IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

EXPLORING THE THERAPEUTIC POTENTIAL OF HERBS AGAINST DYSMENORRHEA

Avinash Bichave*, Ruchika Dhavale, Shrutika Patil

*: Assistant professor, 1: Final year student, 2: Principal
TMV's Lokmanya Tilak Institute of Pharmacy (LTIP), Kharghar, Navi-Mumbai-410210.

ABSTRACT

As a prevalent gynaecological issue, dysmenorrhea affects women of all ages and ethnicities, impacting their quality of life. Various methods have been employed to alleviate dysmenorrhea, with herbal remedies commonly used in treatment. This article discusses the utilization of select herbal remedies for managing dysmenorrhea.

Dysmenorrhea manifests as abnormal abdominal pain during menstruation. While it's typical for 50 to 70% of women to experience lower abdominal and uterine pain during menstruation, severe pain that hinders daily activities is termed dysmenorrhea or painful periods. Chemical treatments for dysmenorrhea often entail side effects such as gastrointestinal disturbances, nausea, blurred vision, headaches, and dizziness. Consequently, the use of herbal remedies and traditional medicine has gained popularity.

This systematic review study highlights key medicinal plants utilized for dysmenorrhea. Keywords such as dysmenorrhea, medicinal plants, menstruation, pain, and primary dysmenorrhea were employed in this review. The medicinal herbs discussed in this study include *Foeniculum Vulgare*, *Zingiber officinale*, *Matricaria Chamomilla*, *Cinnamomum Zeylanicum*, and *Zataria Multiflora*.

KEYWORD: Dysmenorrhea, *Foeniculum Vulgare*, *Zingiber officinale*, *Matricaria Chamomilla*, *Cinnamomum Zeylanicum*, and *Zataria Multiflora*.

INTRODUCTION

Dysmenorrhea, as described in Greek literature, combines "Dys," meaning difficult, painful, or abnormal, "meno," referring to month, and "rrhea," indicating flow or discharge. Clinically, dysmenorrhea is synonymous with menstrual pain, which can be severe enough to hinder daily activities, necessitating regular analgesic use.(1) This condition can lead to significant issues such as missed workdays, school absenteeism, reduced work productivity, and increased accident rates, resulting in financial losses. Moreover, it can profoundly impact the quality of life and performance in daily activities among affected women.

Medical therapy offers various treatments for dysmenorrhea, including non-steroidal anti-inflammatories (NSAIDs) or oral contraceptive pills (OCPs), both aimed at reducing myometrial activity.(2) Sexual maturation and puberty development represent the transition from childhood to adulthood during adolescence. This phase is marked by cognitive, pubertal, mental, and psychological changes as girls transition from childhood to potential motherhood. Consequently, menarche, the onset of puberty in adolescent girls, can bring about excessive bleeding, abnormal menstruation, facial issues such as acne, and dysmenorrhea.(3)

Primary dysmenorrhea is characterized by painful menstruation with normal pelvic anatomy, typically beginning during adolescence.(4-5) It occurs in the absence of uterine disease, distinguishing it from secondary dysmenorrhea, which arises from pelvic pathologies.(3) Symptoms associated with dysmenorrhea include elevated levels of prostaglandins, leading to pain and inflammation, as well as nausea, dizziness,

diarrhoea, irritability, headache, and menstrual cramps, particularly in the days leading up to and during menstruation.(6) Various risk factors contribute to primary dysmenorrhea, including poor sleep, hygiene, alcohol and tobacco use, caffeine consumption, family history, lack of exercise, obesity, stress, and dietary habits.(7)

Dysmenorrhea poses a risk factor for fibromyalgia, characterized by fatigue and disruptions in sleep, memory, and mood. Women experiencing primary dysmenorrhea exhibit reduced quality of life, mood disturbances, and poorer sleep compared to painless cyst sections and pain-free menstruation phases of control women.(8)

Secondary dysmenorrhea, on the other hand, manifests as menstrual pain associated with underlying pathology, often appearing years after menarche.(4) Prostaglandins accumulate in the uterine muscle shortly before menstruation, acting as smooth muscle contractors to expel the endometrium.(4),(9) Several factors contribute to secondary dysmenorrhea, including younger age, low BMI, smoking, early menarche, prolonged menstrual flow, premenstrual disorders, pelvic infections, mental disorders, and genetic influences.(10) Common causes of secondary dysmenorrhea include endometriosis, fibroids, adenomyosis, endometrial polyps, pelvic inflammatory disease, and intrauterine contraceptive use.(4)

Risk factors associated with dysmenorrhea severity include menstrual flow, earlier menarche, smoking, obesity, alcohol consumption, and high stress levels, along with accompanying conditions such as depression, anxiety, and social media disorders.

METHODOLOGY:

A comprehensive search strategy was employed to identify relevant studies investigating the efficacy of herbal remedies in alleviating dysmenorrhea. Electronic databases, including PubMed, Scopus, and Google Scholar, were systematically searched using predefined search terms, including "dysmenorrhea," "medicinal plants," "menstruation," and "pain." Only peer-reviewed articles published in English were included in the review. The selection process prioritized research paper, and meta-analyses to ensure the inclusion of high-quality evidence. The identified studies were scrutinized for their methodological rigor and relevance to the research objectives.

RESULTS:

The review identified five medicinal herbs that have shown promise in managing dysmenorrhea. Fennel (*Foeniculum Vulgare*), renowned for its anti-inflammatory and antispasmodic properties, has demonstrated efficacy in alleviating menstrual pain. Similarly, Ginger (*Zingiber officinale*) has been extensively studied for its analgesic effects and ability to mitigate dysmenorrhea symptoms. Chamomile (*Matricaria Chamomilla*), Cinnamon (*Cinnamomum Zeylanicum*), and *Zataria Multiflora* have also shown potential in relieving menstrual discomfort through various mechanisms of action. However, further research is warranted to elucidate the optimal dosage, administration route, and long-term safety profile of these herbal remedies.

Taxonomical Profile:

Table 1

Sr. No.	Category	Plant A	Plant B	Plant C	Plant D	Plant E
1.	Kingdom	Plantae	Plantae	Plantae	Plantae	Plantae
2.	Division	Tracheophyta	Tracheophyta	Tracheophyta	Tracheophyta	Tracheophyta
3.	Class	Magnoliopsida	Magnoliopsida	Magnoliopsida	Magnoliopsida	Magnoliopsida
4.	Order	Apiales	Zingiberales	Asterales	Laurales	Lamiales
5.	Family	Apiaceae	Zingiberaceae	Asteraceae	Lauraceae	Lamiaceae
6.	Genus	Foeniculum	Zingiber	Matricaria	Cinnamomum	Zataria
7.	Species	Vulgare	Officinale	Chamomile	Zeylanicum	Multiflora
8.	Taxonomical name	*Foeniculum vulgare mill*	*Zingiber officinale*	*Matricaria chamomoilla l.*	*Cinnamomum zeylanicum*	*Zataria Multiflora Boiss*

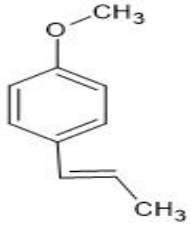
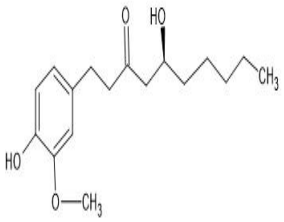
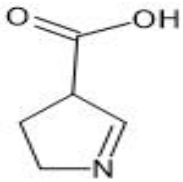
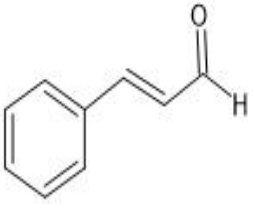
Common Names:

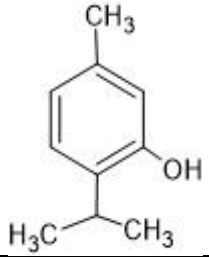
Table 2

Sr. No.	Plant	Hindi	Kannada	Marathi	Telugu	Bengali
1.	*Foeniculum Vulgare*	Moti saunf, Sonp	Dodda sompu, Badi sopu	Badishep, Badisep, Shoap	Peddajilakarra, sopu	Mauri, Panmouri
2.	*Zingiber Officinale*	Adrak	Alla, Shunthi	Aale, Alha	Allamu, Shonti, Allamu chettu	Ada
3.	*Matricaria Chamomoilla*	Babuna	Sevanti huvu	Shevanti	Chaamanthi	Na
4.	*Cinnamomum Zeylanicum*	Dalchini	Dalchini	Dalchini	Dalchina-chekka, Dalcini, Lavanga-patta	Daruchini
5.	*Zataria Multiflora*	NA	NA	NA	NA	NA

Plant Profiles:

Table 3

Sr. No.	Plant Name	Family	Chemical Constituent	Geographical Source	Pharmacological Action	Reference
1.	*Foeniculum Vulgare* (Fennel)	Apiaceae / Umbelliferae	Anethole 	France, Saxony, Japan, Galicia, Russia, India, and Persia.	Oestrogenic, Anti-Genotoxic, Sedative, Local anesthetic, etc.	(11-16)
2.	*Zingiber Officinale* (Ginger)	Zingiberaceae	Gingerdiol, Gingerol 	Asia (India and China), West Africa, Jamaica.	Protective effects against male infertility, Nausea and vomiting, Analgesic, Anti-diabetic, Anti-inflammatory, Anti-obesity	(11)(17-18)
3.	*Matricaria Chamomoilla* (Chamomile)	Asteraceae	Azoline 	Native to Southern and Eastern Europe and Northern and Western Asia.	Anti-inflammatory, Antiseptic	(11)(19-20)
4.	*Cinnamomum Zeylanicum* (Cinnamon)	Lauraceae	Cinnamaldehyde 	Asia and Australia, Indigenous tree of Sri Lanka.	Anti-inflammatory, Anti-spasmodic	(11),(21)

5.	*Zataria Multiflora* (Avishan-E-Shirazi, Shirazi thyme)	Lamiaceae	Organic oil of Thymol and Carvacrol 	Iran, Pakistan and Afghanistan.	Reduced Ach-induced intestinal and uterine contractions	(22-23)

***Foeniculum vulgare* (Fennel)**

Figure-1: *Foeniculum vulgare*

Foeniculum vulgare (Fennel) Family: Apiaceae / Umbelliferae

F. vulgare has been utilized in traditional Iranian medicine for centuries and is renowned for its anti-inflammatory, analgesic, and antispasmodic effects.(11), (24) The mechanism underlying its analgesic effect can be elucidated in two ways:

1. The essential oil present in Fennel inhibits uterine contractions induced by oxytocin and prostaglandin, thereby relieving pain in the uterus.(11)
2. Fennel facilitates the discharge of blood in a shorter duration, consequently reducing dysmenorrhea.

Additionally, Fennel extract contains small amounts of coumarins, which can impact clotting and bleeding, further contributing to pain relief in dysmenorrhea.(12) It is suggested to alleviate menstrual pain by lowering blood prostaglandin levels.(13) Prostaglandin production increases during menses in the uterine myometrium containing phosphotidylcholine (14C) AA in Sn-2 (150,000 dpm) and cyt.

Fennel is a well-known umbelliferous plant, with its seeds purported to promote menstruation, alleviate symptoms of menopause in females, and increase libido. Moreover, the use of Fennel essential oil (FEO) in treating pediatric colic and respiratory disorders has been reported due to its anti-spasmodic effects.

In traditional medicine, *F. vulgare* is employed as an energizing, sedative, and antispasmodic herb.(14) Fennel essential oil (FEO) may reduce the frequency and intensity of contractions in isolated rat uterine organ models. Furthermore, the utilization of FEO in traditional medicine is highly recommended for relieving symptoms of dysmenorrhea.

The mechanism of action of Fennel essential oil appears comparable to that of the nonsteroidal anti-inflammatory drug (NSAID) mefenamic acid. It seems to involve the inhibition of uterine contractions induced by prostaglandin E2 and oxytocin.

***Zingiber officinale* (Ginger)**

Figure-2: *Zingiber officinale*

Zingiber officinale (Ginger)

Family: Zingiberaceae

Ginger boasts a rich history in medicine and is recognized as one of the most potent prostaglandin inhibitors, primarily through cyclo-oxygenase inhibition. In a double-blind clinical study, the efficacy of *Z. officinale* was compared to mefenamic acid and ibuprofen in treating primary dysmenorrhea.(11),(25) Ginger contains various active ingredients, including gingerol, gingerdiol, gingerdione, beta-carotene, capsaicin, caffeic acid, and curcumin.(17),(26) Moreover, ginger exhibits beneficial effects in preventing cancer, as well as alleviating nausea and vomiting associated with pregnancy, chemotherapy, surgery, and osteoarthritis.(27-28)

Ginger acts as both a cyclooxygenase (COX) and lipoxygenase inhibitor, leading to the suppression of leukotriene and prostaglandin synthesis.(29),(25) A clinical study explored the pain-relieving effects of ginger at a dosage of 1500 mg daily in female students with moderate to severe primary dysmenorrhea, administered before and at the onset of menstruation or solely at menstruation onset. This underscores ginger's role as an analgesic in primary dysmenorrhea, attributed to its anti-inflammatory properties through the inhibition of prostaglandin synthesis.(17),(30)

In addition to its anti-inflammatory properties, ginger has been studied for its potential antioxidant, antimicrobial, and anticancer effects. Research suggests that ginger may help reduce oxidative stress and inflammation in the body, contributing to its overall health benefits.(31) Furthermore, ginger's antimicrobial properties have shown promise in combating various pathogens, including bacteria, viruses, and fungi.(32)

Moreover, emerging evidence suggests that ginger may exert protective effects on gastrointestinal health. Studies indicate that ginger may help alleviate gastrointestinal discomfort, including symptoms of indigestion, nausea, and vomiting. Its ability to modulate gastric motility and reduce gastric acid secretion may contribute to its gastroprotective effects.(31)

Additionally, ginger's potential role in managing metabolic disorders such as diabetes and obesity is of growing interest. Research suggests that ginger may help improve insulin sensitivity, regulate blood sugar levels, and promote weight loss.(33) These findings highlight the multifaceted therapeutic potential of ginger beyond its traditional use in alleviating dysmenorrhea.

***Matricaria Chamomoilla* (Chamomile)**

Figure-3: *Matricaria Chamomoilla*

Family: Asteraceae

Matricaria chamomilla, commonly known as chamomile, exhibits an array of therapeutic effects including anti-inflammatory, antispasmodic, sedative, and anxiolytic properties. Research suggests that chamomile is most effective in alleviating dysmenorrhea when used prophylactically before the onset of pain.(11),(34) When combined with *Foeniculum vulgare*, chamomile significantly impacts symptoms of premenstrual syndrome (PMS) and dysmenorrhea, with chamomile being particularly effective for pelvic and abdominal pain, depression, and anger.(11),(35)

Chamomile extract inhibits the production of prostaglandins and leukotrienes, making it beneficial for various conditions including stomach pain, irritable bowel syndrome, insomnia, and wound healing. Key compounds such as pure azulene, matricin, bisabolol, apigenin, and methoxy-coumarin contribute to its anti-inflammatory, antiseptic, and antispasmodic properties, thereby reducing menstrual bleeding and relieving associated symptoms.(19)

One of the most common forms of chamomile consumption is through tea. Chamomile tea possesses anti-spasmodic properties that can alleviate the painful cramps experienced during menstruation. Furthermore, the constituents in chamomile tea help modulate the actions of neurotransmitters like dopamine and serotonin, potentially mitigating depressive symptoms associated with dysmenorrhea.(19)

In addition to its well-documented effects on dysmenorrhea, chamomile has a long history of use in traditional medicine for various ailments. Its calming and soothing properties have made it a popular remedy for anxiety, stress, and insomnia. Chamomile tea is often recommended as a natural sleep aid due to its mild sedative effects.

Furthermore, chamomile's anti-inflammatory properties extend beyond menstrual pain relief. It has been studied for its potential in managing conditions such as arthritis and inflammatory skin conditions like eczema. Topical applications of chamomile extract have shown promise in reducing inflammation and promoting wound healing.

Moreover, chamomile's gentle nature makes it suitable for individuals with sensitive skin or digestive issues. It is commonly used in skincare products, such as creams and lotions, to soothe irritation and reduce redness.

Overall, chamomile's versatility and gentle efficacy make it a valuable herb in natural medicine, offering a holistic approach to health and well-being beyond the scope of dysmenorrhea relief.

***Cinnamomum Zeylanicum* (Cinnamon)**

Figure-4: *Cinnamomum Zeylanicum*

Family: Lauraceae

Cinnamomum zeylanicum, commonly known as cinnamon, is renowned for its aromatic flavor and diverse medicinal properties. Rich in constituents like mucilage, tannin, pigment, calcium oxalate, sugar, essential oil, and resin, cinnamon's essential oil predominantly comprises cinnamaldehyde, with bark oil containing approximately 55-57% cinnamaldehyde and 5-18% eugenol. These compounds confer upon cinnamon its potent antispasmodic effect, while eugenol may additionally inhibit prostaglandin biosynthesis and modulate inflammation.(11),(36)

Studies have suggested that cinnamon holds promise in reducing the intensity of primary dysmenorrhea, owing to its multifaceted therapeutic profile. Beyond menstrual pain relief, cinnamon exhibits antioxidant, antibacterial, antifungal, and anti-inflammatory properties, making it a versatile remedy for various ailments. Traditional uses of cinnamon include treating cough, indigestion, abdominal cramps, intestinal spasms, nausea, and regulating serum glucose and total cholesterol levels in diabetic individuals.(37)

However, despite its widespread use in traditional medicine, comprehensive studies specifically evaluating the effectiveness of cinnamon for dysmenorrhea are limited. Nevertheless, its recognized mechanisms of action, such as antispasmodic and anti-inflammatory effects, suggest potential utility in alleviating menstrual pain.

Further research is warranted to explore the therapeutic efficacy of cinnamon in managing dysmenorrhea and elucidate its precise mechanisms of action in this context. As such, cinnamon stands as a promising botanical agent with a rich history of medicinal use and the potential to offer relief for individuals suffering from menstrual discomfort.

Zataria multiflora (Shirazi thyme)

Figure-5: *Zataria multiflora*

Family: Lamiaceae

Zataria multiflora, commonly known as Shirazi thyme, holds a significant place in traditional medicine, particularly for alleviating dysmenorrhea. This valuable plant contains organic oils rich in thymol and carvacrol, which exhibit potent antispasmodic and anti-inflammatory effects.(22) Research has demonstrated

the relaxing effects of *Z. multiflora* and its constituents on various smooth muscles, including those in the trachea, blood vessels, gastrointestinal tract, and urogenital system.(38)

The relaxing effect of *Z. multiflora* on visceral smooth muscle may help reduce the symptoms of premenstrual syndrome (PMS) and mitigate the severity of dysmenorrhea. Clinical studies have shown that *Zataria multiflora* essential oil (ZMEO) effectively reduces the severity of dysmenorrhea, suggesting its therapeutic potential in urogenital diseases.(38)

Thymol, a key component of *Zataria multiflora*, has been found to inhibit contractions induced by cellular scaling and block calcium channels, thereby directly acting on pain receptors and ultimately inhibiting the release of prostaglandins.(39) This action of *Zataria multiflora* oil is believed to minimize pain intensity and shorten the duration of pain in women suffering from primary dysmenorrhea.(40)

In summary, *Zataria multiflora* emerges as a promising botanical remedy for dysmenorrhea, offering both antispasmodic and anti-inflammatory properties that may provide relief from menstrual pain and discomfort. Further research is warranted to explore its full therapeutic potential and elucidate its precise mechanisms of action in managing dysmenorrhea.

CONCLUSION:

In conclusion, dysmenorrhea, a prevalent medical issue primarily affecting young women, encompasses various factors such as pain pathways, inflammatory mediators, and centralized reactions. While pharmaceutical treatments exist, herbal remedies have gained traction due to their long history of safe and effective use in managing primary dysmenorrhea. The increasing popularity of herbal alternatives offers women accessible options to alleviate dysmenorrhea symptoms.

This systematic review highlights several medicinal herbs renowned for their therapeutic effects in treating dysmenorrhea. *Foeniculum vulgare, Zingiber officinale, Matricaria chamomilla, Cinnamomum zeylanicum,* and *Zataria multiflora* have demonstrated efficacy in mitigating menstrual pain and discomfort.

Medical professionals may consider recommending these herbal treatments to women seeking relief from dysmenorrhea. However, further research is warranted to comprehensively understand the mechanisms of action, optimal dosages, potential adverse effects, and appropriate modes of administration for herbal remedies. By conducting carefully designed studies, healthcare providers can offer evidence-based guidance on the use of herbal treatments for dysmenorrhea management, ensuring safe and effective care for women experiencing menstrual pain.

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