Full Length Research Article

Advancements in Life Sciences – International Quarterly Journal of Biological Sciences

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Identification of Plant Flora Affecting Anti-Anxiety and Anti-Depression Disorders Based on Ethnobotanical Knowledge of the Arasbaran Region, Azerbaijan, Iran

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Abstract

Background: Ethnobotany, as a part of every district's national capital, involves residents' experience and knowledge about plants and their features being the result of a long time of trial and error in nature. The purpose of this study was to obtain and document the culture of the traditional application of Arasbaran medicinal plants from Azerbaijan province in Iran.

Methods: In this research, the information and knowledge of the people about the effective medicinal plants on common psychiatric syndromes including anxiety and depression were collected through questionnaires and interviews. Questions contain local names, organ usage, and traditional therapeutic characteristics of plants. Interviews then went on until the repeated answers confirmed the reliability and validity.

Results: Labiatae plant family with 4 plants was the most effective herb family for the treatment of common psychiatric diseases. Also, the most plant organs utilized for treating nervous disorders included aerial parts (36%), fruits (22%), flowering branches (each with 21%) and flowers (14%), and seeds (7%). So, identification and documentation of their indigenous knowledge can pave the way for a better application of medicinal plants and their products.

Conclusion: In this study, 12 medicinal plant species belonging to 9 families were studied. The largest proportion of plant species was related to the Labiatae family. The most commonly used organs were aerial parts, fruits, and flowering branches, respectively. Native medicinal plants of the Arasbaran region are traditionally used to treat common psychiatric syndromes and can be highly effective in the treatment of disorders such as depression and anxiety.

Introduction

Anxiety and depression disorders are well-known as psychiatric disorders of worldwide concern which can threaten human being welfare [1]. Depression and anxiety are generally defined due to adverse emotional experiences which are related to biochemical, somatic, behavioral, cognitive, and also psychological alterations [2, 3]. Anxiety and depression disorders negatively influence a lot of people and are highly accompanied by serious physiological symptoms including tachycardia, insomnia, sweating, irritability, respiratory dysfunction, numbness, and occasionally paralysis of the limbs [4, 5]. Approximately 4-6% of the world population feels pain from different types of anxiety syndromes such as high heart rate and blood pressure, negative emotions, fatigue, aggression, tension, and restlessness [6]. Also, depression is affecting an estimated 3.8% of the global population, including 5.0% in adults and 5.7% in adults over 60 years of age. About 280 million people in the world suffer from depression [7]. In addition, depression was considered the main reason for disability which may conduct to suicide [8]. Different forms of synthetic drugs including benzodiazepines and barbiturates are utilized to treat anxiety. However, several types of these chemical medicines applied for treating depression and anxiety mental disorders may have side effects [9, 10]. Despite the advancement of technology in the production of effective drugs for the treatment of various diseases, many people all around the world are trying to use folk and native medicines, medicinal plants, and products derived from herbs to cure mental diseases [11]. Different extracts of plants with antioxidant properties have been studied worldwide widely as valuable sources of bioactive substances including phenolic and flavonoid components with the capability to treat disease [12-14]. According to World Health Organization (WHO) reports, large numbers of people (approximately four billion) use traditional and medicinal plants. Based on statistics, around 25% of all therapeutic plants suggested by medics are generally obtained from different parts such as trees, flowers, herbs, buds, leaves, fruits, skins, seeds, and bushes of all shapes and sizes. Some medicinal plants are derived directly from herbal extracts and the other ones are obtained artificially to cause effects similar to medicinal plants [15]. Antidepressant impact of several traditional medicines extracted from plants such as lemon balm (*Melissa officinalis*), lavender (*Lavandula angustifolia*), Cinnamon (*Cinnamomum zeylanicum*), Banafsha (*Viola Odorata*), Echium (*Echium ammonium*), valerian (*Valeriana officinalis*), Aloysia (*Aloysia triphylla*), Citrus (*Citrus aurantium*) and Salix (*Salix aegyptiaca*) has been reported in Iran [16].

There have been few studies on ethnobotany and psychiatric disorders such as depression and anxiety.

Yelda Güzel et al. (2015) studied the ethnobotany of Antakya area in Turkey and reported that the application of various traditional herbs showed anti-depressant, anxiety and stress, anorexia, insomnia, and migraine effects [17]. Also, López-Rubalcava and Estrada-Camarena. (2016) investigated the Mexican medicinal plants' effect on anxiety and depression and revealed that a large number of medicinal plants which belong to this region have positive therapeutic effects on depression, and anxiety [18]. In this regard, considering the importance of identifying medicinal species, this article deals with the knowledge of medicinal plants for the treatment of depression, and anxiety in Arasbaran, which is native to the region of Azerbaijan.

Methods

Standard questionnaires were used in this study. Traditional therapeutic information about effective plants on depression and anxiety was acquired by questionnaires. The questionnaires contained the names of medicinal plants along with information about the organ used, the traditional effect of the plant and the traditional method of use. Also, the questionnaire included the demographic information of the participants. For this purpose, then the researchers of the study personally and face-to-face attended the interviews with the local people of the Arasbaran region. First, a written consent was obtained from the interviewees to participate in the study, then they were asked questions about the types of plants and the parts used in these plants and how they are used in the treatment of disorders such as depression and anxiety, and they were included in the questionnaire. After the end of data collection, the extracted data were analyzed by Excel software.
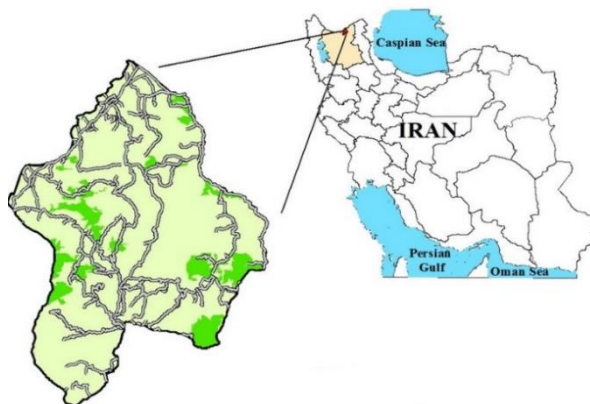

**Figure 1:** Map of Azerbaijan province located in Iran

Results

According to the results acquired from the analyses of the questionnaire, it was shown that of 31 apothecaries,

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68% (21 people) were men and 32% (10 people) were women. In terms of education, 4 people were educated and 27 people were uneducated and just answered questionnaires by experiential learning. Apothecary's age range was from 19 years to 77 years (the average age was 48 years).

Numerous types of medicinal plants have been used to treat depression and anxiety in the city of Azerbaijan (Table 1). According to table 1 and results that have been obtained from statistical analysis of questionnaires, twelve medicinal plants are effective in treating common psychiatric diseases and the Labiatae plant family with 4 were the most effective ones in this regard (Figure 2). The most widely used plant organs for the treatment of common psychiatric syndromes consist of aerial parts (36%), fruits (22%), flowering branches (each with 21%), and flowers (14%) (Figure 4).
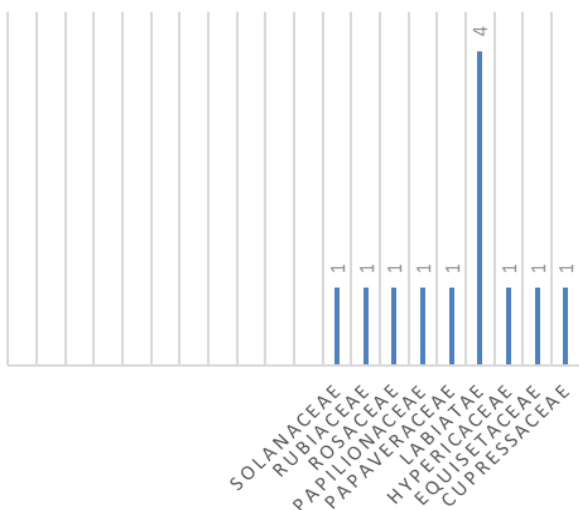
Figure 2: Use of each medicinal plant for the treatment of depression, and anxiety in Azerbaijan province
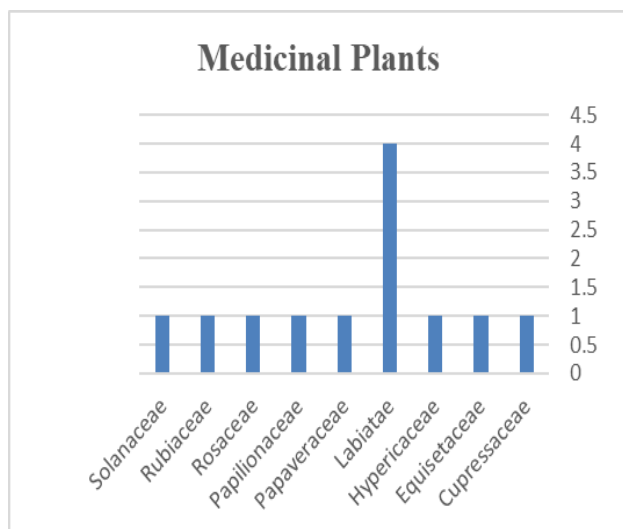
Figure 3: Percentage of plant organs used to treat depression, and anxiety in Azerbaijan province
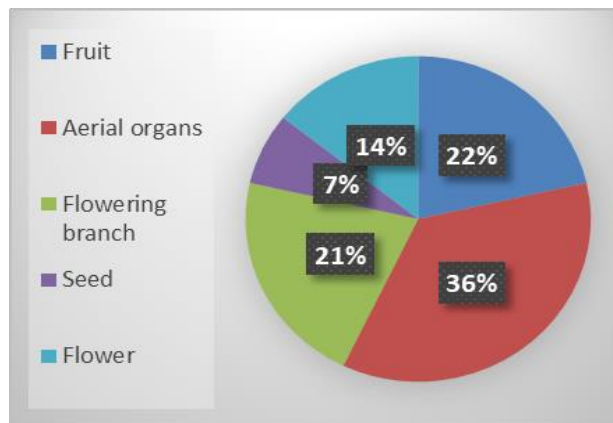
Figure 4: Percentage of plant organs used to treat depression, and anxiety in Azerbaijan province

Discussion

Inadequate internal and international research has been performed on ethnobotany and psychiatric diseases including depression and anxiety all around the world. The findings of various research showed that Iran is a distinguished country with a high rank in terms of plant richness and biodiversity due to its geographical location and prevailing climatic conditions [19]. Many medicinal herbs have been recognized as having positive properties for dealing with psychiatric disorders. Generally, their main mechanism of action is because of the active components such as terpenoids and

polyphenols with anxiolytic and antidepressant properties [20]. Moreover, the antidepressant activity of most medicinal plants is due to increasing the level of serotonin, dopamine, and norepinephrine in the brain by interacting with the serotonergic, adrenergic, and dopaminergic receptors, relevant transporters or by inhibiting the enzyme monoamine oxidase [21]. Hypericum perforatum is a plant whose antioxidant activities have been confirmed [22, 23]. Hypericum contains hypericin and hyperforin, which has an inhibitory impact on the monoamine oxidase enzyme, and by avoiding the degradation of serotonin and rising this neurotransmitter in the brain diencephalon section, also contains components which are agonists of gamma-aminobutyric acid (GABA) and receptors of sigma opioid, cause anti-anxiety and anti-depressant features [24].

As mentioned in Figure 4, the people of the region use different parts of these plants, such as flowering branches, aerial parts, flowers, fruits, and seeds for various diseases. The results of the study of Ramzannejad and Parishani, who introduced some medicinal plants of the Maymand region in Kerman province, show that among the plant organs used, leaves, seeds, and roots have the most medicinal uses among the local people [25, 26]. Meanwhile, the results of Mehrabani et al.'s research in Baft city of Kerman

Persian name	Scientific name	Family name	Plant part used	Activity	Effective substance
Piru	*Juniperus communis*	Cupressaceae	Fruits	Antidepressant	α-pinene, myrcene, sabinene, limonene and β-pinene
Domeh Asb	*Equisetum arvense*	Equisetaceae	Aerial organs	Antidepressant	3-O-glucoside (isoquercitrin), apigenin 5-O-glucoside and kaempferol 3-O-glycoside
Alaf Chai	*Hypericum perforatum*	Hypericaceae	Flowering branch	Antianxiety	α-pinene, β-pinene, undecane and germacrene-D
Domeh Shir	*Leonurus cardiaca*	Labiatae	Aerial organs	Antianxiety	caryophyllene, α-humulene, , α-pinene, β-pinene, linalool
Marzanjush	*Origanum vulgare*	Labiatae	Flowering branch	antianxiety	Carvacrol, β-fenchyl alcohol, thymol, and γ-terpinene
Maryam Goli	*Salvia sclarea*	Labiatae	Flowering branch	Antidepressant	Calcium, phosphate, total protein, amylase
Anjideh Siah	*Ballota nigra*	Labiatae	Aerial organs	Antidepressant and Antianxiety	caryophyllene oxide, trans-caryophyllene, germacrene D, 1-undecene, isoaromadendrene epoxide, and tridecane-1
Khashkhash Sharghi	*Papaver orientale*	Papaveraceae	Aerial organs	Antidepressant	Codeine, rhoeadine, papaverine, protopine, noscapine, setigeridine
Ahumash Zard	*Lotus cornicolatus*	Papilionaceae	Flower and fruit	Antianxiety	3-O-rhamnoglusosyl-kaempferol
Nastaran Vahshi	*Rosa canina*	Rosaceae	Flower and fruit	Antianxiety	Astragalin, (+)-catechin and (−)-epicatechin
Shir Panir	*Asperula odorata*	Rubiaceae	Aerial organs	Antianxiety	Anthraquinone
Bangdaneh	*Hyoscyamus niger*	Solanaceae	Seed	Antidepressant and Antianxiety	Alkaloids, saponins, lignans, coumarinolignans, flavonoids, and some other nonalkaloidal compounds

Table 1: The scientific name, plant family, Persian name, used organ and therapeutic effect

province indicate that aerial branches, fruits, and seeds have the highest amount of use among local people [26]. Also, Maliki Khadrlou et al, in the study of ethnobotany and traditional uses of some herbs of Ajabshir city in Iran reported that the leaf organ is the most functional part of medicinal plants with 49% use [27]. The methods that Iranian people used native medicinal plants are often brewed, boiled, sweat, raw, and soaked in water [25, 28]. In this regard, the findings of Gholipour et al. in the ethnobotanical study of medicinal plants in Zarmarud Neka village (Mazandaran province) showed that the most common way of consuming medicinal plants in the study area is infused and boiled, and the least amount in the field of consumption is as a spray [29].

In the study by Hosseini et al., who identified and investigated the ethnobotanical selection of medicinal plants in Neyshabur city of Iran, the Asteraceae, Lamiaceae, and Apiaceae plants were identified as the most effective medicinal plants in the treatment of digestive diseases, colds, and especially mental diseases. They have been used for centuries as painkillers and sedative drugs [30]. Based on Erfani and Shahsavari, 2012 study on the effect of the herbal extract on the anxiety of students in Karaj showed that Hypericum perforatum has a positive effect in reducing anxiety levels in students, and since the lack of side effects of this herbal extract it is suggested in the cure of Anxiety [31]. Cynodon dactylon is traditionally used as hypnotics, Heracleum persicum, Kelussia odoratissima, and Pimpinella anisum are effective sedatives, and Crataegus curvisepal as anti-anxiety and stress medicine in Khuzestan, which is located in the south of Iran [32]. For example, the Kashan region, located in the center of Iran, use *Potentilla elvendensis* to relieve headache [33]. Locals in Abhar (northwestern city of

Iran) use several herbs for treating mental diseases such as *Lotus corniculate* and *Herniaria hirsute* for depression, *Descurainia sophia* and *Cota tinctoria* to relieve headaches [34]. Identifying and comparing different uses of plants in the study area as well as other parts of Iran prove the similarity of uses among similar plant species in different regions of the country. For example, *Hypericum perforatum* L., *Origanum vulgare*, *Ballota nigra*, *Rosa canina*, *Papaver orientale* & *Lotus corniculatus*, and *Asperula odorata* are used to treat pain, migraine, nerve weakness, insomnia stress in the Arasbaran district, Iran, respectively. Herbal medicines are rich in effective substances and antioxidants, and in this way, they are used in the treatment of many diseases [35-39]. The results of the present study show that some medicinal herbs are pharmacologically the same or have relatively similar therapeutic properties to those studied in other studies. These results confirm that most of the medicinal plants in different regions have almost the same edible and medicinal functions among local communities.

The anti-anxiety and antidepressant properties of the native plants which have been grown in the Arasbaran district of Iran were determined. The findings of this study show that the Arasbaran region has almost good richness in terms of diversity of plant species and especially medicinal species. Native medicinal plants of the Arasbaran region are traditionally utilized to treat common psychiatric diseases and can be applied as natural and effective treatments for disorders such as depression and anxiety. Due to the phytochemical compounds of medicinal plants and also lack of side effects they can be employed to produce nature-based, anti-anxiety, and depression drugs and antioxidants.

Competing Interest

The authors have declare that there is no conflict of interest.

Author Contributions

All authors contributed equally to the manuscript.

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