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A Review of Medicinal Plants Effective in Relieving Menstrual Pain Based on Ethnobotanical Knowledge of Eastern Iran

Ameneh Fijan [1]✉

[1]Department of Obestetric and Gynecology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

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✉ ***Correspondence to:***
Ameneh Fijan

Email:
amenehfijan@ymail.com

A B S T R A C T

Objective: Menstrual pain, a common affliction among women, can significantly impact their daily activities. In this context, the use of medicinal plants as a natural and effective remedy for relieving such pain has been acknowledged in the western border region of Iran, serving as an alternative or complementary therapeutic approach. The aim of this study is to identify the medicinal plants employed in this region of Iran for the treatment of menstrual pain.

Methodology: This review study employed keywords such as medicinal plants, Iran, menstrual pain, and the provinces of West Azerbaijan, East Azerbaijan, Ardabil, Kurdistan, Kermanshah, Ilam, Khuzestan, and their cities, along with ethnobotany terms. Databases such as Google Scholar, SID, MegaIran, PubMed, and Scopus were utilized for article searches. Ethnobotanical articles related to the topic were selected for text review.

Results: Based on the ethnobotanical review, it was identified that in the cities and provinces of the western border region of Iran, medicinal plants such as *Foeniculum vulgare* Mill., *Anthriscus cerefolium* L., *Capsella bursa pastoris* (L.), *Nigella sativa* L., *Thymus kotschyanus* Boiss. & Hohen., *Celtis australis* L., *Ruta graveolens* L., *Carthamus oxyacantha* M.B., *Myrtus communis* L., *Ulmus glabra* Hudson., *Pistacia atlantica*, *Mentha piperita* Stokes., *Dactylorhiza umbrosa* (Kar. & Kir.) Nevski, *Orchis mascula* Crantz, *Achillea millefolium*, *Biebersteinia multifida*, *Hypericum perforatum*, *Urtica dioica*, *Orchis latifolia* L., *Avena sativa* L., *Adiantum capillus-veneris* L., *Achillea millefolium*, *Carthamus tinctorius*, *Crataegus pontica*, *Heracleum persicum* L., *Calendula officinalis* L., *Crocus abantensis*, *Thymus vulgaris* L., *Stachys lavandulifolia*, *Ziziphora clinopodioides*, *Rheum ribes* L., *Anthemis Susiana* L., *Cardaria draba* (L.) Desv., *Marrubium astracanicum* Jacp. are commonly used for managing, controlling, and treating menstrual pain. Notably, the highest diversity of plant species was observed in the regions of Behbahan, Khuzestan, and Zrewar, Kurdistan. Leaves were the most commonly used plant part, and the Asteraceae and Lamiaceae families presented the highest number of species, indicating the rich diversity of medicinal and traditional plant applications.

Conclusion: The findings of this study demonstrate that the local communities in the western border region of Iran possess extensive knowledge regarding the use of medicinal plants for alleviating menstrual pain. Documenting and scientifically exploring this knowledge could lay the groundwork for the development of effective and natural herbal medicines in the domain of women's health.

Keywords: Disease, women, menstrual pain, medicinal plants, treatment, Iran

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Introduction

Maintaining the health of women, as the cornerstone of family well-being, is of significant importance [1]. Increasing women's awareness of female health issues and common disorders plays a crucial role in improving their quality of life, preventing diseases, preparing for illness management, and ultimately ensuring their health [2]. Various diseases pose a threat to women's health, some of which have high prevalence rates and impact a woman's sexual, physical, and reproductive health, consequently affecting her quality of life [3,4]. Menstruation is a natural and regular process in the monthly cycle of women, accompanied by vaginal bleeding [5]. Many women experience varying degrees of pain during this period, typically felt as rhythmic contractions in the lower abdomen. This pain may be associated with symptoms such as lower back pain, nausea, and headaches, which exacerbate the discomfort [6]. Dysmenorrhea,

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or menstrual pain, results from uterine contractions to expel its internal lining. These contractions reduce blood flow and oxygen delivery to the uterine tissue and exacerbate pain by producing prostaglandins [7]. Dysmenorrhea is categorized into primary (without underlying causes) and secondary (due to uterine diseases) types. Several factors contribute to dysmenorrhea, including irregular menstruation, heavy bleeding, age under 30, family history, lack of pregnancy, use of IUDs, stress, and smoking [8]. Menstrual pain usually begins with the onset of bleeding and can last between 48 to 72 hours [9,10]. The pain, particularly during heavy bleeding, can intensify and affect various areas such as the abdomen, lower back, legs, and breasts. Symptoms like nausea, diarrhea, and headaches may also accompany it [10].

The treatment of dysmenorrhea aims to reduce pain intensity and improve the quality of life [10]. Primary dysmenorrhea is typically treated empirically without the need for diagnostic investigations, while secondary dysmenorrhea requires identifying and treating the underlying cause [11]. Menstrual pain can also be attributed to conditions such as endometriosis, adenomyosis, uterine fibroids, ovarian cysts, and pelvic inflammatory diseases. Therapeutic methods include the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and, in some cases, hormonal medications [11]. For pain relief, supplements containing vitamins and minerals such as vitamin B6, B1, E, omega-3, calcium, and magnesium are recommended. Certain foods and medicinal plants, including chamomile, fennel, cinnamon, ginger, and dill, can also help alleviate pain [10,11].

Chemical drugs are typically used to treat menstrual pain, but their prolonged use may lead to side effects [11]. These include gastrointestinal problems, kidney disorders, and an increased risk of heart disease [12]. Hormonal drugs can also cause blood clots, mood swings, and certain cancers. The use of medicinal plants as a natural and low-side-effect treatment for dysmenorrhea has garnered significant attention [13]. Medicinal plants, with their anti-inflammatory and analgesic properties, can help reduce menstrual pain [14]. These plants are typically consumed in the form of infusions and assist in reducing uterine contractions and improving blood circulation. The aim of this study is to identify the medicinal plants used in the western border region of Iran for treating menstrual pain [14].

Methodology

In this review study, relevant articles concerning effective medicinal plants in ethnobotany for treating menstrual pain in the western border region of Iran were searched using keywords such as "medicinal plants," "menstrual pain," "Iran," "West Azerbaijan," "East Azerbaijan," "Ardabil," "Kurdistan," "Kermanshah," "Ilam," "Khuzestan," "cities of each province," and "ethnobotany." The goal of this search was to identify ethnobotanical articles related to the use of medicinal plants for treating menstrual pain in these specific regions.

For the search of articles, reputable databases such as Google Scholar, SID, MegaIran, PubMed, and Scopus were utilized. These databases provide various scientific resources that are highly effective in identifying articles and research related to the topic of this study.

In this study, ethnobotanical articles, particularly those focused on the western regions of Iran and the mentioned provinces, were thoroughly reviewed. These articles were selected as primary sources for an overview of existing knowledge on the use of medicinal plants for treating menstrual pain.

Inclusion and Exclusion Criteria:

For this study, inclusion criteria specifically focused on ethnobotanical articles published in the western border provinces of Iran. Additionally, articles providing information on menstrual pain and dysmenorrhea in the context of ethnobotany and the use of medicinal plants for menstrual pain relief were considered. All articles published in reputable, indexed scientific databases were selected for review.

On the other hand, articles lacking sufficient scientific credibility or accurate documentation were excluded. Likewise, articles not directly related to the main topic of the study, which is the traditional and ethnobotanical effects of medicinal plants in treating menstrual pain, were discarded. Articles that were not published in reputable scientific databases or were inaccessible due to specific restrictions were also excluded from the selection process.

Ultimately, after searching and reviewing various articles, the selected articles were carefully analyzed according to the stated criteria to ensure that the best scientific and research resources were chosen for presenting the study's findings.

Results

Ethnobotanical surveys revealed that various medicinal plants are used in the cities of the western border provinces of Iran for the management, control, and treatment of menstrual pain. These plants include *Foeniculum vulgare* Mill., *Anthriscus cerefolium* L., *Capsella bursa pastoris* (L.), *Nigella sativa* L., *Thymus kotschyanus* Boiss. & Hohen., *Celtis australis* L., *Ruta graveolens* L., *Carthamus oxyacantha* M.B., *Myrtus communis* L., *Ulmus glabra* Hudson., *Pistacia atlantica*, *Mentha piperita* Stokes., *Dactylorhiza umbrosa* (Kar. & Kir.) Nevski, *Orchis mascula* Crantz, *Achillea millefolium*, *Biebersteinia multifida*, *Hypericum perforatum*, *Urtica dioica*, *Orchis latifolia* L., *Avena*

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sativa L., *Adiantum capillus-veneris* L., *Achillea millefolium*, *Carthamus tinctorius*, *Crataegus pontica*, *Heracleum persicum* L., *Calendula officinalis* L., *Crocus abantensis*, *Thymus vulgaris* L., *Stachys lavandulifolia*, *Ziziphora clinopodioides*, *Rheum ribes* L., *Anthemis Susiana* L., *Cardaria draba* (L.) Desv., *Marrubium astracanicum* Jacp. These plants are widely utilized in these regions to alleviate menstrual pain. Additional ethnobotanical information regarding these medicinal plants used for menstrual pain in the western border region of Iran is provided in Table 1.

Table 1: Persian Name, English Name, Plant Family, Used Part, and Study Area.

Scientific Name	Plant Name	Plant Family	Used Part	Study Area
Foeniculum vulgare Mill	Fennel	Apiaceae	Seed	Urmia, West Azerbaijan, Iran [15]
Anthriscus cerefolium L.	Wild Parsley	Apiaceae	Leaf	Behbahan, Khuzestan, Iran [16]
Capsella bursa pastoris (L.)	Shepherd's Purse	Brassicaceae	Aerial Part	Behbahan, Khuzestan, Iran (16)
Nigella sativa L.	Black Seed	Ranunculaceae	Seed	Behbahan, Khuzestan, Iran [16]
Thymus kotschyanus Boiss. & Hohen.	Thyme	Lamiaceae	Aerial Part	Behbahan, Khuzestan, Iran [16]
Celtis australis L.	Hackberry	Cannabaceae	Aerial Part	Behbahan, Khuzestan, Iran [16]
Ruta graveolens L.	Rue	Rutaceae	Aerial Part	Behbahan, Khuzestan, Iran [16]
Carthamus oxyacantha M.B.	Yellow Safflower	Asteraceae	Flower	Dehloran & Abdanan, Ilam, Iran [17]
Myrtus communis L.	Myrtle	Myrtaceae	Leaf	Dehloran & Abdanan, Ilam, Iran [17]
Ulmus glabra Hudson.	Smooth-leaved Elm	Ulmaceae	Leaf	Dehloran & Abdanan, Ilam, Iran [17]
Pistacia atlantica	Kurdistan Pistachio	Anacardiaceae	Fruit	Zarrivar, Kurdistan, Iran [18]
Mentha piperita Stokes.	Peppermint	Lamiaceae	Leaf	Zarrivar, Kurdistan, Iran [18]
Dactylorhiza umbrosa (Kar. & Kir.) Nevski	Marsh Finger Orchid	Orchidaceae	Underground Tubers	Zarrivar, Kurdistan, Iran [18]
Orchis mascula Crantz	Male Orchid	Orchidaceae	Underground Tubers	Zarrivar, Kurdistan, Iran [18]
Achillea millefolium	Yarrow	Asteraceae	Leaf	Saqez, Kurdistan, Iran [19]
Biebersteinia multifida	Adam's Root	Ranunculaceae	Aerial Part	Saqez, Kurdistan, Iran [19]

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Hypericum perforatum	St. John's Wort	Hypericaceae	Aerial Part	Saqez, Kurdistan, Iran [19]
Urtica dioica	Stinging Nettle	Urticaceae	Leaf & Flower	Saqez, Kurdistan, Iran [19]
Orchis latifolia L.	Broad-leaved Orchid	Orchidaceae	Tubers	East Khuzestan, Khuzestan, Iran [20]
Avena sativa L.	Oats	Poaceae	Seed	East Khuzestan, Khuzestan, Iran [20]
Adiantum capillus-veneris L.	Maidenhair Fern	Pteridaceae	Aerial Part	East Khuzestan, Khuzestan, Iran [20]
Achillea millefolium	Yarrow	Asteraceae	Flower	Ajabshir, East Azerbaijan, Iran [21]
Carthamus tinctorius	Safflower	Asteraceae	Flower	Ajabshir, East Azerbaijan, Iran [21]
Crataegus pontica	Pontic Hawthorn	Cannabaceae	Fruit & Leaf	Ajabshir, East Azerbaijan, Iran [21]
Heracleum persicum L.	Persian Hogweed	Apiaceae	Fruit	Meshginshahr, Ardabil, Iran [22]
Calendula officinalis L.	Marigold	Asteraceae	Flower	Meshginshahr, Ardabil, Iran [22]
Crocus abantensis	Abant Crocus	Iridaceae	Flower	Meshginshahr, Ardabil, Iran [22]
Thymus vulgaris L.	Common Thyme	Lamiaceae	Aerial Part	Meshginshahr, Ardabil, Iran [22]
Stachys lavandulifolia	Lavender-leaved Betony	Lamiaceae	Aerial Part	Meshginshahr, Ardabil, Iran [22]
Ziziphora clinopodioides	Wild Basil	Lamiaceae	Leaf & Seed	Meshginshahr, Ardabil, Iran [22]
Rheum ribes L.	Rhubarb	Polygonaceae	Root	Meshginshahr, Ardabil, Iran [22]
Anthemis Susiana L.	Eastern Chamomile	Asteraceae	Flower & Leaf	Sosan Region, Darehfol, Khuzestan [23]
Cardaria draba (L.) Desv.	Hoary Cress	Brassicaceae	Leaf & Flower	Sosan Region, Darehfol, Khuzestan [23]
Marrubium astracanicum Jacp.	Purple Horehound	Lamiaceae	Leaf & Flower	Sosan Region, Darehfol, Khuzestan [23]

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The analysis of plant family occurrences in the list revealed that among 30 samples, the Apiaceae and Asteraceae families each represent the highest number of samples with 3 and 7 occurrences, respectively. The Orchidaceae family accounted for 4 samples, and the Lamiaceae family had 7 samples. Other families, such as Brassicaceae, Ranunculaceae, and Cannabaceae, each represented 2 samples, showing lower percentages compared to the primary families. Families like Rutaceae, Myrtaceae, Ulmaceae, Anacardiaceae, Hypericaceae, Urticaceae, Poaceae, Pteridaceae, Iridaceae, and Polygonaceae each contained one sample.

Overall, aerial and leaf parts of the plants were the most commonly used, while other parts such as seeds, fruits, and underground tubers were used less frequently. This analysis can assist researchers in identifying various patterns of plant organ usage in studies based on medicinal plants and their applications.

In this study, the highest plant diversity was observed in the provinces of Khuzestan and Kurdistan, with these two provinces accounting for more than 50% of the samples. Other provinces such as East and West Azerbaijan and Ardabil had lesser representation.

The distribution map of medicinal plant species in Iran is shown in Figure 1.

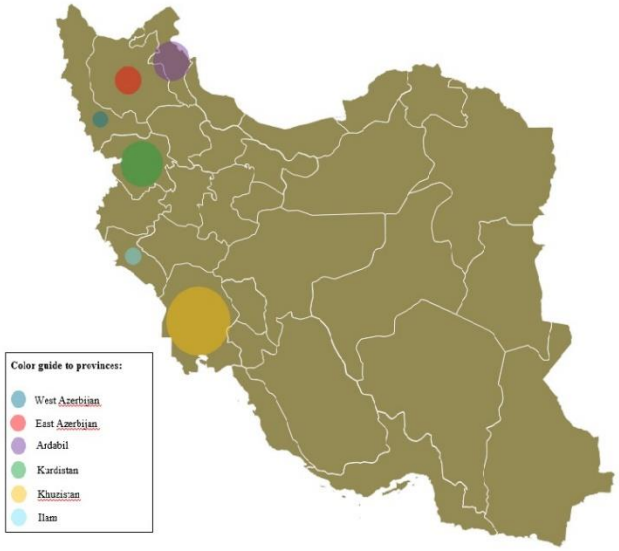

Figure 1: Distribution Map of Medicinal Plant Species in Iran

Discussion

Traditional medicine in Iran, one of the oldest therapeutic systems, recommends the use of medicinal plants for treating various diseases and issues. One common problem among women is menstrual pain and dysmenorrhea, which can affect daily life. In this regard, herbal medicine has gained special attention as a natural and effective method [24].

Various medicinal plants, with their anti-inflammatory, analgesic, and sedative properties, help alleviate the symptoms of painful menstruation. Plants such as saffron, marigold, Golpar, Zalazak, Calendula, Yarrow, Horsetail, Oat, Orchis, Male Orchis, Marsh Fingerroot, Mint, Kurdish Pistachio, Elm Leaf, Myrtle, Yellow Marigold, Rue, Damask Rose, Thyme, Black Cumin, Shepherd's Purse, Wild Parsley, Fennel, St. John's Wort, Yarrow, and Chamomile, commonly used in the western border regions of Iran, are effective in managing menstrual pain.

One study showed that dysmenorrhea, a common issue among women, is usually accompanied by lower abdominal muscle cramps. This study found that Valerian root, as a sedative and pain reliever, can be as effective as mefenamic acid in reducing menstrual pain. Furthermore, a fruit-based diet and the consumption of medicinal plants like ginger, coriander seeds, and sesame are also recognized as beneficial in treating menstrual disorders [25]. Another review study showed that herbal medicines such as Vitex, Evening Primrose, Chamomile, Wheat Germ, Lavender, Ashwagandha, Valerian root, Orange Peel oil, and Ginger help reduce the severity of premenstrual syndrome [26]. A semi-experimental study aimed at evaluating the effects of a combination of fennel, chamomile, and ginger on the severity of primary dysmenorrhea in female students from Ardabil universities showed that the herbal combination significantly reduced dysmenorrhea pain intensity (P=0.017). Given the high prevalence of dysmenorrhea and the potential of medicinal plants, it is recommended to use these herbs alongside conventional treatments for pain relief [27]. Results from a study conducted in Mashhad, which investigated the impact of herbal medicine on dysmenorrhea, found that the use of herbal remedies significantly alleviates dysmenorrhea pain, with plants like mint, thyme, and cumin showing the greatest efficacy. Additionally, comparisons between herbal and pharmaceutical treatments suggested that herbal remedies could be a viable alternative for managing dysmenorrhea [28]. This review study examined the effects of herbal medicines on primary dysmenorrhea in Iran. According to the results, 16 medicinal plants were studied in 35 clinical trials, most of which contained flavonoid compounds with anti-inflammatory and analgesic properties. Plants like fennel showed positive results in relieving dysmenorrhea pain with minimal side effects [29]. A study on the effectiveness of herbal remedies for reducing premenstrual syndrome (PMS) symptoms found that plants like Vitex,

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Evening Primrose, Chamomile, and Ginger have a beneficial effect in alleviating PMS symptoms with minimal side effects [30].

Conclusion

The findings of this study showed that numerous medicinal plants are used in the western border regions of Iran for managing and treating menstrual pain. These plants, with their anti-inflammatory, analgesic, and blood circulation-enhancing properties, play a significant role in reducing menstrual pain intensity. The high plant diversity, particularly in Khuzestan and Kurdistan provinces, indicates the richness of local knowledge in utilizing medicinal plants. Documenting and scientifically evaluating this knowledge can contribute to the development of effective and low-side-effect herbal treatments for menstrual pain. Therefore, attention to indigenous medicinal plants in Iran could pave the way for the production of natural medicines that improve women's health.

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.

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