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The medicinal plants and plant-based products of Iran effective on dysmenorrheal

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Abstract : Background: Dysmenorrhea is one of the most prevalent gynecological disorders and a main cause of women's attending clinics. Dysmenorrhea occurs due to painful uterine cramping before or during menstruation and consequently the release of prostaglandin, in the absence of any pelvic pathological factor. In different communities, medicinal plants have long been used to manage pain and treat diseases, and currently, the medicinal plants and plant-based products, alongside synthetic drugs, are being used. Regarding the prevalence of dysmenorrhea and Iranian women's access to different medicinal plants, this review article seeks to report the medicinal plants and plant-based products of Iran that are effective on dysmenorrheal.

Methods: First, 100 articles were retrieved from reliable databases using the relevant key words and search engines. Then, 50 articles were selected. Finally, 24 articles that were judged relevant to the subject of this review article and were closely analyzed. The required data were extracted with reference to the research purposes and, after classification, presented in the *Results* section.

Results: The findings of this review article demonstrated that Iranian women use 18 plants and plant-based products to treat dysmenorrhea, including valerian, *Zingiber officinale*, *Stachys lavandulifolia* Vahl., *Thymus vulgaris*, *Cuminum cyminum*, *Trigonella foenum-graecum*, *Foeniculum vulgare*, *Matricaria recutita*, *Lavendula officinalis*, *Rosa × damascena*, *Triticum aestivum* shoot, *Melissa officinalis*, *Salvia officinalis*, *Aloe vera*, *Mentha spicata*, *Echinophora cinerea*, *Olea europaea*, and *Anethum graveolens*. These plants were reported to be effective on dysmenorrheal.

Conclusion: Given the prevalence of dysmenorrhea and the necessity of treating it to manage pain and ameliorate declined function during menstruation, and the women's welcoming the use of the medicinal plants, the 18 medicinal plants investigated by the studies conducted on dysmenorrhea in Iran can be useful to relieve dysmenorrhea severity because of having anti-inflammatory and nonsteroidal properties.

Key words: Medicinal plants, plant-based products, women, dysmenorrhea, Iran.

Introduction

Dysmenorrhea is one of the most prevalent gynecological disorders. Dysmenorrhea occurs due to painful uterine cramping before or during menstruation in the absence of any pelvic pathological factor and usually because of release of prostaglandin, and is a main cause of women's attending clinics (1).

Dysmenorrhea develops in approximately 5% of women with regular menstruation and 50% of adolescent girls. At least 50% of women may experience dysmenorrhea during pregnancy, which can lead to

some problems such as declined quality of life and prolonged absence from work or school. Dysmenorrhea may adversely affect all dimensions of life (2).

Although there are several treatments for dysmenorrhea, the treatments that cause few or no side effects, such as medicinal plants and exercise, are particularly important to relieve the problems of women with dysmenorrhea. The use of medicinal plants dates back to the first human beings and these plants have long been used as healing agents (3-10). Recently, promising findings have been obtained on the effects of medicinal plants in treating different diseases (11-25).

Currently, the medicinal plants and plant-based products are being increasingly used worldwide to treat diseases. Moreover, people are paying much attention to these products for treating diseases (26-35). A main cause of welcoming medicinal plants and plant-based products can be fewer side effects of these plants than those of chemical drugs (37, 154-166).

According to the latest report of the Statistical Center of Iran, the population of Iran is above 76 million, 50% of whom are women. Approximately 18 millions of Iranian women are at fertility ages, and according to the studies, nine millions of these women may experience dysmenorrhea (Statistical Center of Iran).

Regarding the above-mentioned and the necessity of concluding the findings on the medicinal plants and the plant-based products that are effective on dysmenorrhea, this review article seeks to report the medicinal plants and plant-based products of Iran that are effective on dysmenorrhea.

Materials and methods

First, 100 articles and abstracts were retrieved from reliable databases using the relevant key words and search engines. Then, duplicate publications, the articles published in both Persian and English languages, or presented in the congresses were considered single publication. Accordingly, 50 articles were selected. Finally, 24 articles published by Iranian researchers in Persian and English languages that were judged relevant to the subject of this review article were closely analyzed. The required data were extracted with reference to the research purposes and, after classification, presented in the *Results* section.

Results

Results: The findings of this review article demonstrated that Iranian women use 18 plants and plant-based products to treat dysmenorrhea, including valerian, *Zingiber officinale*, *Stachys lavandulifolia* Vahl., *Thymus vulgaris*, *Cuminum cyminum*, *Trigonella foenum-graecum*, *Foeniculum vulgare*, *Matricaria recutita*, *Lavendula officinalis*, *Rosa × damascena*, *Triticum aestivum* shoot, *Melissa officinalis*, *Salvia officinalis*, *Aloe vera*, *Mentha spicata*, *Echinophora cinerea*, *Olea europaea*, and *Anethum graveolens*. These plants were reported to be effective on dysmenorrhea.

Overall, 78.6% of the participants were university students and the rest non-university students. Of the students, 38% lived in dormitories. The mean duration of interventions on the studied participants was three consecutive cycles, and the mean duration of administration three days per a cycle and three times a day. 47.6% of the plants were used as capsule, 19.4% as oral drop, 16.2% as herbal tea, 12.3% as essential oil, and 4.5% as other forms (Table 1).

Table 1. The results of the reviewed studies on the use of plants and plant-based products for dysmenorrhea

Findings	Groups of study	Duration of study	Sample size and occupation	Pants/remedies	Researchers' names
Decreasing the symptoms associated with dysmenorrhea (39)	3 groups	3 days/2 cycles	100 students	Valerian	Mirabi and et al
Relieving the pain due to primary dysmenorrhea (40)	2 groups	3 days/1 cycle	78 students	*Zingiber officinale*	RahnamaParvin
Relieving the pain due to primary dysmenorrhea (41)	1 group	5 days/3 cycle	50 girls	*Stachys lavandulifolia* Vahl.	OlfatiForouzan
Contributing to decreasing dysmenorrhea (42)	3 groups	1cycle/during pain	108 students	*Thymus vulgaris*	IravaniMina
Relieving dysmenorrhea severity (43)	2 groups	3 days/2 cycles	101 students	*Trigonella foenum-graecum*	Sima Younosi
Relieving pain and decreasing menstrual symptoms (44)	2 groups	4 days/2 cycles	60 students	*Lavendula officinalis*	Shourangiz Beiranvand
Treating physical symptoms of dysmenorrhea (45)	4 groups	3 days/2 cycles	60 students	*Zingiber officinale*	Nafiseh Saadatnejad
Relieving dysmenorrhea symptoms (46)	1 group	12 days/2 cycles	90 students	*Foeniculum vulgare*, *Matricaria recutita*, *Zingiber officinale*	Nasrin Samadi
Decreasing the severity and duration of menstrual pain (48)	3 groups	3 days/2 cycles	90 students	*Lavendula officinalis*	Marzieh Davari
Having positive	2 groups	17 days/2 cycles	90 female hospital staff	*Rosa* × *damascena*	Maryam Ataollahi

effects on primary dysmenorrhea (48)					
Decreasing primary dysmenorrhea severity (49).	3 groups	1 day/2 cycles	75 students	*Rosa* × *damascena*	sadeghi-avval-shahr Homa
Relieving pain intensity and decreasing dysmenorrhea duration (50).	1 group	2 days/3 cycles	50 girls	*Melissa officinalis* and *Salvia officinalis*	Ramezan Kalvandi
Decreasing primary dysmenorrhea severity (51).	2 groups	3 days/2 cycles	90 students	*Matricaria recutita*	Zahra Karimian
Decreasing dysmenorrhea severity (52).	2 groups	3 days/2 cycles	90 students	*Foeniculum vulgare*	Leila Moslemi
Relieving menstrual pain (53).	2 groups	5 days/3 cycles	90 students	*Stachys lavandulifolia* Vahl.	Fatemeh Shobeiri
Decreasing dysmenorrhea severity (2).	2 groups	2 cycles	80 students	*Aloe vera*	Somayyeh Khazaeian
Decreasing dysmenorrhea severity (54).	2 groups	As pain began/2 cycles	100	*Mentha spicata*	Mahboubeh Omoumi Roknabad
Decreasing dysmenorrhea severity (55).	2 groups	6 days/2 cycles	60 students	*Echinophora cinerea*	Masoumeh Delaram
Decreasing dysmenorrhea severity (1).	2 groups	6 days/2 cycles	60 students	*Foeniculum vulgare*	Masoumeh Delaram
Contributing to treating primary dysmenorrhea (56).	2 groups	14 days/2 cycles	60 students	*Olea europaea*	Maryam Rezaeian
Effective on dysmenorrhea (57).	2 groups	After onset of pain/3 cycles	100 students	*Anethum graveolens*	Neda Mohammadinia
Decreasing dysmenorrhea severity (58).	2 groups	6 days/2 cycles	60 students	*Echinophora cinerea*	Masoumeh Delaram

Discussion

Dysmenorrhea refers to the painful menstruation that usually occurs 1-2 years after the beginning of menstruation, the beginning of ovulation, and is associated with uterine cramps. These cramps occur simultaneously with the beginning of menstruation or some days and hours after, and may last for 72 hours. As menstruation persists, the severity of dysmenorrhea declines. Approximately 50% of women suffer from dysmenorrhea.

According to the studies, 60% of women experience primary dysmenorrhea, of whom 5-25% report to have pain (1). According to unofficial figures, 31% of women experience severe pain due to dysmenorrhea and the WHO reported that 10-20% of these women suffer from severe dysmenorrhea. Approximately 60% of adolescents that menstruate may experience dysmenorrhea at different degrees and 14% of them are frequently absent from school (44).

In a longitudinal study on the students aged 17-19 years in the USA, 17% of the participants reported to experience dysmenorrhea in half of their menstrual cycles and 42% reported to experience their activities being interrupted by dysmenorrhea at least once. A study in Iran reported the prevalence of primary dysmenorrhea to be 71%, and that 15% of the students were 1-7 days abesent from school because of dysmenorrhea.

Primary dysmenorrhea is a common reason for absence from school or work because of inability or disability, which is a subcategory of health indices and may affect community health and consequently productivity (57). Approximately 10-15% of women with dysmenorrhea need to rest for 1-3 days each month (59,60). Primary dysmenorrhea has been constantly addressed from socioeconomic perspectives and is estimated to be the most important reason for waste of time and absence from work and school. As women comprise approximately 42% of adult workforce, millions of useful working hours are wasted each year because of development of dysmenorrhea in women. In the USA, if diarrhea is not treated effectively, it may lead to the waste of about 600 millions of working hours each year (61).

We found that in the studies conducted in Iran, approximately 78.6% of the participants in the studies on the effects of medicinal plants on primary dysmenorrhea were university students, most likely to experience dysmenorrhea. Of this population, 38% were enrolled from dormitories. 14.2% of the participants were non-university students. Poureslami study reported that 63% of female university students in Iran suffer from dysmenorrhea with highest prevalence in women aged under 20 years and declining after the ages of 30-35 years (62).

Dysmenorrhea can decline the quality of life and social activities among young woman, especially if it presents with headache, fatigue, nausea, vomiting, diarrhea, impatience, chills, and muscle spasms.

Severe dysmenorrhea can lead to absence from work and school. Therefore, about 1% of women at fertility ages may have difficulty attending workplace efficiently three days a month and consequently millions of working hours are wasted each year. Notably, women with dysmenorrhea who continue to go to work are more likely to face accident or have a lower quality of work (62). In addition to causing economic difficulties, dysmenorrhea can influence social relationships. Dysmenorrhea may make women unwilling to do household daily chores and affect their family relationships because of mood variations. Because women comprise a large population of any communities, paying no adequate attention to treating dysmenorrhea may cause some socioeconomic problems for countries. Therefore, it is highly important to treat dysmenorrhea.

Menstrual pains and related symptoms such as nausea, vomiting, fatigue, and headache are caused by prostaglandins release during menstruation. According to the studies, women frequently use supplemental medicine to treat diseases. For example, in the USA, 48.9% of women, 37.8% of men, and at least 40% of adults use supplemental medicine once a year. Decreased progesterone levels at the end of the luteal phase causes stimulation of lysis in enzymes and release of phospholipids alongside producing arachidonic acid and activating the cyclo-oxygenase pathway (63,64). The use of synthetic drugs, especially in the long term, may lead to several side effects. For example, prostaglandin inhibitors can cause nausea, gastric stimulation, peptic ulcers, renal papillary necrosis, and declined renal perfusion (2).

In addition, most young women tend not to use hormonal agents to relieve the pain due to dysmenorrhea. Therefore, many researchers have become interested in investigating the use of the medicinal plants to treat different diseases, and because these plants cause fewer side effects compared to synthetic drugs, people have recently become highly interested in supplementary and alternative medicine (65-88). Focusing on the findings of the studies on medicinal plants and/or plant-based products conducted in Iran, this review article indicated that the studied plants and plant-based products were found to exert prostaglandin-lowering effects or cause defect or change in cyclo-oxygenase pathway. All of these plants were reported to be effective in treating dysmenorrhea.

Besides that, the findings indicate that the medicinal plants can be effective only in the luteal phase of menstrual cycle and therefore it is not necessary to use them throughout the whole menstruation (69). Studies have demonstrated that the main compounds of the plants, including flavonoids, affect pituitary gland directly,

and via increasing LH release, lead to increased progesterone levels and hence adjust certain disorders such as premenstrual syndrome and dysmenorrhea, which are due somehow to declined hormones in the late menstrual cycle. In the present work, we found that in most studies, the interventions started at the end or the beginning of menstruation.

Shah-Hosseini et al reported that the medicinal plants might take three months to exhibit their effects. The greatest pain-relieving effects due to these plants are exhibited six months after use or later (90). However, the mean duration of the Interventions in many studies has been three cycles, three days on average, and three times per day. Another property of flavonoids and phenolic compounds is increasing the body's antioxidant capacity (92,107).

Dysmenorrhea is associated with oxidative stress which can be reduced by the oxidative stress of some medicinal plants (108-122). Therefore, the effects in relieving the problems due to dysmenorrhea can be partly explained by reduction in oxidative stress. There are many plants with antioxidant properties (123-155), which can be examined for anti-dysmenorrhea properties.

Conclusion

Given the prevalence of dysmenorrhea and the necessity of treating it to manage pain and ameliorate declined function during menstruation, and the women's welcoming the use of the medicinal plants, the 18 medicinal plants investigated by the studies conducted on dysmenorrhea in Iran can be useful to relieve dysmenorrhea severity because of having anti-inflammatory and nonsteroidal properties.

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