The most common native medicinal plants used for psychiatric and neurological disorders in Urmia city, northwest of Iran

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ABSTRACT

Objective: To determine and introduce medicinal plants used in the treatment of psychological disorders in Urmia city of Iran.

Methods: Direct observation, interviews and collection of herbarium native medicinal herbs were used in this study. Questionnaires included herbalists’ personal information, native herbs list to include local name of plant, used organ, application methods and therapeutic effect of the plant. Samples that listed in the questionnaires were collected to determine the genus and species.

Results: By interviews, 22 medicinal plants of 10 families were determined in Urmia city. Asteraceae family had the most therapeutic effects (32%). Seeds of plants were the most used organs and common application method of plants was decoction (80%).

Conclusions: Indigenous knowledge of medicinal plants offers new ideas for modern pharmaceutical science. These study results might be tested experimentally in order to produce new herbal remedies for management of neurological and psychiatric disorders.

1. Introduction

Pain is one of the main problems which for years, humans have been trying to find out a way to get rid of[1]. Pain occurs in acute and chronic forms. Both can be seen as limiting disability causes that prevent individuals of doing daily activities[2]. Trying to find a way to eliminate pain began when the man knew the pain[3]. Pain is one of the main problem of various diseases[4]. Long period pains will lead to adverse psychological outcomes. Therefore, relieving pains or curing of the diseases is essential[5]. Nowadays, analgesics are non-steroidal anti-inflammatory drugs and opioids that may not be used in all cases due to their probably adverse effects[6].

According to the World Health Organization report, depression as the second reason of disability after cardiovascular diseases resulting causes severe social and economic deficits[7].

Anxiety disorders are the most common mental disorders in communities. Almost 30 million people are suffering of this disorder in the United States[8]. Insomnia is one of the most common disorders that chronically, many people are suffered from it for different reasons[9].

Convulsion is abnormal discharge of a group of neurons in the central nervous system, and may occur in different clinical forms depending on the discharge rate and its spreading. Epilepsy is a chronic disorder which is associated with alteration in mental processes, state
of consciousness or involuntary movements. Epilepsy prevalence in different populations is estimated at 0.3 to 0.5 percent and its rate is higher in developing countries[10].

Traditional medicine with its thousands years history gives fundamental and comprehensive solutions to resolve some of the health problems of the community. Recent studies have also shown promising results from the use of these compounds in the treatment of conditions such as pain[11-13], stress and anxiety[14-16], schizophrenia[17], cognition deficit or Alzheimer[18,19] and cardiovascular diseases[20-22].

The uses of plants, always have been popular among Iranians[23-36]. With regard to the incidence and prevalence of neurological and psychiatric disorders in the community, the aim of this study was to determine and introduce medicinal plants used in the treatment of psychological disorders in Urmia city of Iran.

2. Materials and methods

This study was done from October 2013 until December 2013, based on completing provided questionnaires and interviews using non documental folk resources. Data were collected from herbalists of the Urmia city, direct observation and collection of native medicinal plants and asking about usual effectiveness on mental diseases. The questionnaires included personal information of herbalists, native plants therapeutic effects and their used organs with method of using without naming the plants. All collected specimens were prepared separately and labeled with name, therapeutic effects with their traditional use. A total of 42 samples of herbarium plants were collected based on local herbalists information in questionnaires. Samples were sent to Urmia Agricultural Research Center and Agriculture Faculty of Urmia University for genus and species determination using various scientific sources.

3. Results

Due to surveying and data collection based on questionnaires, interviews and plant sampling, a total of 21 medicinal plants of 10 families were identified which were used in the treatment of neurological and psychiatric disorders. Ethno-botanic information of the identified plants is shown in Table 1. Plants of the Asteraceae family were used more than the other families (Figure 1). Herb seeds and flowering shoots were used more often than other parts of medicinal plants (Figure 2). Most of the medicinal plants were consumed as decoction (Figure 3). Most of the effects of traditional treatment and its number is indicated in Figure 4.
Table 1
Ethno-botanic information of medicinal plants used in neurological and psychiatric disorders.

| Scientific name | Family               | Persian name | Used organ | Using method | Traditional therapeutic effect               |
|-----------------|----------------------|--------------|------------|--------------|---------------------------------------------|
| Achillea millefolium L. | Asteraceae | Boumadaran | Corymb     | Decoction    | Anticonvulsant, antiepileptic               |
| Alhagi camelorum Fisch | Fabaceae | Khar–shotor | Aerial organs | Decoction    | Lumbago                                     |
| Amygdalus kotchyi Boiss. | Rosaceae | Badam     | Seed       | Decoction    | Narcotic                                    |
| Anthemis tinctoria L. | Asteraceae | Bahounneh zard | Flowering shoot | Decoction, pomade | Nerve tonic, sedative                         |
| Centaurea cyanus L. | Asteraceae | Gole gandom | Corymb     | Decoction    | Narcotic                                    |
| Cichorium intybus L. | Asteraceae | Cassi      | Root, Leaf, Flower, Seed | Decoction | Nerves tonic                                |
| Coronilla varia L. | Fabaceae | Tonja baghi | Leaf       | Raw edible, decoction | Sedative                                    |
| Datura stramonium L. | Solanaceae | Tantoureh | Seed       | Decoction, pomade | Sedative                                    |
| Echinum italicum L. | Boraginaceae | Gaw zalan | Flowering shoot | Decoction | Anticonvulsant, sedative                    |
| Hypericum perforatum L. | Asteraceae | Alaf chai | Flowering shoot | Decoction | Headache, sedative                          |
| Inula oculus-christi L. | Asteraceae | Mosaffaye cheshme mash | Flowering shoot | Decoction | Rheumatism, myalgia, bone, pain            |
| Valeriana officinalis L. | Valerianaceae | Sonbol altaieb | Root | Decoction | Hypnotic, sedative                          |
| Papaver rhoes L. | Papaveraceae | Shaghaiegh | Seed capsule | Decoction | Narcotic, sedative                          |
| Pimpinella affinis Ledeb. | Apiaceae | Tareitzake baghi | Flowering shoot, Seed | Decoction | Relieving chest pain                        |
| Pyrus salicifolia Pall. | Rosaceae | Golabi    | Fruit      | Fresh food | Nerve tonic                                 |
| Solanum dulcamara L. | Solanaceae | Taj rize pich | Stem | Decoction | Sedative                                    |
| Solanum nigrum L. | Solanaceae | Taj rizi  | Fruit, Seed | Decoction | Sedatives, antidepressant                   |
| Stachys lavandulifolia Vahi. | Lamiaceae | Chaie alafi | Flowering shoot | Decoction | Narcotic                                    |
| Tanacetum parthenium (L.) Schultz. | Asteraceae | Bahounneh yeh kabir | Leaf, Flower | Decoction | Anti–headaches                              |
| Ocimum basilicum L. | Lamiaceae | Reihan     | Aerial organs | Decoction | Sedative                                    |
| Cydonia oblonga Mill. | Rosaceae | Beh        | Fruit, Seed | Decoction | Sedative                                    |

4. Discussion

Results of this study presented the medicinal plants in use for the treatment of neurological and psychiatric disorders. Different parts of the plants and various using methods were applied for this purpose.

Nowadays, chamomile as a herb of the Asteraceae family is used widely with anti-inflammatory, spasmolytic and sedative features[37]. This plant is also capable of inhibiting increase in cyclic adenosine monophosphate, induced by morphine withdrawal[38,39]. Aqueous and ethanol extracts of flowers of this plant have anti-inflammatory, antispasmodic, sedative and anti-agitation effects. It is also applied for neurological digestive disorders, travel disease and colds[40].

*Achillea* plants are used in numerous cases such as blood hemostasis, menstrual disorders, hemorrhoids, hematuria, insomnia, visual disturbances, epilepsy and acute or chronic gastritis. The most important compounds in *Achillea millefolium* include essential oils, polyphenols, some types of flavons, lactones, betaines, acetylene compounds, resin, tannin, anilin phosphates, nitrates, potassium salts and organic acids[41]. Tannins, aromas and bitter substances of *Achillea* are effective on the nervous system and heart. This medicinal plant is used in other cases such as general fatigue, heart failure, kidney stones and also in neurological diseases such as neuroasthenia, hysteria, epilepsy and seizures[42,43].

*Datura* plant has been recommended as an analgesic in Iranian ancient medicine[44]. In recent years, this plant is used as hallucinogen in European and American communities. Presence of alkaloids and alkaline compounds is the main cause of these symptoms[45]. Other species of *Datura* scientifically named *Datura inoxia* Miller is used in traditional medicine to treat seizures and nervous pains such as pain in the face and headache[46]. Important alkaloids of *Datura* are hyoscyamine, atropine, scopolamine and hyoscine, which have antagonistic effects on muscarinic receptors[47-49]. *Datura stramonium* is used as an antispasmodic and anticholinergic[49].

*Datura fastuosa* has analgesic effects[50]. The previous studies indicate that muscarinic alkaloids of *Datura* plants are able to reduce pain through the central nervous system[51,52].

Basil (*Ocimum basilicum*) contain many compounds including monoterpines (carrone, thujone, and myrcene, linanol, geraniol, fenchone, cineole), tri-terpenoids (ursolic acid), sesqui-terpenoids, farnesol and caryophyllene and flavonoids (apigenin)[53-55]. The brewed form of this plant in traditional medicine used as anticonvulsant, strengthen, tonic, diuretic, digestive amplifier, anti–bloating, anti–dizziness, relievers of abdominal cramps and anti–coughing[56,57]. Basil extract is likely able to interact with the opioid system. Excitatory amino acids are involved in the development of withdrawal syndrome[58]. Linalol of this plant blocks L–glutamate activity in the *in vitro* experiments (as a competitive antagonist of glutamate) and *in vivo* experiments (seizures). Quin, N–methyl–D–aspartic acid and glutamate release is reduced[59,60]. Anticonvulsant effect, removing migraine headache, tension headaches
and treatment of gastrointestinal origin headaches are the basil’s therapeutic effects[56].

In traditional medicine, valerian is used for refreshment and relaxation, treatment of seizures, tension pains and muscle cramps. Valerian root and rhizome are used to treat neurological disorders such as epilepsy, insomnia, dizziness, palpitations, traditionally[61]. Valerian root contains tannin, glucose, various salts, oils, acids, valerenic acid (normal valeric acids) (formic acid, acetic acid, propionic acid and valepotriate[61,62]. Valepotriates are terpenoids made in valerian root that was extracted by dichloromethane. The valerian extract induces releasing of GABA in GABAergic nerves and also reduces its reabsorption[63]. According to the report of Yuan et al., valeric acid can be attached to GABA receptors in GABAergic nerves and can mimic the activity of GABA[64]. Activation of the GABAergic system causes anxiety reduction[65,66], so valpotriate anxiolytic effects can be attributed to activation of this system.

Papaveraceae plants like poppy have various alkaloids such as readine, readic acid, papaveric acid, meconic acid, mucilage and sugar. These plants are useful for insomnia and inflammation reduction and have narcotic and expectorant effects. Due to existence of small amount of morphine in the extract, the extract is called harmless opium[67–71]. Several compounds with biological activities as antidepressants, antimicrobial and anti-inflammatory effects of these species are: hypericin (naphthodianthrone), pseudohypericin, flavonoids like quercetin and phloroglucinol with various effects[72].

In recent years, Hypericum perforatum has been used as an alternative treatment for mild to moderate depression[73]. Previous studies considering the positive results of the different species of Hypericum are in Indian, Spanish, Pakistani and Egyptian where Hypericum has anti-inflammatory and analgesic effects. Iranian native Hypericum has similar therapeutic effects[74,75].

Cichorium intybus is another used plant of the traditional medicine in Iran. Pharmaceutical parts of the plant are roots and aerial organs[76]. Cichorium intybus has neuroprotective and antioxidant properties and can prevent neurons damage due to free radicals of oxygen[77].

Unsaturated fatty acids are essential for fetus growth and neurons development[78]. Three essential fatty acids known as omega–3 includes: alpha linoleic acid, eicosapentaenoic acid and docosahexaenoic acid[79–81]. A diet rich in almond creates a harmonious environment for maintaining structure of old cell in brain[82].

Docosahexaenoic acid protects rat brain against toxicity and prevents seizure-like activity in the rat hippocampus[79].

Perhaps almond oil prevents interference in fatty acid metabolism in the hippocampus due to change in the synthesis and releasing of central neurotransmitters and diminishing in learning and memory[83].

Indigenous knowledge of medicinal plants has offered new interesting ideas for modern pharmaceutical science[84–93]. This study results should be tested experimentally in order to produce new herbal remedies for the treatment of neurological and psychiatric disorders.

Conflict of interest statement

We declare that we have no conflict of interest.

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