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Sedation with Medicinal Plants: A Review of Medicinal Plants with Sedative Properties in Iranian Ethnoblotanical Documents

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Abstract

The complexity of today's modern society, increasing problems and changes in lifestyles can lead all to stress and anxiety. To control stress and anxiety, sedative drugs that have anxiolytic and sedative effects and temporarily calm the person and lead to a pleasant sleep are used. However, it must also be kept in mind that each of these drugs have their own side effects. The information in this review study was obtained from scientific publications indexed in databases such as the Information Sciences Institute, PubMed, Scopus, Scientific Information Database, Magiran, and Google Scholar that were retrieved by using relevant search terms including sedative, ethnobotany, herbal drug, Iran, medicinal plants, extracts, and essential oils. A total of 46 articles were retrieved by our initial search. The articles were reviewed. Forty three articles were further reviewed, 16 of which were finally used to review the sedative effects in ethnobotany. Being sedative is one of the reported properties of some herbal drugs. The use of these materials can be beneficial and will not cause side effects like those of conventional sedative drugs. The use of oral herbal drugs is one of the ancient methods that have been used to control anxiety, stress and pain. Besides, numerous side effects of chemical drugs

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have caused a renewed tendency to use herbal medicine. Therefore, this study is aimed to introduce some of the most effective medicinal plants with sedative properties based on Iranian ethnobotanical documents.

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Introduction

The complexity of today's modern society, increasing problems, and changes in lifestyles can lead to stress, anxiety and mental disorders in people that have become the most important problems in modern societies [1-5]. Stress is defined according to mental perceptions of an individual and his/her perception of a situation as being beyond his/her abilities that can disturb his/her health. In general, stress is experienced by all people and it should be noted that certain degrees of the stress can be effective in increasing and improving the performance of individuals, but when stress exceeds the capacity of a person, behavioral and emotional disorders occur in him/her [6,7]. Anxiety is a type of natural feeling that is experienced in threatening situations. Clinical properties of anxiety disorders are the same as normal anxiety and do not differ in type, but do in duration and severity [8]. Mental state, anxiety and concern are accompanied by certain physiological changes such as increased heart rate, hypertension, increased respiratory rate, and increased muscle tone, making the individual ready for escape or defense [9]. Pathologic anxiety is one of the most common psychiatric disorders that cause disturbance of daily life and suffering in humans. Benzodiazepines and barbiturates are used to treat this condition [10]. Sedatives are drugs that, by suppressing the central nervous system (CNS), can lead to calmness, relaxation of the nervous system, relief of anxiety and stress, sleepiness, euphoria, decrease in respiratory rate, sensations of imbalance, muscle relaxation, impaired judgments, and slow and hesitant reactions [11,12]. Although taking chemical medications to relieve anxiety can temporarily calm the person and bring about a pleasant sleep for him/her, it must also be kept in mind that each of these medications have their own side effects, and it is therefore advised to take them according to the prescription of a physician and not to take them at high doses under any circumstances [11]. Sedatives have anxiolytic and calming effects and are also used to treat insomnia. Common sedative medications include benzodiazepines, opiates, barbiturates and hypnotics. Opiates are one of the most sought-after drug classes because of causing analgesia. In addition to analgesia, these drugs also have sedative effects [13,14]. Side effects of sedatives, especially in the elderly, are due to hypersensitivity to these drugs, which can lead to certain complications such as weakened response of the nervous system to hypercapnia, hypoxia, hypotension that should be treated, and postoperative apnea [15-18]. Medicinal plants and foods have a huge impact on the health of individuals [19,20]. Any food has a specific impact on the function of the body. Being sedative is one of the reported properties of some herbal drugs. They are very beneficial and less likely to cause the side effects of conventional sedative drugs. The use of oral herbal drugs is one of the ancient methods that have been used to control anxiety, stress and pain. In addition, several side

effects due to chemical drugs have caused a renewed tendency to using herbal medicine [21]. Medicinal plants have been shown to boost the immune system, produce antimicrobial effects, and be effective on infectious and non-infectious diseases and chronic diseases, which have been proven in both ethnobotanical and pharmacological studies [22-27]. Therefore, this study is aimed to introduce some of the most effective medicinal plants with sedative properties based on Iranian ethnobotanical documents.

Methodology

The information in this review study was obtained from scientific publications indexed in databases such as the Information Sciences Institute, PubMed, Scopus, Scientific Information Database, Magiran, and Google Scholar that were retrieved by using relevant search terms including sedative, ethno-botany, herbal drug, Iran, medicinal plants, extracts, and essential oils. A total of 46 articles were retrieved by our initial search. The articles were reviewed. Forty three articles were further reviewed, 16 of which were finally used to review the sedative effects in ethno-botany.

Results

Ethnobotany is the study of how people of a particular ethnic group, culture, or region use indigenous plants. The results of this review of Iranian ethnobotanical documents showed that medicinal plants from certain families such as Apiaceae, Asteraceae and Lamiaceae are among the most important plants used in Iran for their sedative effects (Table 1).

The geographical map of Iran is shown in Figure 1.

Figure 1. Geographical map of Iran

Table 1. Medicinal plants with sedative effects according to Iranian ethnobotanical documents

Scientific name	Family name	Domestic name	Used organs	Region
Allium sp	Liliaceae	Paiz vahshi	Bulb	Abadeh fars [28]
Nonnea cospica	Boraginaceae	Chesh gorbei	Flower	Joupar kerman [29]
Valeriana ficariaefolia	Valerianaceae	Alafe gorbeh	Root, rizhome	Joupar kerman [29]
Avena sativa	Poaceae	Jo dosar	Aerial parts	Zabol [30]
Rubia tinctorum	Rubiaceae	Ronas	Root	Zabol [30]
Heracleum persicum	Apiaceae	Golpar	Fruit and leaf	Khuzistan [31]
Kelussia odoratissima	Apiaceae	Karafseh kouhi	Aerial parts	Khuzistan [31]

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Pimpinella anisum	Apiaceae	Anison	Fruit	Khuzistan [31]
Trachyspermum copticum	Apiaceae	Zenian	Fruit and seed	Khuzistan [31]
Centurea depressa	Asteraceae	Gole gandom	Stem	Khuzistan [31]
Lactuca virosa	Asteraceae	Kahoye vahshi	Aerial parts	Khuzistan [31]
Echium amoenum	Boraginaceae	Gav zaban	Flower	Khuzistan [31]
Brassica napus	Brassicaceae	Shalgham	Seed and root	Khuzistan [31]
Humulus lupulus	Cannabaceae	Razak	Inflorescence	Khuzistan [31]
Lavandula angustifolia	Lamiaceae	Ostokhodous	Flower, stem and leaf	Khuzistan [31]
Melissa officinalis	Lamiaceae	Badranjbouyeh	Leaf and stem	Khuzistan [31]
Mentha longifolia	Lamiaceae	Pouneh	Leaf and stem and flower	Khuzistan [31]
Scutelaria lateviflora	Lamiaceae	Varangbou	Seed	Khuzistan [31]
Peganumharmala	Nitrariaceae	Spand	Seed and fruit	Khuzistan [31]
Crataegus curvisepala	Rosaceae	Zalzalak	Leaves, flowers and fruits	Khuzistan [31]
Hyoscyamus orthocarpus	Solanaceae	Bazrolbanj	Leaf and seed	Khuzistan [31]
Pistacia khinjuk	Anacardiaceae	Pesteh kouhi	Fruit	Fasa [32]
Avenasativa	Graminaceae	Jodosaar	Fruit	Fasa [32]
Stachysinfllata	Lamiaceae	Sonboleh badkonaki	Flowered flower	Fasa [32]
Alliumcanadense	Liliaceae	Sirmouk	Aerial parts	Fasa [32]
Papaverdubium	Papaveraceae	Shaghayegh	Flower & Gum	Fasa [32]
Plantagomajor	Plantaginaceae	Barhang	Seed and leaf	Fasa [32]
Citrusaurantium	Rutaceae	Naranj	Flower and fruit	Fasa [32]
Marrubium vulgare	Labiatae	Ferasion	Stem and leaf	Gichak [32]
Zataria multiflora	Lamiaceae	Abeshm	Aerial parts	Naein [33]
Ziziphora tenuior	Lamiaceae	Ostaghodos	Aerial parts	Naein [34]
Echium spp.	Boraginaceae	Gavzaban	Flower	Erim neka [35]
Viola ororata	Violaceae	Banafsheh	Flower	Erim neka [35]
Achillea biebersteinii	Asteraceae	Boumadaran	Leaf and flower	Dehloran and Abdanan [36]

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Cerasus microcarpa	Rosaceae	Albalouyeh vahshi	Resin	Dehloran and Abdanan [36]
Hypericum scabrum	Hypericaceae	Gole raei	Flowered flower	Dehloran and Abdanan [36]
Lonicera nummulariifolia	Caprifoliaceae	Pilakhor	Leaf and flower	Dehloran and Abdanan [36]
Narcissus tazetta	Amaryllidaceae	Narges	Flower	Dehloran and Abdanan [36]
Papaver dubium	Papaveraceae	Khashkhash tanaz	Leaf and flower	Dehloran and Abdanan [36]
Stachys lavandulifolia	Lamiaceae	Sonbolei	Leaf and flower	Dehloran and Abdanan [36]
Grammosciadium platycarpum	Apiaceae	Shevid kouhi	Aerial parts	Behbahan [37]
Anthemis cotula	Apiaceae	Babouneh bahari	Aerial parts	Behbahan [37]
Leonurus cardiaca	Lamiaceae	Ostoghodous vahshi	Aerial parts	Behbahan [37]
Mentha mozaffarianii	Lamiaceae	Pouneh kouhi	Aerial parts	Behbahan [37]
Datura stramonium	Solanaceae	Tatoureh	Aerial parts	Behbahan [37]
Celtis australis	Ulmaceae	Daghdaghan	Aerial parts	Behbahan [37]
Vitex pseudonegundo	Verbenaceae	Panj angosht	Aerial parts	Behbahan [37]
Verbenaceae	Verbenaceae	Gole gavzaban	Aerial parts	Razovergolan [38]
Cannabis sativa	Cannabaceae	Shahdaneh	Leaf, seed	Sirjan [39]
Echium amoenum	Boraginaceae	Zabangav	Aerial parts	Sirjan [39]
Datura innoxia	Solanaceae	Datoureh	Stem	Sistan [40]
Solanumnigrum	Solanaceae	Tajrizi siah	Leaf and seed	Sistan [40]
Borago officinalis	Boraginaceae	Sisenak	Flower and leaf	North Iran [41]
Hyoscyamus niger	Solanaceae	Taltouleh	Leaf	North Iran [41]
Melissa officinalis	Lamiaceae	Badranjbouyeh	Aerial parts	Kazeroun [42]
Vitex agnus-castus	Verbenaceae	Bangela	Leaf and fruit	Hormozgam [43]

Discussion

Depression, fatigue, anxiety, anger, annoyance, chastity and agitation These familiar traits nowadays are heard from

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every man and woman, old and young, and even children and adolescents. Relaxation or mild anesthesia is a method that reduces the amount of pain and incitement caused by the therapeutic process or painful diagnosis using sedative medications. Drugs that are used in this process include Propofol, Probiotics, Ketamine, Fentanyl, and Midazolam [44]. Over the years, natural medicines, especially medicinal herbs, have been the basis and sometimes even the only remedy, while raw materials used in the pharmaceutical industry were used [45]. Today, due to the adverse effects of some chemical drugs and people's beliefs about the increased safety of the use of natural compounds, the tendency to use herbal medicines has increased. One of the problems that is spreading among our society today is insomnia and neurotic stress caused by personal and social problems. This has led people to tend to use sedative medications.

Among the others, the most effective plants with sedative hypnotic properties are *Valeriana officinalis*. It is noted as a remedy to modulate the troubled nerves and to induce untroubled sleep. It has mild effects, however, it is a safe remedy for use [46]. *Valeriana officinalis* is prepared as ethanol or aqueous extracts. Its therapeutic dose is about 600 mg per day. The mechanism action of *V. officinalis* has been roughly identified previously. However, the plant has more than 100 components and it is not known which one is responsible for its anxiolytic action [47]. Valeric and iso-valeric acids are among the most important components and have GABA re-uptake inhibitory in brain, which are involved in its tranquilizer effects. Valerian preparations of usually do not impose immediate action and usually 2 to 4 weeks is necessary for achievement significant improvements [48]. The main value of this plant is its capability of promoting natural sleep. However, this will be achieved after several weeks consumption of this remedy. It has no adverse health effects or risk of dependence [49]. Echium amoenum is another plant which possess sedative effects. Chemical substances such as flavonoids, saponins and unsaturated terpenoids and sterols has been identified in Echium amoenum. Natural Flavonoids and their derivatives maintain mild sedative and anxiolytic effects via binding to the central benzodiazepine receptors [50]. Infusion of hydroalcoholic and aqueous extracts of Echium amoenum in mice have been reported to induce anxiolytic activities [51]. Furthermore, it has been showed that administration of 50 mg/kg of Echium amoenum extract induces anxiolytic effects and a reduction in locomotor activity [52]. Another noteworthy plant to mention is humulus lupus. It is used in conditions such as insomnia and anxiety. Humulus lupus extracts contain alpha bitter acids and beta acids which both have sedative effects, but the latter is weaker compared to the first one. Humulus lupus interacts with melatonin receptors which play a role in sleep [53]. In a study by shishehgar et al. 2012, it was showed that humulus lupulus had more sedation, pre-anesthetic, and anti-anxiety effect compared to diazepam [54]. It should be noted that high level of free radicals, which usually lead to oxidative stress and neurodegenerative disorders and health complaints. Patients with primary insomnia have been shown to possess significantly lower glutathione activity and higher amount of blood malondialdehyde than normal subjects which show that insomnia increases oxidative stress and sleep can reduce oxidative stress [55]. The plants presented in this review and a lot of other plants have antioxidant activities [56-58]. Therefore, these plants may also show positive effects on insomnia. It is important to note that most of plants have multi-function [59-61].

Conclusion

The use of oral herbal drugs is one of the ancient methods that have been used to control anxiety, stress and pain. Besides, numerous side effects of chemical drugs have caused

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a renewed tendency to using herbal medicine. Therefore, this study is aimed to introduce some of the most effective medicinal plants with sedative properties based on Iranian ethnobotanical documents.

Conflict of interest

None of the authors have any conflict of interest to declare.

Consent for publications

All authors approved the final manuscript for publication.

Availability of data and material

Data are available on request from the authors.

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