopodium album</i> L.		Solmetere	Lamb's quarters, Melde, Goosefoot and Fat hen	Aerial parts	0.21	56	0.29	Laxative
<i>Noaea mucronata</i> (Forssk.) Asch. & Schweinf.		Khargo	Bedouin sirr, Pig weed	Leaf and flower	0.44	134	0.71	Urolithiasis
<i>Salsola vermiculata</i> L.		Shour	Saltwort	Stalk and leaf	0.45	77	0.41	Laxative and anti-scorbutic (vitamin C deficiency)
<i>Seidlitzia rosmarinus</i> Bunge ex Boiss.		Benjeke-shenan	Seidlitzia	Aerial parts	0.47	145	0.76	Washing of wounds, hair tonic
<b>Amaryllidaceae</b>	0.51							
<i>Allium akaka</i> S.G.Gmel. ex Schult. & Schult.f.		Aneshk	Ramsons broad	Leaf and bulb	0.56	83	0.44	Appetizer, antiseptic, antimicrobial, antiparasitic and stomachic
<i>Allium ampeloprasum</i> L.		Tareg	Perennial sweet leek	Bulb and leaf	0.59	92	0.48	Kidney disorders, urinary tract infections, gastric ulcer, intestines disorders
<i>Allium olivieri</i> Boiss.		Piyaze	Litre tree	Stalk and bulb	0.20	38	0.20	Anti-flatulent
<i>Narcissus tazetta</i> L.		Narges	Polyanthus narcissus	Flower and bulb	0.66	123	0.65	Sedative, relieves headache, antiparasitic, and prevent miscarriage
<b>Anacardiaceae</b>	0.76							
<i>Pistacia atlantica</i> Desf.		Banad, Koleng-kala	Pistache	Fruit and resin	0.81	165	0.87	Memory enhancer, anti-hemorrhoids, laxative, tonic, stomachic and for bone pain
<i>Pistacia khinjuk</i> Stocks		Banak, Kolenge-kala	Pistache	Fruit and resin	0.80	178	0.94	Disorders affecting the digestive system, diuretic, asthma, stomachic and mouth freshener
<i>Rhus coriaria</i> L.		Somagh	Sicilian sumac	Fruit	0.66	98	0.52	Appetizer, anti-diarrheal, gastrointestinal disorders

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Apiaceae</b>	0.39							
<i>Ferula behboudiana</i> (Rech.f. & Esfand.) D.F.Chamb.		Anio	Giant fennel	Stalk, leaf and floral branches	0.29	65	0.34	Antiseptic
<i>Ferula haussknechtii</i> H.Wolff ex Rech.f.		Kame	Giant fennel	Stalk, leaf and floral branches	0.65	88	0.46	Disinfectant
<i>Ferulago angulata</i> (Schltld.) Boiss.		Chavir	Ferulago	Leaf	0.55	82	0.43	Antiseptic, strengthen hair
<i>Oliveria decumbens</i> Vent.		None-khoda	Oliveria	Aerial parts	0.33	81	0.43	Diarrhea and abdominal pain
<i>Pimpinella anisum</i> L.		Vavheshing	Anise	Fruit	0.20	47	0.25	Carminative
<i>Prangos ferulacea</i> (L.) Lindl.		Bale har, Ginoo	Prangos	Leaf and flower	0.41	77	0.41	Laxative
<i>Smyrniun cordifolium</i> Boiss.		Pinoume	Alexanders	Stalk	0.25	82	0.43	Nutritious and to treat indigestion
<b>Apocynaceae</b>	0.51							
<i>Cionura erecta</i> (L.) Griseb.		Benjek-kishkoe	Dogbane, Milkweed	Aerial parts	0.55	77	0.41	Antiparasitic
<i>Nerium oleander</i> L.		Hortil	Oleander	Leaf, flower and resin	0.49	109	0.57	Burns, wounds, eczema, tonic and diuretic
<i>Periploca aphylla</i> Decne.		Kholf	Silk vine	Leaf and flower	0.50	66	0.35	Anti-inflammatory
<b>Aristolochiaceae</b>	0.34							
<i>Aristolochia clematitis</i> L.		Zaravand	Birthwort	Aerial parts	0.25	72	0.38	Washing of wounds
<i>Aristolochia olivieri</i> Colleg. ex Boiss.		Zaravand	Dutchman's pipe	Leaf and stalk	0.43	92	0.48	Skin disorders and wounds
<b>Biebersteiniaceae</b>	0.32							
<i>Biebersteinia multifida</i> DC.		Genou	Vernacular	Aerial parts	0.32	80	0.42	Antiparasitic
<b>Boraginaceae</b>	0.67							
<i>Echium italicum</i> L.		Gole-gazo	Viper's bugloss	Flower	0.67	105	0.55	Relaxation of the nervous system, Anti flatulent, cold, sore throat, wound healing and antiseptic
<b>Brassicaceae</b>	0.35							
<i>Alyssum simplex</i> Rudolph		Ghodoume	Alyssum	Fruit	0.45	120	0.63	Wheezy chest, cough and sore throat
<i>Isatis raphanifolia</i> Boiss.		Vasme	Dyer's woad	Root, seed and leaf	0.50	137	0.72	Dye color
<i>Lepidium draba</i> L.		Toufo-sarae	Hoary cress	Leaf	0.26	66	0.35	Nutritious and energizing
<i>Nasturtium officinale</i> R.Br.		Kaleshak	Water cress	Leaf, flower and root	0.23	177	0.93	Appetizer, antiparasitic
<i>Sinapis arvensis</i> L.		Terpeki	Mustard	Flower and stalk	0.33	39	0.21	Laxative and appetizer

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Cannabaceae</b>	0.85							
<i>Cannabis sativa</i> L.		Shadone	Hemp	Fruit	0.85	163	0.86	Laxative, anti-parasitic, tonic, cough and treat disorders of the nervous system
<b>Capparaceae</b>	0.55							
<i>Capparis spinosa</i> L.		Kalkem	Caper	Leaf, root and fruit	0.55	131	0.69	Hepatoprotector, toothache, diabetes
<b>Caprifoliaceae</b>	0.54							
<i>Lonicera nummulariifolia</i> Jaub. & Spach		Pelakhor	Lonicera	Leaf and flower	0.54	151	0.79	Antipyretic, anti-diarrheal, antitussive and sedative
<b>Caryophyllaceae</b>	0.52							
<i>Dianthus orientalis</i> Adams		Gole-mikhak	Pink	Flower and fruit	0.52	163	0.86	Toothache and antispasmodic
<b>Colchicaceae</b>	0.50							
<i>Colchicum kotschy</i> Boiss.		Kahran	Autumn saffron	Flower	0.50	81	0.43	Rheumatism
<b>Compositae</b>	0.40							
<i>Achillea arabica</i> Kotschy		Bomaro	Yarrow	Leaf and capitula	0.54	73	0.38	Indigestion, rheumatism, sedative, analgesic, antiseptic and for toothache
<i>Achillea wilhelmsii</i> K.Koch		Boumaro	Sand spurrey	Leaf and capitula	0.34	66	0.35	Abscess, wound healing, refreshing
<i>Artemisia herba-alba</i> Asso		Doukhoshgele	White wormwood	Aerial parts	0.41	71	0.37	Anthelmintic
<i>Artemisia scoparia</i> Waldst. & Kitam.		Selmana	Oriental worm wood	Floral branches	0.54	70	0.37	Indigestion, wheezy chest and respiratory tract infections
<i>Artemisia sieberi</i> Besser		Boukhoshgeleh	Wormwood	Leaf and stalk	0.76	156	0.82	Anti-parasitic, anti-diarrheal and appetizer
<i>Calendula arvensis</i> (Vaill.) L.		Gole-zarde	Iranian marigold	Capitula and leaf	0.41	73	0.38	Wounds, eczema and other skin disorders
<i>Carthamus oxyacanthus</i> M.Bieb.		Zarde-dereg	Safflower	Capitula	0.55	88	0.46	Treatment of menorrhagia and other menstrual disorders in women
<i>Centaurea iberica</i> Trevir. Ex Spreng.		Asan-dereg	Centaurea	Capitula	0.41	91	0.48	Stomach-ache
<i>Centaurea intricate</i> Boiss.		Benjeke-deregi	Centaurea	Aerial parts	0.31	77	0.41	Indigestion and stomach-ache
<i>Centaurea ovina</i> Pall. ex Willd.		Tileg	Centaurea	Capitula	0.22	81	0.43	Indigestion and stomach-ache
<i>Cichorium intybus</i> L.		Kasni	Chicory	Leaf, root and stalk	0.45	97	0.51	Laxative, diuretic, stomach pain and skin disorders
<i>Cirsium sorocephalum</i> Fisch. & C.A.Mey.		Kangare-dereg	Bull thistle	Stalk	0.23	56	0.29	Gastric infections

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<i>Cota altissima</i> (L.) J.Gay		Baiene	Chamomile	Leaf and flower	0.23	59	0.31	Dyspepsia
<i>Echinops viscidulus</i> Mozaff.		Ghaneshakrouk	Globe thistle	Bulb	0.52	102	0.54	Cough, cold, sore throat
<i>Picnemon acarna</i> (L.) Cass.		Goledion	Yellow plume thistle	Leaf	0.33	62	0.33	Indigestion and stomach disorders
<i>Tanacetum polycephalum</i> Sch.Bip.		Samsa	Tansy	Leaf	0.44	91	0.48	Anti-inflammatory and anti-hemorrhoids
<i>Tragopogon graminifolius</i> DC.		Haplouk	Salsify	Root(bulb) and leaf	0.26	59	0.31	Sore throat and wound healing
<i>Xanthium spinosum</i> L.		Chazang	Cocklebur	Leaf and fruit	0.39	81	0.43	Skin disorders, diuretic
<i>Xanthium strumarium</i> L.		Ghazank	Cocklebur	Leaf and fruit	0.40	71	0.37	Laxative, tonic and stomachic
<b>Cucurbitaceae</b>	0.63							
<i>Citrullus colocynthis</i> (L.) Schrad.		Shomi-shetona	Citrule	Fruit	0.63	55	0.29	Diabetes and wound healing
<b>Elaeagnaceae</b>	0.44							
<i>Elaeagnus angustifolia</i> L.		Arddgon	Oleaster	Fruit	0.44	82	0.43	Anti-diarrheal, stomach-ache and hepatoprotective
<b>Ephedraceae</b>	0.57							
<i>Ephedra foliata</i> Boiss. ex C.A.Mey.		Armak	Joint fir	Root and stalk	0.57	74	0.39	Anti-microbial and antipyretic
<b>Euphorbiaceae</b>	0.62							
<i>Euphorbia macroclada</i> Boiss.		Shir-ghotghan	Milkwort	Latex	0.49	110	0.58	Anti-warts
<i>Ricinus communis</i> L.		Kerchek	Castor oil	Fruit	0.74	127	0.67	Flatulence and digestive disorders
<b>Fagaceae</b>	0.72							
<i>Quercus brantii</i> Lindl.		Bali	Oak	Fruit and seed	0.72	99	0.52	Stomach ulcers, sore throat and antidiabetic
<b>Hypericaceae</b>	0.58							
<i>Hypericum scabrum</i> L.		Sie-ren	St. John's wort	Floral branches	0.58	100	0.53	Sedative, headache and relaxes the nervous system
<b>Iridaceae</b>	0.43							
<i>Crocus pallasii</i> subsp. <i>haussknechtii</i> (Boiss. & Reut. ex Maw) B.Mathew		Pishouk	Crocus	Leaf	0.56	99	0.52	Stomach and intestinal antibiotic
<i>Crocus sativus</i> L.		Kolmas	Saffron	Flower	0.30	51	0.27	Refrigerant, heart tonic
<b>Lamiaceae</b>	0.46							
<i>Mentha longifolia</i> (L.) L.		Pine	Horsemint	Leaf and flower	0.66	94	0.49	Carminative, used as food and flavoring agent
<i>Nepeta persica</i> Boiss.		Pine-si	Catmint	Leaf and flower	0.41	92	0.48	Anti-flatulent

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<i>Phlomis olivieri</i> Benth.		Give-balkan	Phlomis	Leaf and flower	0.43	81	0.43	Carminative and anti-flatulent
<i>Salvia palaestina</i> Benth.		Maryam-goli	Annual clary	Leaf and floral branches	0.58	110	0.58	Infertility, vaginal infections
<i>Salvia sclarea</i> L.		Maryamgloi	Clary	Leaf, seed and floral branches	0.49	133	0.70	Common cold and Antipyretic
<i>Satureja khuzistanica</i> Jamzad		Jatare	Summer	Aerial parts	0.23	52	0.27	Indigestion, headache and stomach-ache
<i>Stachys lavandulifolia</i> Vahl		Goulpar	Stachys	Leaf and flower	0.83	144	0.76	Anti-flatulent, rheumatism, dyspepsia, headache, heart tonic, analgesic and anti-depressant
<i>Teucrium polium</i> L.		Miyere-nekhe	Germander	Leaf and flower	0.40	75	0.39	Antiseptic, gastric pain, stomatitis
<i>Thymbra spicata</i> L.		Azboue	Thyme	Leaf and floral branches	0.27	34	0.18	Antimicrobial, carminative
<i>Vitex agnus-castus</i> L.		Kerf	Chaste tree	Leaf	0.45	75	0.39	Increases breast milk
<i>Ziziphora capitata</i> L.		Kakouti	Ziziphora	Leaf and floral branches	0.31	31	0.16	Spice, antimicrobial
<b>Leguminosae</b>	0.55							
<i>Alhagi maurorum</i> Medik.		Agol	Camel's thorn	Leaf and stalk	0.87	169	0.89	Antibiotic, urinary tract infections and laxative for children
<i>Astragalus glaucacanthos</i> Fisch.		Mive-badkonaki	Astragal	Gum	0.24	76	0.40	Tonic and energizing
<i>Astracantha gossypina</i> (Fisch.) Podlech		Gavan	Astragal	Gum	0.54	89	0.47	Common cold and strengthen hair
<i>Glycyrrhiza glabra</i> L.		Balik	Licorice	Root	0.71	110	0.58	Gastric ulcers, digestive disorders, diabetes
<i>Medicago sativa</i> L.		Yoenje	Alfalfa	Flower and leaf	0.77	140	0.74	Tonic, reduces blood cholesterol and abdominal fats
<i>Onobrychis elymaitiaca</i> Boiss. & Hausskn.		Pieh-kol	Sainfoin	Leaf and flower	0.55	133	0.70	Antimicrobial, kidney disorders
<i>Prosopis farcta</i> (Banks & Sol.) J.F.Macbr.		Blaveri	Syrian mesquite	Fruit	0.79	79	0.42	Blood thinner and anti-hyperglycemic
<i>Trifolium repens</i> L.		Shapareh	White clover	Leaf and floral branches	0.31	83	0.44	Analgesic and skin disorders
<i>Vicia sativa</i> subsp. <i>nigra</i> (L.) Ehrh.		Mashk	Narbonne	Fruit	0.23	71	0.37	Antitussive
<b>Liliaceae</b>	0.68							
<i>Fritillaria imperialis</i> L.		Sosan-gol	Imperial crown	Bulb	0.68	121	0.64	Rheumatism and sciatica

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Lythraceae</b>	0.28							
<i>Lawsonia inermis</i> L.		Khana	Henna plant	Leaf	0.28	107	0.56	Urinary tract infections
<b>Malvaceae</b>	0.67							
<i>Alcea angulata</i> Freyn & Sint.		Gole-hiro	Mallow	Root	0.67	98	0.52	Wounds healer and softener
<i>Malva neglecta</i> Wallr.		Touli	Mallow	Leaf and flower	0.67	91	0.48	Eye infections, laxative, sore throat and asthma
<b>Moraceae</b>	0.71							
<i>Ficus carica</i> L.		Anjir	Fig	Latex	0.71	56	0.29	Laxative, antitussive and anti-warts
<b>Myrtaceae</b>	0.64							
<i>Myrtus communis</i> L.		Mourt	Myrtle	Leaf	0.64	123	0.65	Disinfection, gynecological disorders, wound healing, antibacterial and air freshener
<b>Nitrariaceae</b>	0.78							
<i>Peganum harmala</i> L.		Espan, Sphan	Peganum, Harmel	Seed and fruit	0.78	91	0.48	For disinfection and treatment of scorpion sting
<b>Papaveraceae</b>	0.49							
<i>Fumaria parviflora</i> Lam.		Shatare	Fumitory	Flower, leaf and stalk	0.50	86	0.45	Treatment of dermatitis, eczema and other skin disorders
<i>Papaver dubium</i> L.		Gele-sorah	Great scarlet poppy	Leaf and flower	0.48	103	0.54	Brain tonic, sedative
<b>Pedaliaceae</b>	0.42							
<i>Sesamum indicum</i> L.		Konjed	Sesame	Seed	0.42	110	0.58	Cuts and wound healing
<b>Poaceae</b>	0.55							
<i>Avena barbata</i> Pott ex Link		Ganem-gia	Wild oat	Fruit	0.54	121	0.64	Stomach-ache, indigestion, rheumatism and tonic
<i>Hordeum murinum</i> subsp. <i>glaucum</i> (Steud.) Tzvelev		Jo	Barley grass	Fruit	0.62	139	0.73	Urinary tract infections
<i>Sorghum halepense</i> (L.) Pers.		Helit	Johnson grass	Leaf, rhizome and flower	0.51	115	0.61	Abortifacient
<i>Stipa capensis</i> Thunb.		Golkouh	Needle grass	Flower	0.55	141	0.74	Gastric problems and relaxation of the nervous system
<b>Polygonaceae</b>	0.42							
<i>Rheum ribes</i> L.		Ribas	Rhubarb	Stalk	0.34	131	0.69	Hypertension and reduces triglycerides level
<i>Rumex ephedroides</i> Bornm.		Torshe-mast	Dock	Leaf	0.50	119	0.63	Anti-inflammatory

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Portulacaceae</b>	0.71							
<i>Portulaca oleracea</i> L.		Perpelik	Purslane	Leaf, stalk and root	0.71	171	0.90	Antiparasitic
<b>Pteridaceae</b>	0.65							
<i>Adiantum capillus-veneris</i> L.		Kamar-avizeh	Southern maidenhair	Leaf	0.65	132	0.69	Disinfectant, kidney pain, body ache
<b>Ranunculaceae</b>	0.38							
<i>Adonis dentata</i> Delile		Gole-zardeh	Bird's eye, Adonis	Flower	0.35	120	0.63	Treatment of gastrointestinal disorders, indigestion and jaundice
<i>Consolida orientalis</i> (J.Gay) Schrödinger		Zaban ghafa	Larkspur	Flower	0.41	102	0.54	Laxative and anti-parasitic
<b>Rhamnaceae</b>	0.44							
<i>Paliurus spina-christi</i> Mill.		Dereg-der	Christ's thorn	Fruit	0.39	71	0.37	Hypotensive, reduces cholesterol level
<i>Rhamnus pallasii</i> Fisch. & C.A. Mey.		Arzhan	Buckthorn	Fruit	0.44	60	0.32	Cold, wheezy chest, cough and sore throat
<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.		Titeke	Camel thorn	Fruit and leaf	0.34	83	0.44	Tonic and for gastric ulcer
<i>Ziziphus spina-christi</i> (L.) Desf.		Sedr and Konar	Christ's thorn	Fruit and leaf	0.59	81	0.43	Anti-dandruff and strengthens hair roots
<b>Rosaceae</b>	0.47							
<i>Cotoneaster luristanicus</i> G.Klotz		Shirkhesht	Cotoneaster	Resin	0.47	41	0.22	Laxative for babies
<i>Crataegus azarolus</i> var. <i>pontica</i> (K.Koch) K.I.Chr.		Gich	Azarole	Fruit and leaf	0.40	34	0.18	Tonic
<i>Prunus arabica</i> (Olivier) Meikle		Bayem	Almond	Fruit and leaf	0.78	145	0.76	Antiparasitic, strengthen hair, Baby earache, bronchitis, digestive disorders
<i>Prunus lycioides</i> (Spach) C.K.Schneid.		Tanyers	Eridoclada	Aerial parts	0.56	100	0.53	Anti-parasitic
<i>Prunus mahaleb</i> L.		Bralik	Mahaleb cherry	Fruit	0.23	93	0.49	Laxative, anti-microbial, appetizer
<i>Prunus microcarpa</i> C.A.Mey.		Helonah	Sour cherry	Resin, crust of plant	0.56	85	0.45	Urolithiasis, fever
<i>Rosa canina</i> L.		Gole-tiyereg	Dog rose	Flower	0.55	104	0.55	Treatment of dyspepsia
<i>Rosa × damascena</i> Herrm.		Gole-bakhi	Persian rose	Flower	0.25	65	0.34	Treatment of indigestion
<i>Rubus anatolicus</i> Focke		Ti-yareg	Elm-leaved blackberry	Fruit	0.43	81	0.43	Appetizer, anti-parasitic
<b>Rutaceae</b>	0.20							
<i>Citrus limon</i> (L.) Osbeck		Limou	Lemon	Fruit	0.20	49	0.26	Diarrhea
<b>Salicaceae</b>	0.38							
<i>Salix alba</i> L.		Vi	White willow	Leaf	0.38	155	0.82	Antipyretic

**Table 1.** Information on medicinal uses and quantitative values of the medicinal taxa of Ilam province (continued).

Family   Scientific name	FUV	Vern. name	English name	Parts used	MUV	FC	RFC	Indigenous medicinal uses
<b>Santalaceae</b>	0.31							
<i>Viscum album</i> L.		Darvash	White mistletoe	Leaf, flower, stalk	0.31	102	0.54	Body ache, joint pain and abscess
<b>Scrophulariaceae</b>	0.65							
<i>Scrophularia deserti</i> Delile		Benjek-mashine	Figwort	Aerial parts	0.80	167	0.88	Wound healing, wounds antiseptic, antimicrobial, for kidney infections, vaginitis and brucellosis
<i>Verbascum alepense</i> Benth.		Gloe-zardeh	Mullein	Leaf and flower	0.51	117	0.62	Antipyretic, treatment of skin disorders and wounds healing
<b>Solanaceae</b>	0.58							
<i>Datura innoxia</i> Mill.		Tatotae	Hindu datura	Resin	0.61	171	0.90	Anti-warts
<i>Lycium depressum</i> Stocks		Khoshak	Wolf berry	Leaf and fruit	0.79	180	0.95	Treatment of urological disorders
<i>Nicotiana tabacum</i> L.		Tamakou	Tobacco	Leaf	0.66	94	0.49	Anti-lice, for tinea infections
<i>Physalis divaricata</i> D. Don		Araousake-poshtepardeh	Winter cherry	Fruit	0.6	115	0.61	Urolithiasis and kidney infections
<i>Solanum americanum</i> Mill.		Roarazek	Black nightshade	Fruit	0.26	56	0.29	Skin diseases, wound healing and eczema
<b>Tamaricaceae</b>	0.67							
<i>Tamarix ramosissima</i> Ledeb.		Shoor-gaz	Tamarisk	Resin and leaf	0.67	73	0.38	Treatment of skin disorders and wound healing
<b>Thymelaeaceae</b>	0.58							
<i>Daphne mucronata</i> Royle		Toye	Daphne	Wood	0.58	50	0.26	For refreshing eyes and eye pain
<b>Typhaceae</b>	0.25							
<i>Typha domingensis</i> Pers.		Loan	Cat's tail	Flower and resin	0.25	66	0.35	Antipyretic
<b>Ulmaceae</b>	0.55							
<i>Ulmus glabra</i> Huds.		Vezm	Elm	Leaf	0.55	83	0.44	Treatment of heart diseases and infertility
<b>Xanthorrhoeaceae</b>	0.77							
<i>Aloe vera</i> (L.) Burm.f.		Sabre-zard	Aloe	Leaf	0.77	148	0.78	Diarrhea, wound healing

FUV=Family use value; MUV=Medicinal use value; FC= No. of informants; RFC=Relative frequency of citation. The scientific names were proposed according to The Plant List (<http://www.theplantlist.org/>).

**Table 3.** Dominant medicinal plant families.

Family	Genera	Species
<i>Amaranthaceae</i>	5	5
<i>Anacardiaceae</i>	2	3
<i>Apiaceae</i>	6	7
<i>Apocynaceae</i>	3	3
<i>Asclepiadaceae</i>	15	21
<i>Brassicaceae</i>	5	5
<i>Compositae</i>	12	19
<i>Euphorbiaceae</i>	2	2
<i>Iridaceae</i>	3	3
<i>Lamiaceae</i>	10	11
<i>Leguminosae</i>	9	9
<i>Liliaceae</i>	1	1
<i>Malvaceae</i>	2	2
<i>Poaceae</i>	4	4
<i>Ranunculaceae</i>	2	2
<i>Rhamnaceae</i>	3	4
<i>Rosaceae</i>	6	9
<i>Scrophulariaceae</i>	2	2
<i>Solanaceae</i>	5	5

Various parts of the plant can accumulate diverse secondary metabolites. These metabolites are supportive to combat the plant's pathological stress and can also be used as a medicine by the community to cure a diversity of their disorders (Shah et al., 2013; Shah et al., 2014; Ullah et al., 2014). As different parts of the plants concentrate different types of bioactive constituents that is why local community reported it specifically. A total of 10 types of plant material (plant parts) were reported. Leaves (31%) were the mostly used plant part followed by flowers (19%), fruits (14%), stalks (8%), and aerial parts (7%). Roots, resins and floral branches were used 4-5% whereas 3% use was indicated by seeds and bulbs as showed in Table 4. In this regard, our study is congruent with those of Miraldi et al. (2001); Ayyanar and Ignacimuthu (2005); Ghorbani (2005), and Amri and Kisangau (2012), reported that leaves of plant part can be used in herbal remedies from different parts of Iran. However, this is not the case in Traditional Chinese Medicine according to recent reports where roots are the dominant part used (Weckerle et al., 2009; Ghorbani et al., 2011). Among 132 plants, 72 plants expressed the usage of single

plant part while the remaining 60 recorded more than one part to be used in herbal remedies. It appears that plant parts are specific to diseases and not all parts of a medicinal plant are necessarily important.

**Table 4.** Different plant parts used for medicinal purposes.

Part of plant	Percentage (%)
Aerial parts	7.00
Bulb	2.91
Floral branches	4.40
Flower	18.93
Fruit	14.07
Leaf	31.06
Resin	5.33
Root	4.85
Seed	3.39
Stalk	7.80

Some plants had excessive use in the area and regularly mentioned by the informants. The highest medicinal MUV reported was 0.87 while the lowest 0.20. The mostly used plants were *Alhagi maurorum* (0.87), *Cannabis sativa* (0.85), *Stachys lavandulifolia* (0.83), *Pistacia atlantica* (0.81), *Pistacia khinjuk* (0.80), *Scrophularia deserti* (0.80), *Prosopis farcta* (0.79), *Lycium depressum* (0.79), *Prunus arabica* (0.78), *Peganum harmala* (0.78), *Aloe vera* (0.77), *Medicago sativa* (0.77) and *Artemisia sieberi* (0.76). *Alhagi maurorum* is used as diaphoretic, diuretic, expectorant and in ulcer treatment (Kulieva and Shasvarov, 1972). It is also used as laxative and in diseases of the urinary tract and liver (Batanouny, 1999). Different types of flavonoids have been reported from aerial parts (Sapko et al., 2011) and aliphatic ketones and esters from roots (Marashdah and Al-Hazimi, 2010). *Cannabis sativa* is also a well-known medicinal plant and used as potent refrigerant, narcotic, anti-diarrheal and general stimulant (Ullah et al., 2014). Leaves can be used in bandage for healing wounds, and their powdered are used as an anodyne, sedative, tonic narcotic. Moreover, their juice can be added with milk and nuts as a cold drink ("tandai") generating a pleasant excitement (Akhtar et al., 2013). It is the oldest plants used in medicine,

which has been studied several times with respect to its phytochemistry (Akhtar et al., 2013). Currently, a total of 483 constituents have been identified in *Cannabis* of which 66 are cannabinoids (Ross et al., 2005). About 20 flavonoids have been reported to be present in *Cannabis* as aglycones or as conjugated O-glycosides or C-glycosides (Ross et al., 2005). *Peganum harmala* is widely distributed in North Africa, Mediterranean, the Middle East, Pakistan, India and Iran and has been introduced in America and Australia (Asghari and Lockwood, 2002; Yousefi et al., 2009). It has been traditionally used in Iran as an antiseptic and disinfectant agent by burning its seeds (Fathiazad et al., 2006). *Peganum harmala* is used as antifatulent, insect repellent, evil repellent, anti-spasmodic, and boils in camels and jaundice in animals (Ullah et al., 2014).

The most pharmacological active compounds of *P. harmala* are several alkaloids, which are found in the seeds and roots (Mirzaie, 2007). There are various reports that *P. harmala* had different pharmacological activities including spontaneous effect (Fathiazad et al., 2006), anti-tumor effect, insecticidal effect, curing malaria (Goel et al., 2009), anti-leishmanial (Mirzaie et al., 2007), anti-spasmodic, anti-histaminic, vaso-relaxant effect (Asghari and Lockwood, 2002), wound healing (Derakhshanfar et al., 2010), immuno-modulator, anti-oxidant activity (Astulla et al., 2008), hypoglycemic effect (Singh et al., 2014). Also, it has been reported as antibacterial, antifungal and antiviral effects by Shonouda et al. (2008). *Stachys lavandulifolia* is used as antifatulent, heart tonic, analgesic, anti-depressant, and against rheumatism, dyspepsia and headache in our study area. Its aerial parts are used against infection and cold in Kohghiluyeh va Boyer Ahmad province of Iran (Mosaddegh et al., 2012). The decoction of the flowers is being used by the tribal people for treatment of skin infection, menorrhagia and anti-bacterial (Pirbalouti, 2009). Pharmacologically its anti-inflammatory and analgesic activities were elucidated by Hajhashemi et al. (2007) and wound healing activity by Pirbalouti and Koohpyeh (2010).

*Pistacia khinjuk* is used against disorders affecting the digestive system, asthma, and as diuretic, stomachic and mouth freshener in our study area. In folk medicine, the *Pistacia* species are generally used as antiviral, antibacterial, anti-inflammatory,

antifungal, and antipyretic agents as well as astringents for treating of diarrhea, throat infections, and disorders of the liver, kidney, heart, and respiratory system (Kordali et al., 2003). Its oil has anti-helminthic effect against protozoa of *Echinococcus granulosus* (Taran et al., 2009). There are also reports concerning the antimicrobial and antifungal wound healing properties of *P. khinjuk* (Taran et al., 2010). It follows that our most cited species are medicinally widely used in other cultures and the medicinal properties of some of them are validated through pharmacological assays.

Family use value (FUV) depicts which family has extensively been used by the local population regardless of number of species. The majorly used families were *Cannabaceae* (0.85), *Nitrariaceae* (0.78), *Anacardiaceae* (0.76), *Fagaceae* (0.72), *Moraceae* (0.71), *Portulacaceae* (0.71), *Tamaricaceae* (0.67), *Boraginaceae* (0.67), *Amaryllidaceae* (0.51), *Pteridaceae* (0.65) and *Scrophulariaceae* (0.65). For majority of the above families only single species were reported. Among the largest families high FUV was demonstrated by *Leguminosae* (0.55) *Rosaceae* (0.47), *Lamiaceae* (0.46) and *Compositae* (0.40). Sher and Hussain (2009) and Bennett and Prance (2000) reported that *Lamiaceae* is a family with frequently herbaceous plants producing volatile scent over all aerial parts, as leading medicinal plant family. *Leguminosae* is exclusively composed of legumes and many of them, for instance, species of *Vicia*, *Medicago*, and *Trifolium*, among others are well known edible plants. *Glycyrrhiza glabra* a medicinal legume with MUV of 0.71, also known as liquorice, its roots and rhizomes are herbal medicine and natural sweetener.

Lot components have been isolated from liquorice such as triterpene saponins, flavonoids, isoflavonoids and chalcones, with glycyrrhizic acid as the main biologically active component. It is used primarily in treating peptic ulcer, hepatitis C, and pulmonary and skin diseases. Previous related studies reported that there are various other useful pharmacological properties including antiviral, anti-inflammatory, antimicrobial, antioxidative, immune-modulatory, hepatoprotective and cardioprotective effects (Asl and Hosseinzadeh, 2008).

Highest RFC value was exhibited by *Lycium depressum* (0.95); followed with slight difference by

*Pistacia khinjuk* (0.94), *Nasturtium officinale* (0.93) and *Portulaca oleracea* (0.90). However, lowest RFC was recorded by *Ziziphora capitata* (0.16), known as anti-microbial in ethnomedicinal literature and its *in vitro* antibacterial activity is validated by Asghari and Lockwood (2002). Tabaraki et al. (2013) have performed an *in vitro* experiment with its extract and reported it as a strong antioxidant. However, Qasem (2015) has reported it as strong anti-diabetic and as a potent agent in reducing high blood pressure. Ghasemi et al. (2013) reported its use in urogenital problems by the community of Kurd tribe in Dehloran and Abdanan districts, Ilam province, Iran. In traditional Iranian medicine, different parts of *Pistacia* have been used for a long time as useful remedies for different diseases, for example, the fruit kernel of *P. vera* as a cardiac, stomach, hepatic, and brain tonic; the fruits of *P. atlantica*, *P. khinjuk*, and *P. terebinthus* for their aphrodisiac activity and treatment of liver, kidney, heart, and respiratory system disorders, and the gum resin of *P. lentiscus*, *P. atlantica*, *P. khinjuk*, and *P. terebinthus* for their wound healing activity, and treatment of brain and gastrointestinal disorders (Sina, 1997). The high RFC of *Nasturtium officinale* and *Portulaca oleracea* could be attributed to the fact that these are common wild vegetables known and used in many cultures. The young shoots of *Nasturtium officinale* and its leaves are cooked as vegetable and used for treatment of constipation, dyspepsia and stomach-ache with an RFC value of 0.65 in Karak district of Pakistan (Rehman et al., 2015). While *Portulaca oleracea* is used against diabetes (Rehman et al., 2015) and as stomach tonic (Mosaddegh et al., 2012).

Many plants reported in the present study are also known from other cultures and utilized against diverse ailments. In this section we give a comprehensive comparison of some of the well-known plants. *Nerium oleander* is used in Morocco as hypoglycemic, abortive, anti-vertigo, and anti-diabetic, against itching and headache; In Tamil Nadu, India against snake bite and jaundice (Thirumalai et al., 2010). In the present study *Centaurea iberica* was used in stomach-ache, and it is used as antipyretic and wound healer (Çakılcıoğlu and Türkoğlu, 2007) as well as in stomach-ache (Ugurlu and Secmen, 2008) in Turkey. *Adiantum capillus-veneris* is used

as disinfectant and against kidney pain. It is reported to be used for asthma and dyspnea in Kohghilyeh va Boyer Ahmad province of Iran (Mosaddegh et al., 2012) and snake and scorpion bite in Swat district of Pakistan (Ilyas et al., 2013). *Solanum nigrum* has been reported from India to be used in Jaundice, soothes inflammation of eyes, cure acne and pimples (Bhatia et al., 2014). It showed a role against skin diseases, wound healing and eczema. The other study by Akhtar et al. (2013) revealed that its use against skin inflammation in addition to use against fever from Pakistan. *Myrtus communis* is used as vulnerary, cough, sedative and digestive in Italy (Loi et al., 2005). In contrast to their observations, we reported the use of *Myrtus communis* as antibacterial, disinfection, air freshener, against gynecological disorders and wound healing. In Tabarkins, a northern Italian (Ligurian) minority in southwestern Sardinia it is used against cold and as bechic (Maxia et al., 2008). The above comparison demonstrates the novel uses of medicinal plants in the present study as well as similar uses to those from different cultures.

Indigenous medical plants are an important part of the culture of Iranian, and Medicinal plants are traditionally used by most of Iranian people. In many of the Iranian ethnomedicinal studies males have been the dominant contributors to the ethnomedicinal knowledge (Ghorbani, 2005; Bahmani et al., 2012), however females have been shown to be dominant contributors in others (Mosaddegh et al., 2012; Bahmani et al., 2014; Nasab and Khosravi, 2014). In the present study the men to women ratio was 60 to 40, showing that both genders are using plant-based medicines. Both genders provided precious knowledge on medicinal flora of the study area. Also, the associated knowledge possessed by the elder ones is lost when they depart or when they unable to deliver the knowledge. The communities residing the southern district of Ilam are mostly associated with agriculture and apparently, they are largely dependent on plant-based medicines.

Therefore, the present study is an important contribution towards documenting the precious ethnomedicinal knowledge from the people of Ilam and saving it for their future generations.

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## CONCLUSIONS

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The results of the present research showed that a plethora of medicinal plants mainly the dicotyledons (angiosperms) are used by the local communities of the southern district of Ilam province, Iran for the treatment of broad spectrum of human ailments. Use of indigenous medicinal plants by the inhabitants in the study area ensures the continuity of indigenous knowledge associated with the respective plants. In this investigation, 132 medicinal plants of the study area, some of which were demonstrated by MUV (*Alhagi maurorum*, *Cannabis sativa*, *Stachys lavandulifolia*, *Pistacia atlantica*, *Pistacia khinjuk*, *Scrophularia deserti*, *Prosopis farcta*, *Lycium depressum*, *Prunus arabica*, *Peganum harmala*, *Aloe vera*, *Medicago sativa*, *Artemisia sieberi*, and *Alhagi maurorum*) and RFC (*Lycium depressum*, *Pistacia khinjuk*, *Nasturtium officinale*, *Portulaca oleracea*) as the most common and important used plants of the study area were presented. These important plants were specifically compared with the existing literature from different cultures within Iran and abroad. The information was at instances matched with other studies and for some important plants referenced the pharmacological validations. However, many of medicinal uses given in this paper were not found in the existing literature. Also, the most cited species were not necessarily the most cited ones in other studies indicating their distinctive usage in the study area. Therefore, these uses could make the baseline for further pharmacological assays in the laboratory on the respective plants.

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## CONFLICT OF INTEREST

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The authors declare no conflict of interest.

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**Author contribution:**

Contribution	Nejad ASM	Shah SA	Shah NA	Bahmani M	Rafeian-Kopaei M
Concepts or ideas				X	X
Design		X	X	X	X
Definition of intellectual content	X	X		X	
Literature search	X	X			
Experimental studies				X	X
Data acquisition	X			X	X
Data analysis	X	X	X	X	
Statistical analysis	X	X	X		
Manuscript preparation	X			X	
Manuscript editing	X	X	X		X
Manuscript review	X	X	X	X	X

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