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Hypertetion Treatment in Central Iran Using Medicinal Plants: A Review of Iranian Ethnobotanical Records

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A B S T R A C T

Objective: Hypertension refers to the abnormal elevation of blood pressure in the arterial walls and can lead to serious conditions such as cardiovascular diseases, kidney failure, atherosclerosis, eye disorders, and stroke. The aim of this study was to identify medicinal plants in central Iran that are used to treat high blood pressure.

Methods: In this review study, articles were searched using key terms such as "medicinal plants," "blood pressure," "ethnobotany," "Iran," "Esfahan province," "Fars," "Yazd," "Central," "Qom," "Alborz," and "Semnan." Databases such as Google Scholar, SID, MegaIran, PubMed, and Scopus were utilized for the search. Ethnobotanical articles in this field were reviewed and analyzed.

Results: The results indicate that certain medicinal plants are effective in controlling high blood pressure and treating hypertension. Medicinal plants such as *Ajuga chamaecistus*, *Salvia*, *Crataegus atrosanguinea*, *Artemisia dranculus*, *Capsella bursa-pastoris*, *Zea mays*, *Portulaca oleracea*, *Solanum melongena*, *Crataegus monogyna*, *Tragopogon graminifoliu*, *Rheum × hybridum*, *Phoenix dactylifera*, *Cichorium intybus*, *Silybum marianum*, *Olea europaea*, *Rumex crispus*, *Ziziphus jujuba*, and *Anthemis gayana* have shown efficacy in reducing high blood pressure and may be used as natural treatments to prevent cardiovascular diseases.

Conclusion: The use of various medicinal plants in central Iran can be considered as an effective and natural treatment for controlling high blood pressure. These plants, in addition to lowering blood pressure, serve as a preventive option against cardiovascular diseases. However, further studies are required to validate the clinical effects and safety of these plants in hypertension treatment.

Keywords: Hypertension, medicinal plants, ethnobotany, treatment, Iran

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Introduction

Hypertension, or high blood pressure, is one of the most common health issues worldwide and is considered a primary factor in the development of cardiovascular diseases, strokes, kidney failure, and atherosclerosis [1]. It refers to the abnormal increase in blood pressure within the walls of the arteries and often progresses without noticeable symptoms, such that an individual may be unaware of its existence until serious complications arise [2]. Hypertension can manifest through symptoms such as severe headaches, dizziness, shortness of breath, blurred vision, a pulsating sensation in the head or neck, nausea, fatigue, chest pain, and even blood in the urine [3]. The exact causes of elevated blood pressure are often unclear; however, factors such as smoking, obesity, physical inactivity, excessive salt consumption, stress, underlying conditions, and genetic predisposition can play a role in its onset [4]. Additionally, biological factors, such as an imbalance in water and salt levels, disruptions in the renin-angiotensin-aldosterone system, and dysfunction in the sympathetic nervous system, contribute to the development of hypertension. Changes in the structure and function of blood vessels, particularly small vessels, also play a crucial role in this condition [5,6].

Hypertension, being a chronic and complex problem, requires continuous treatment and medical care [7]. In many societies, the use of pharmaceutical drugs is the standard treatment for high blood pressure [8], although these medications may have side effects [9]. However, in some regions, especially in rural areas and places with limited access to healthcare services, the use of natural remedies and medicinal plants has emerged as a complementary or alternative treatment for hypertension [10,11].

Iran, with its diverse climate and biodiversity, is a rich source of medicinal plants used in traditional medicine and ethnobotany for the treatment of various diseases [12,13]. Ethnobotanical studies have shown that many of these plants possess effective properties for lowering blood pressure and preventing cardiovascular diseases [14,15]. In this regard, the central regions of Iran, due to their unique plant diversity [16], play a significant role in the use of medicinal plants for the treatment of hypertension. The aim of this review is to identify the medicinal plants used for hypertension treatment in these eastern regions of Iran.

Methodology

In this review, an extensive search was conducted to identify articles related to the impact of medicinal plants on blood pressure and their ethnobotanical applications in this context. Initially, specific keywords such as "medicinal plants," "blood pressure," "ethnobotany," "Iran," "Isfahan province," "Fars," "Yazd," "Markazi," "Qom," "Alborz," and "Semnan" were carefully selected. These keywords were used as search criteria across various databases. To identify and select relevant scientific articles, reputable databases such as Google Scholar, SID (Scientific Information Database of Jihad University), MegaIran, PubMed, and Scopus were utilized.

The articles related to ethnobotany and the traditional impacts of medicinal plants on blood pressure, particularly those that referenced the geographical and ethnobotanical conditions of various regions in Iran, were selected for review. Initially, articles directly related to the subject were identified. Then, inclusion and exclusion criteria were carefully defined to ensure that the articles used in this study were both valid and relevant to the topic

Inclusion Criteria

Scientific and research articles published in reputable journals that are directly related to the use of medicinal plants in the treatment of hypertension or the application of ethnobotany in this context. Articles that specifically address the effects of medicinal plants in different provinces of Iran (such as Isfahan, Fars, Yazd, Qom, Alborz, Semnan, and Markazi). Articles in both Persian and English languages that discuss the use of medicinal plants for treating hypertension and ethnobotany.

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Exclusion Criteria

Articles that generally address the topic of hypertension but do not directly relate to the use of medicinal plants or ethnobotany. Articles that primarily investigate the effects of hypertension outside of Iran or in geographically unrelated regions.

After identifying the initial articles, content analysis was performed, and those articles that met the inclusion criteria were selected for more detailed study and data extraction

Results

Based on the results obtained, it was found that medicinal plants from various regions of Iran have been analyzed to assess their therapeutic potential. These plants have been categorized according to the parts used, scientific names, families, and common local names, providing a comprehensive overview of the most commonly used plants in traditional medicine across different areas of Iran. For instance, in the Abadeh region of Shiraz, aerial parts of Ajuga chamaecistus from the Lamiaceae family and the flowering tops of Salvia sp. (sage) are utilized. In the Arak region, the fruit of *Crataegus atrosanguinea* (hawthorn) from the Rosaceae family is commonly used. In the Arjan region of Fars, the aerial parts of *Artemisia dranculus* (wormwood) from the *Asteraceae* family and *Capsella bursa-pastoris* (shepherd's purse) from the *Brassicaceae* family are employed.

In the Darab region, the flowers of *Zea mays* L. (corn) from the *Poaceae* family, the aerial parts of *Portulaca oleracea* L. (purslane) from the *Portulacaceae* family, and the fruit of *Solanum melongena* L. (eggplant) from the *Solanaceae* family are widely used as herbal remedies. In the Sajasarud region of Zanjan, the fruit and flowers of *Crataegus monogyna* (hawthorn) from the *Rosaceae* family and the aerial parts of *Tragopogon graminifolius* (goat's beard) from the *Asteraceae* family are utilized. In the Semnan region, the fruit and flowers of *Crataegus monogyna* (hawthorn) from the *Rosaceae* family are consumed.

In the Shazand Central region, the stems of *Rheum hybridum* (rhubarb) from the *Polygonaceae* family are used as a medicinal plant. In Fasa, the fruit of *Phoenix dactylifera* L. (date palm) from the *Arecaceae* family, the leaves and flowers of *Cichorium intybus* L. (endive) from the *Asteraceae* family, the flowers of *Silybum marianum* (milk thistle) from the *Asteraceae* family, and the fruit and leaves of *Olea europaea* L. (olive) from the *Oleaceae* family are recognized as medicinal plants. In the Mobarakeh region of Isfahan, the leaves of *Rumex crispus* L. (curled dock) from the *Polygonaceae* family, the fruit of *Ziziphus jujuba* (L.) H.Karst (jujube) from the *Rhamnaceae* family, and the fruit of *Olea europaea* L. (olive) from the *Oleaceae* family are consumed. Lastly, in the Natanz Kashan region, the leaves and flowers of *Anthemis gayana* Boiss. (chamomile) from the *Asteraceae* family are used as a medicinal plant.

This study highlights the rich diversity of plant species and their extensive therapeutic applications, serving as evidence of the deep-rooted cultural and traditional uses across various regions of Iran. Detailed information on these plants is provided in Table 1.

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Table 1: Medicinal Plants Effective on Blood Pressure in the Belt Regions of Iran

Common Name	Scientific Name	Family	Plant Part Used	Region	Ref.
Lebdisi	Ajuga chamaecistus	Lamiaceae	Aerial Part	Abadeh Shiraz	[17]
Maryamgoli	Salvia spp.	Lamiaceae	Flowering Branch	Abadeh Shiraz	[17]
Zalzalake khonin	Crataegus atrosanguinea	Rosaceae	Fruit	Arak	[18]
Dermaneh	Artemisia dranculus	Asteraceae	Aerial Part	Arjan Fars	[19]
Kapsela	Capsella bursa-pastoris	Brassicaceae	Aerial Part	Arjan Fars	[19]
Kakolezorat	Zea mays L.	Poaceae	Flower	Darab	[20]
Khorfeh	Portulaca oleracea L.	Portulacaceae	Aerial Part	Darab	[20]
Bademjan	Solanum melongena L	Solanaceae	Fruit	Darab	[20]
Zalzalak	Crataegus monogyna	Rosaceae	Fruit, Flower	Sajasarud Zanjan	[21]
Sheng	Tragopogon graminifoliu	Asteraceae	Aerial Part	Sajasarud Zanjan	[21]
Zalzalak	Crataegus monogyna	Rosaceae	Fruit, Flower	Semnan	[22]

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Revas	Rheum × hybridum	Polygonaceae	Stem	Shazand	[23]
Nakhl	Phoenixdactylifera L.	Arecaceae	Fruit	Fasa	[24]
Kasni	Cichoriumintybus L.	Asteraceae	Leaf, Flower	Fasa	[24]
Kharmaryam	Silybummarianum	Asteraceae	Flower	Fasa	[24]
Zeytoun	Olea europaea L.	Oleaceae	Fruit, Flower	Fasa	[24]
Torshak	Rumex crispus L.	Polygonaceae	Leaf	Mobarakeh Isfahan	[25]
Anab	Ziziphus jujuba(L) H.Karst	Rhamnaceae	Fruit	Mobarakeh Isfahan	[25]
Zeytoun	Olea europaea L	Oleaceae	Fruit	Mobarakeh Isfahan	[25]
babouneh	Anthemis gayana Boiss.	Asteraceae	Leaf, Flower	Natanz Kashan	[26]

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Discussion

In traditional Iranian medicine, the use of medicinal plants for controlling blood pressure is recognized as a natural and effective approach. Many indigenous medicinal plants in Iran, such as yarrow, coriander, garlic, and barberry, possess ACE-inhibitory properties, which can be effective in reducing blood pressure. Various studies have shown that the use of these plants can be considered as an adjunct or even an alternative treatment option for managing hypertension.

Medicinal plants such as yarrow, common purslane, hibiscus, onion, shallot, garlic, aloe vera, dill, celery, lemon balm, barberry, turnip, cannabis, sour cherry, chicory, etc., have ACE-inhibitory properties and can be considered as potential ACE inhibitors in traditional Iranian medicine. These plants should be further explored for the development of antihypertensive drugs [27].

A review study found that some medicinal plants, including garlic tablets, black currant, nettle extract, clover, burdock, olive leaves, and walnut leaves, were effective in reducing blood pressure [28].

Studies have shown that medicinal plants such as celery, barberry, nettle, garlic, thyme, valerian, yarrow, olive leaves, and pomegranate juice have a significant impact on lowering blood pressure. Extracts from plants like barberry and nettle significantly reduce blood pressure ($P<0.001$ and $P<0.05$), and garlic tablets effectively reduce both systolic and diastolic blood pressure ($P=0.001$). Furthermore, intravenous administration of some plants like thyme and valerian has a significant blood pressure-lowering effect ($P<0.0001$). The role of these plants in reducing blood pressure has also considered their potential toxicity and drug interactions, so their consumption should be monitored by a physician [29].

A study conducted in Abadeh, Shiraz, identified six plant species from four different families for controlling blood pressure. The Lamiaceae, Asteraceae, Liliaceae, and Brassicaceae families were the most important families used in the treatment of hypertension. Results showed that plants such as Ajuga chamaecistus, Salvia sp., Allium sp., Satis minima, Scariola orientalis, Taraxacum syriacum were antihypertensive in this region, and different parts of the plants, including flowers, leaves, roots, aerial parts, bulbs, bulbils, flower branches, and petals, were recommended for treating hypertension, and all plants were consumed as decoctions [30].

In Shahrekord, various medicinal plants such as Centaurea depressa M., Berberis vulgaris, Hypericum perforatum, Anethum graveolens Dhi, Coriandrum sativum, Cichorium intybus L., Ribes divaricatum, Althea aucheri Boiss., Borago officinalis, Gundelia tournefortii L., Trigonella monspeliaca, Viscum album, Petroselinum sativum, Allium sativum, Crataegus aronia, Ficus religiosa, Glaucium oxylobum Boiss & Buhse, Glaucium grandiflorum Boiss & Huet., Olea europaea, Camellia sinensis, Rhus coriaria L., Matricaria recutita, Valeriana officinalis, Cotoneaster persica Pojark., Physalis alkekengi, Descurainia Sophia (L.) Schr., Ziziphus zizyphus are used for treating hypertension [31].

This study identified various medicinal plants used across different regions of Iran to treat hypertension. Among these plants is Olea europaea (olive) from the Oleaceae family, which is used in the northeastern Persian Gulf and Khuzestan province as both fruit and leaves. Other plants like Silybum marianum (milk thistle) and Tragopogon aureus (a type of thistle) are used in Khuzestan for traditional treatments [32, 33]. In a study, various medicinal plants used for traditional treatments in Lorestan province were identified. For instance, Nectaroscordum tripedale and Nectaroscordum coelzi from the Amaryllidaceae family are used as "Lorestan summer onions" with their buds [34]. In the Arasbaran region, various medicinal plants are traditionally used for the treatment of high blood pressure. For instance, Berberis vulgaris (Barberry) from the Berberidaceae family, Achillea millefolium (Yarrow) from the Asteraceae family, and Ecbalium elaterium (Wild Cucumber) from the

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Cucurbitaceae family are commonly used for their leaves, roots, and fruits. Other plants such as Ribes orientale (Eastern Grape) and Crataegus monogyna (Hawthorn) are also utilized for their fruits and leaves in traditional treatments [35]. A study conducted on medicinal plants effective against high blood pressure in western Iran identified plants such as Foeniculum vulgare (Fennel), Achillea millefolium (Yarrow), Fumaria officinalis (Fumitory), and Crataegus monogyna (Hawthorn), which are known to possess antihypertensive properties. These findings suggest that some medicinal plants can be used as adjunct or alternative treatments for managing hypertension [36]. Chronic diseases such as cancer, leukemia, and hemophilia are often associated with oxidative stress [37-39], highlighting the potential of medicinal plants with antioxidant properties as an effective approach for prevention and supportive treatment [40]. In many diseases and disorders [41-46], turning to nature and embracing traditional or natural therapeutic approaches can serve as a beneficial and complementary strategy helping to alleviate symptoms, support overall well-being, and enhance patients' quality of life [47].

Conclusion

Based on the studies conducted, various medicinal plants from different regions of Iran have been identified to have antihypertensive properties. The use of these plants in Iranian traditional medicine as complementary treatments for blood pressure control can be considered. However, the consumption of these plants should be under medical supervision to avoid potential side effects or drug interactions.

Statements and Declarations

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Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Author contributions

SN: Conceptualization, the original draft writing, investigation, writing including reviewing and editing and investigation and formal analysis; PP: Conceptualization, supervision, and project administration; PP and SN Conceptualization, the original draft writing, investigation, writing including reviewing and editing

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