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The Effect of Ginger on Primary Dysmenorrhea

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Abstract

Primary dysmenorrhea is a painful menstrual condition caused by uterine contractions without any underlying organic disorder, and its prevalence is high among women of reproductive age. This disorder not only impacts quality of life but also has implications for psychological well-being and individual productivity. In the context of menstrual pain management, non-pharmacological approaches are gaining increasing attention, particularly the use of herbal plants such as Zingiber officinale (ginger), which is known to have anti-inflammatory and analgesic properties. This review specifically focuses on exploring the non-pharmacological benefits of ginger as an herbal therapy in relieving primary dysmenorrhea pain. As a literature review, this article compiles and integrates findings from various previous studies. This review seeks to provide a comprehensive understanding of ginger's effectiveness based on available empirical evidence, including the pharmacodynamic mechanisms underlying its therapeutic effects. This review is expected to provide a conceptual foundation for further, more systematic, evidence-based research, strengthening ginger's position as a therapeutic alternative in the management of primary dysmenorrhea.

Keywords: primary dysmenorrhea, disorder, non-pharmacological, ginger, review

1. Introduction

Menstruation is vaginal bleeding that occurs periodically as part of a woman's monthly cycle. Menarche, or first menstruation, typically occurs between the ages of 10 and 16 and ends at menopause when ovarian function declines. The length of the menstrual cycle varies between individuals, but generally lasts 28±7 days, with an average of 28 days (Rahman et al., 2020; Thiyagarajan et al., 2020). Under physiological conditions, menstruation should not cause significant discomfort, but for most women, it is accompanied by significant pain that interferes with daily activities, known as dysmenorrhea.

Dysmenorrhea is a painful menstrual condition that can be divided into two types: primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is pain that occurs repeatedly at the beginning and during menstruation without any organic abnormalities of the reproductive system. Secondary dysmenorrhea has similar symptoms but is accompanied by gynecological disorders such as endometriosis or uterine fibroids. The pain experienced is usually in the form of pelvic cramps, accompanied by systemic symptoms such as fatigue, headache, nausea, vomiting, diarrhea, and sleep disturbances. These symptoms tend to recur with each menstrual cycle and can worsen in cases of severe dysmenorrhea. Factors influencing pain intensity include young age, emotional state, stress, anxiety disorders, and depression, all of which contribute to a decline in women's quality of life and productivity (Duman, 2022).

The prevalence of primary dysmenorrhea is very high globally, with incidence rates ranging from 45% to 95% in women of reproductive age, and approximately 2% to 29% experiencing severe pain. This difference in prevalence is influenced by variations in assessment methods, age group, race, and individual perception of pain. The highest prevalence is found in young women under 24 years of age, ranging from 70% to 90% (Itani et al., 2022). In Indonesia, the prevalence of menstrual pain reaches 64.52%, consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea (Fahimah, 2017). Despite its high prevalence and significant impact on daily activities, dysmenorrhea is often undertreated and even ignored. Many young women choose to endure the pain without seeking medical help because they consider dysmenorrhea embarrassing and taboo. They consider pain a natural response to menstruation that must be tolerated (Iacovides, 2015; Chen, 2019).

Various methods have been used to manage the pain of primary dysmenorrhea, both pharmacologically and non-pharmacologically. Non-pharmacological approaches such as warm compresses, exercise, yoga, meditation, acupuncture, and the use of herbal remedies are gaining popularity, especially among young women concerned about the side effects of analgesic medications, particularly NSAIDs, which can cause gastric ulcers and cardiovascular disorders (Almanasef, 2023). One widely used herbal ingredient is Zingiber officinale (ginger), which is known to contain active ingredients with anti-inflammatory and analgesic properties. Several studies have shown that ginger can reduce the intensity of menstrual pain through mechanisms such as inhibiting prostaglandin synthesis and modulating inflammatory pathways.

This review focuses on exploring the non-pharmacological benefits and effectiveness of ginger as a herbal therapy in relieving the pain of primary dysmenorrhea. Synthetically, most of the reviewed studies showed that administering ginger in various forms—such as capsules, tea, or extract—can significantly reduce pain intensity compared to control or placebo groups. However, variations in study design, dosage used, intervention duration, and pain assessment methods exist, affecting the consistency and comparability of results across studies. A critical assessment of the analyzed literature revealed that several studies had methodological limitations, such as small sample sizes, lack of placebo controls, and potential subjective bias in pain measurement. Furthermore, most studies did not evaluate the long-term effects or possible interactions of ginger with other therapies, making the results not fully generalizable to a broader population.

A systematic literature search was conducted using PubMed, ScienceDirect, and Google Scholar databases. Keywords used included "ginger," "Zingiber officinale," "primary dysmenorrhea," and "herbal treatment." The articles reviewed were published between 2014 and 2024. From the search results, 24 articles meeting the inclusion criteria were analyzed in this review. This review is expected to provide a conceptual basis for further, more systematic, evidence-based research and strengthen ginger's position as a therapeutic alternative in the management of primary dysmenorrhea.

2. Methods

A systematic literature search was conducted using PubMed, ScienceDirect, and Google Scholar databases. Keywords used included "ginger," "Zingiber officinale," "primary dysmenorrhea," and "herbal treatment." The articles reviewed were published between 2014 and 2024. From the search results, 24 articles meeting the inclusion criteria were analyzed in this review. This review is expected to provide a conceptual basis for further, more systematic, evidence-based research and strengthen ginger's position as a therapeutic alternative in the management of primary dysmenorrhea.

3. Results and Discussion

3.1 The Effectiveness of Ginger in Treating Primary Dysmenorrhea

In the management of primary dysmenorrhea, pharmacological approaches such as the use of NSAIDs have long been the standard of care due to their effectiveness in inhibiting the synthesis of prostaglandins, the primary mediators of menstrual pain. However, growing concerns about the long-term side effects of NSAIDs, particularly on the gastrointestinal and cardiovascular systems, have prompted the search for safer therapeutic alternatives. One widely studied candidate is ginger (Zingiber officinale), a rhizome plant from the Zingiberaceae family native to China and India and used in traditional medicine for over 2,500 years.

Ginger has a complex phytochemical profile and is rich in bioactive compounds. Its strong and distinctive flavor is derived from non-volatile phenylpropanoid derivatives such as gingerols and shogaols (Hetavi et al., 2023). In addition, ginger also contains volatile essential oils such as zingeberene, curcumene, and farnesene, as well as other non-volatile compounds such as zingerone and paradol. These compounds not only give ginger its characteristic hot sensation but also play a role in its biological activity. Gingerol, the most abundant non-volatile compound, is known to have anti-inflammatory and analgesic properties relevant in the context of dysmenorrhea (Offei-Okyne, 2015). Volatile compounds in ginger work by inhibiting prostaglandin synthesis and improving blood circulation, thereby reducing the intensity of menstrual pain.

Several studies have shown that oral consumption of powdered ginger (750–2000 mg) during the first three to four days of the menstrual cycle can significantly reduce pain intensity (Xu et al.,

2020; Rondanelli et al., 2020). However, when reviewed critically, the effectiveness of ginger compared to NSAIDs still shows mixed results. A study by Gurung et al. (2022) stated that ginger is comparable in effectiveness to mefenamic acid and novafen in relieving dysmenorrheal pain. Meanwhile, Chen et al. (2016) showed that ginger is more effective than a placebo but did not explicitly compare it directly to NSAIDs. The evidence from these studies is largely derived from small-scale clinical trials with limited randomized designs, so generalization of the results should be done with caution.

The following table compares ginger and NSAIDs based on effectiveness, dosage, side effects, and the level of evidence from the reviewed studies.

Table 1.

Comparation of ginger dan NSAIDs of table

Aspect	Ginger (Zingiber officinale)	NSAIDs
Working mechanism	Inhibits COX and LOX, reducing synthesis of prostaglandins and leukotrienes	Inhibits COX-1 and COX-2, lowers prostaglandin synthesis
Effectiveness clinical	Effective for lowering light to moderate pain; results vary between studies	Effective, lowering moderate to severe pain; consistent results in clinical trials
Onset of work	Slowly, usually seen after a few hours until the first day of menstruation	Fast, usually in 30–60 minutes after consumption
Common dosage	750–2000 mg/day for the first 3–4 days of the menstrual cycle	250–500 mg every 8 hours for as long as the pain lasts
Side effect	Mild: nausea, heartburn, stomach irritation; allergic reactions are rare.	Moderate to severe: gastric ulcer, kidney impairment, cardiovascular risk
Long-term safety	Relatively safe, no reports of significant toxicity at therapeutic doses.	Risk increases with long-term use, especially in vulnerable patients.
Level of evidence	Studies are limited; most clinical trials are small and not double-blind	Many clinical trials are large, double-blind, and meta-analyses
Study limitations	Variation in dosage and dosage form; lack of active controls; no international standards	Studies are more standardized; but still have risks of bias and side effects

3.2 Critical Discussion

Although ginger has demonstrated considerable effectiveness in relieving primary dysmenorrhea pain, it is important to acknowledge that the evidence supporting its use is still limited compared to NSAIDs. Most studies on ginger have been conducted in limited populations and lacked double-blind designs or strict active controls. Furthermore, variations in dosage forms (powder, capsules, tea) and doses used in these studies complicate the standardization and replication of results.

On the other hand, NSAIDs have undergone numerous large-scale clinical trials and have more established safety and effectiveness data. However, the risk of long-term side effects remains a major concern, particularly for women with a history of gastric disorders or cardiovascular disease. In this context, ginger may be a viable alternative, particularly for individuals experiencing mild to moderate pain and wishing to avoid the use of chemical medications.

Controversy also arises regarding the lack of studies directly comparing ginger with other non-pharmacological therapies such as yoga, warm compresses, or acupressure. Furthermore, there are no clinical guidelines officially recommending ginger as a first-line therapy, so its use remains complementary and requires careful clinical consideration.

Considering all these aspects, an individualized, evidence-based approach is highly recommended when selecting therapy for primary dysmenorrhea. Further research with more robust methodological designs and more diverse populations is needed to strengthen ginger's position as a safe and effective alternative therapy.

4. Conclusion

Data from various studies on natural-based non-pharmacological therapies indicate that consuming ginger extract is highly effective in relieving pain caused by primary dysmenorrhea. Ginger is comparable in effectiveness to non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, mefenamic acid, and Novafen in reducing pain intensity. Ginger's anti-inflammatory and analgesic mechanisms of action are similar to those of NSAIDs, but with fewer potential side effects. In the context of non-pharmacological therapy, ginger can be a safe and economical alternative, especially for patients who are intolerant to NSAIDs or prefer a natural approach. However, ginger's effectiveness can vary depending on the dose and duration of consumption, necessitating clearer standards for its use in clinical practice. Considering the effectiveness, safety, and patient preferences, ginger is worthy of consideration as part of the management of primary dysmenorrhea, either as a sole therapy or as a complement to pharmacological therapy.

5. References

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Barnhart, R. K. (Ed.). (1988). *Chambers dictionary of etymology*. The H. W. Wilson Company
Brown, S. & McIntyre, D. (1993). *Making sense of teaching.* Open University
Almanasef, M., & Alqarni, H. (2023). Self-care strategies for the management of primary dysmenorrhea among young women in Asir region, Saudi Arabia: a cross-sectional study. *European Review for Medical and Pharmacological Sciences*, 27(1), 172–178. https://pubmed.ncbi.nlm.nih.gov/36647866/
Anggraini, M.A., Lasiaprillianty, I.W., & Danianto, A. (2021). Diagnosis dan Tata Laksana Dismenore Primer. *CDK*, 49(4). https://cdkjournal.com/index.php/cdk/article/view/219
Chen, C.X., Barrett, B., & Kwekkeboom, K.L. (2016). Efficacy of Oral Ginger (*Zingiber officinale*) for Dysmenorrhea: a Systematic Review and Meta-Analysis. *Evidence-Based Complementary and Alternative Medicine*, Article ID 6295737. https://pubmed.ncbi.nlm.nih.gov/27274753/
Chen, L., Tang, L., Guo, S., Kaminga, A.C., & Xu, H. (2019). Primary dysmenorrhea and self-care strategies among Chinese college girls: a cross-sectional study. *BMJ Open*, 9, e026813. https://pubmed.ncbi.nlm.nih.gov/31537555/
Duman, N.B., Yıldırım, F., & Vural, G. (2022). Risk factors for primary dysmenorrhea and the effect of complementary and alternative treatment methods: Sample from Corum, Turkey. *International Journal of Health Sciences (Qassim)*, 16(3), 35–43. https://pmc.ncbi.nlm.nih.gov/articles/PMC9092532/
Fahimah, A., Margawati, A., & Fitranti, D.Y. (2017). Hubungan Konsumsi Asam Lemak Omega-3, Aktivitas Fisik Dan Persen Lemak Tubuh Dengan Tingkat Dismenore Pada Remaja. *Journal of Nutrition College*, 6(4). https://doi.org/10.14710/jnc.v6i4.18249
Farrah, A.M., Halim, B., & Kaban, Y.B. (2017). Effectiveness of zinc supplementation in treating dysmenorrhea. *Bali Medical Journal*, 6(1), 34–37. https://www.balimedicaljournal.ejournals.ca/index.php/bmj/article/view/380
Gurung, A., Khatiwada, B., Kayastha, B., Parsekar, S., Mistry, S.K., & Yadav, U.N. (2022). Effectiveness of *Zingiber officinale* (ginger) compared with non-steroidal anti-inflammatory drugs and complementary therapy in primary dysmenorrhea: A systematic review. *Clinical Epidemiology and Global Health*, 18, 101152.
https://www.sciencedirect.com/science/article/pii/S2213398422001944
Harada, T. (2013). Dysmenorrhea and Endometriosis in Young Women. *Yonago Acta Medica*, 56, 81–84. https://pmc.ncbi.nlm.nih.gov/articles/PMC3935015/
Hermawahyuni, R., Handayani, S., & Alnur, R.D. (2022). Faktor Risiko Kejadian Dismenore Primer pada Siswi SMK PGRI 1 Jakarta Timur. *Keskom*, 8(1), 97–101.
Hetavi, J. Thakor, Rathi, Y.S., & Nayak, N.S. (2023). Phytochemical Screening of Ginger (*Zingiber officinale*), a Medicinal Plant. *Scholars International Journal of Traditional and Complementary Medicine*, 6(4), 58–62.
Iacovides, S., Avidon, I., & Baker, F.C. (2015). What we know about primary dysmenorrhea today: a critical review. *Human Reproduction Update*, 21, 762–778. https://pubmed.ncbi.nlm.nih.gov/26346058/
Itani, R., Soubra, L., Karout, S., Rahme, D., Karout, L., & Khojah, H.M.J. (2022). Primary Dysmenorrhea: Pathophysiology, Diagnosis, and Treatment Updates. *Korean Journal of Family Medicine*, 43, 101–108. https://pubmed.ncbi.nlm.nih.gov/35320895/
Kashefi, F., Khajehei, M., Cher, M.T., Alavinia, M., & Asili, J. (2014). Comparison of the effect

of ginger and zinc sulfate on primary dysmenorrhea: a placebo-controlled randomized trial. *Pain Management Nursing*, 15(4), 826–833. https://pubmed.ncbi.nlm.nih.gov/24559600/

Larasati, T., & Alatas, F. (2016). Dismenore Primer dan Faktor Risiko Dismenore Primer pada Remaja. *Jurnal Majority*, 5(3), 79–84. https://scholar.google.co.id/citations?user=w5dWXNYAAAAJ&hl=id

Misliani, A., Mahdalena, & Syamsul, F. (2019). Penanganan Dismenore Cara Farmakologi dan Nonfarmakologi. *Jurnal Citra Keperawatan*, 7(1), 23–32. http://ejurnal-citrakeperawatan.com/index.php/JCK/article/view/100

Negi, R., Sharma, S.K., Gaur, R., et al. (2021). Efficacy of Ginger in the Treatment of Primary Dysmenorrhea: A Systematic Review and Meta-analysis. *Cureus*, 13(3), e13743. https://pubmed.ncbi.nlm.nih.gov/33842121/

Offei-Okyne, R., Patterson, J., Walker, L.T., & Verghese, M. (2015). Processing Effects on Phytochemical Content and Antioxidative Potential of Ginger (*Zingiber officinale*). *Food and Nutrition Sciences*, 6, 445–451. http://dx.doi.org/10.4236/fns.2015.65046

Rondanelli, M., Fossari, F., Vecchio, V., Gasparri, C., Peroni, G., Spadaccini, D., et al. (2020). Clinical trials on pain lowering effect of ginger: A narrative review. *Phytotherapy Research*, 34(11), 2843–2856. https://pubmed.ncbi.nlm.nih.gov/32436242/

Shirooye, P., Hashem-Dabaghian, F., Hamzeloo-Moghadam, M., Afrakhteh, M., Bioos, S., & Mokaberinejad, R. (2017). A clinical comparative study of oral and topical ginger on severity and duration of primary dysmenorrhea. *Research Journal of Pharmacognosy*, 4(1), 23–32. https://www.rjpharmacognosy.ir/article_41132_0bf31f8008cb0ce8ebbc5ee59dad1bad.pdf

Thiyagarajan, R., Basit, D.K., & Jeanmonod, D. (2020). Physiology, Menstrual Cycle. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK500020/

Tsonis, O., Gkrozou, F., Barmpalia, Z., Makopoulou, A., & Siafaka, V. (2021). Integrating Lifestyle Focused Approaches into the Management of Primary Dysmenorrhea: Impact on Quality of Life. *International Journal of Women's Health*, 13, 327–336. https://pubmed.ncbi.nlm.nih.gov/33762855/

Xu, Y., Yang, Q., & Wang, X. (2020). Efficacy of herbal medicine (cinnamon/fennel/ginger) for primary dysmenorrhea: a systematic review and meta-analysis of randomized controlled trials. *Journal of International Medical Research*, 48(6), 1–12. https://pubmed.ncbi.nlm.nih.gov/32603204/

Yang, M., Chen, X., Bo, L., Lao, L., Chen, J., Yu, S., et al. (2017). Moxibustion for pain relief in patients with primary dysmenorrhea: A randomized controlled trial. *PLoS ONE*