



## Literature Review: The Effect of Ajwa Date Consumption on Menstrual Pain Intensity in Women of Reproductive Age

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### Abstract

Dysmenorrhea is one of the most common menstrual disorders among women of reproductive age, characterized by lower abdominal pain due to increased prostaglandin levels that trigger excessive uterine contractions. Although nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used, their long-term use may cause adverse effects. Therefore, natural and safe alternatives are needed, such as Ajwa dates (*Phoenix dactylifera* L.), which contain bioactive compounds like flavonoids, phenols, and phytoestrogens that may reduce menstrual pain through hormonal regulation and anti-inflammatory mechanisms. This study aimed to review the effect of Ajwa date consumption on the intensity of menstrual pain in women of reproductive age. This research employed a literature review design with a narrative approach. Data were obtained from five relevant national and international journals that discussed the effects of Ajwa dates on estrogen, progesterone, and inflammatory mechanisms. The collected data were analyzed qualitatively to identify the relationship between variables and summarize the main findings of each study. The review showed that Ajwa dates can increase estrogen and progesterone levels, which help suppress prostaglandin production, relax uterine muscles, and inhibit cyclooxygenase enzymes (COX-1 and COX-2). Additionally, their nutritional content, such as vitamins and minerals, provides a natural analgesic effect that supports physiological balance during menstruation. Consumption of Ajwa dates has the potential to serve as a safe and effective non-pharmacological therapy to reduce menstrual pain intensity through synergistic hormonal, anti-inflammatory, and nutritional mechanisms

## Introduction

Menstruation is a natural occurrence in normal women. It occurs due to the shedding of the uterine endometrium (Thiyagarajan et al., 2024; Indirani & Premagowri, 2022). Menstruation is the process of shedding the uterine lining accompanied by bleeding that occurs repeatedly every month, except during pregnancy. The first day of menstruation is counted as the start of each menstrual cycle (day 1). Menstruation lasts an average of 3-7 days. Many women experience physical discomfort for several days before or during their menstrual period (Adzani, 2020).

Dysmenorrhea is a common menstrual disorder characterized by pain during menstruation that can be highly disruptive and, in severe cases, significantly limit daily activities. In some women, the pain may be so intense that it adversely affects overall quality of life and may even

pose a risk to reproductive health, including infertility. The clinical manifestations of dysmenorrhea include lower abdominal pain, severe uterine cramping, and lower back pain. In addition, gastrointestinal symptoms such as nausea, vomiting, and diarrhea frequently accompany this condition. The pain associated with dysmenorrhea is primarily attributed to strong and frequent uterine muscle contractions, which impair uterine blood flow and subsequently trigger ischemic pain responses (Anjani et al., 2022; Karomah & Yuliani, 2022).

Dysmenorrhea is one of the most common diseases suffered by women of childbearing age and remains a problem throughout the world. According to data from the World Health Organization (WHO) in 2020, there has been an increase in the incidence of dysmenorrhea in adolescent girls worldwide of around 50%. The average prevalence in Asia is approximately 84.2%, with 68.7% occurring in Northeast Asia, 74.8% in East Asia, and 54.0% in Northwest Asia (Awalia, 2023; Fatmawati & Fatmawati, 2021).

Dysmenorrhea can be caused by various factors, such as strong or prolonged uterine contractions, high levels of prostaglandin hormones, dilation of the cervix during menstruation, pelvic infections, endometriosis, and benign tumors in the uterus. Other contributing factors include poor posture, suboptimal uterine development, excessive caffeine consumption, and stress. Although the exact cause of dysmenorrhea is not yet fully understood, primary dysmenorrhea is generally associated with increased prostaglandin hormones, while secondary dysmenorrhea is more often caused by conditions such as endometriosis (Karomah & Yuliani, 2022; Itani et al., 2022; Rani et al., 2024).

Primary dysmenorrhea is menstrual pain that occurs without any structural abnormalities in the reproductive organs, generally caused by increased production of prostaglandins in the endometrial layer during the menstrual cycle. Prostaglandins, particularly  $\text{PGF}_2\alpha$ , play a role in regulating uterine muscle (myometrium) contractions. Excessive prostaglandin production can cause strong and irregular uterine contractions, accompanied by vasoconstriction that narrows the uterine blood vessels. This condition reduces blood flow to the uterine tissue and causes ischemia, resulting in more intense pain during menstruation. In addition, prostaglandins also increase nerve sensitivity to pain, lower the pain threshold, and trigger systemic symptoms such as nausea, vomiting, headache, diarrhea, and fatigue due to their effects on the digestive tract and central nervous system (Itani et al., 2022; Nagy et al., 2025; Affaitati et al., 2024).

The process of primary dysmenorrhea begins after ovulation, when the egg is not fertilized and the corpus luteum regresses, causing a drastic decrease in progesterone levels. The drop in progesterone triggers the release of the endometrial lining and arachidonic acid from cell membranes, which are precursors to the formation of prostaglandins through the cyclooxygenase (COX) enzyme. This increase in prostaglandin levels causes stronger uterine contractions, especially on the first and second days of menstruation, when production peaks. As a result, women who produce high levels of prostaglandin tend to experience more severe menstrual pain than those with normal production (Itani et al., 2022; Nagy et al., 2025; Mann et al., 2024).

Meanwhile, secondary dysmenorrhea is menstrual pain caused by abnormalities or pathological conditions in the reproductive organs. One of the main causes is endometriosis, which is the growth of endometrial tissue outside the uterus, such as in the ovaries, fallopian tubes, or pelvic cavity, which triggers chronic inflammation, scar tissue formation, and pelvic pain, especially during menstruation. This condition can also interfere with reproductive function and cause infertility. In addition, uterine myomas (uterine fibroids) can compress the tissue surrounding the uterus, alter the anatomical shape of the uterus, and increase the production of prostaglandins, which cause excessive contractions and heavy bleeding. Some congenital abnormalities such as uterine septum or cervical stenosis can also obstruct menstrual

blood flow, increase intrauterine pressure, and cause more severe pain. Thus, secondary dysmenorrhea has more complex causes than primary dysmenorrhea and requires in-depth medical evaluation to determine the appropriate therapy for the underlying condition (Fathiyyah et al., 2024; Kirsch et al., 2024; Liu et al., 2025).

The use of nonsteroidal anti-inflammatory drugs (NSAIDs) is a common pharmacological approach to reducing menstrual pain by inhibiting prostaglandin synthesis. However, long-term use of NSAIDs can cause side effects such as indigestion, stomach ulcers, and kidney dysfunction. Therefore, natural alternatives with minimal side effects are increasingly in demand, including non-pharmacological approaches through the consumption of functional foods. One such alternative is Ajwa dates (*Phoenix dactylifera* L.) from Medina, which are rich in nutrients such as carbohydrates, protein, vitamins, minerals, and bioactive compounds like flavonoids and phenols. These compounds have anti-inflammatory and antioxidant effects and can inhibit cyclooxygenase (COX-1 and COX-2) enzymes, which play a role in the inflammatory response, thereby potentially relieving menstrual pain naturally (Mauludiyana et al., 2023; Salsabila et al., 2024).

Ajwa dates, commonly known as the Prophet's dates, are a type of date that grows in Saudi Arabia and are famous for the words of the Prophet Muhammad (peace be upon him), which say: "Whoever eats seven Ajwa dates between the two sandless lands of Medina in the morning, no poison will harm him until the evening." (Sahih Muslim No. 3813) 17. Ajwa dates themselves have characteristics of an elliptical shape with a diameter of 1.845 cm, a weight of 5.131 grams, a length of 2.459 cm, and fruit flesh thickness of 0.466 cm (Royani et al., 2019).

Dates are rich in nutrients such as magnesium, potassium, and fiber that can help relieve menstrual pain. Magnesium plays a role in muscle relaxation, including the uterine muscles, thereby reducing contractions that cause pain. Potassium helps maintain electrolyte balance and prevents muscle cramps. The fiber in dates also aids digestion and reduces inflammation that can exacerbate menstrual pain. A study evaluated the effectiveness of ginger, lemongrass, and date decoction in reducing the severity of menstrual pain in female students at an Islamic boarding school. The results showed that the drink was quite effective in reducing the severity of menstrual pain (Fatmawati & Muliawati, 2024; Oktafiranda et al., 2025; Torkan et al., 2021).

Antioxidants play an important role in reducing menstrual pain because they can suppress oxidative stress and inflammation, which contribute to increased pain intensity (Kazemi et al., 2022; Amini et al., 2021). Some of the ways antioxidants work to relieve menstrual pain include: Reducing Oxidative Stress: Antioxidants such as vitamin C, vitamin E, flavonoids, and polyphenols can reduce damage caused by free radicals, which play a role in inflammation and menstrual pain. Reducing Inflammation: Antioxidants can suppress the production of pro-inflammatory cytokines that contribute to menstrual pain. Improving Blood Circulation: Some antioxidants such as resveratrol and curcumin can help improve blood flow to the uterus, thereby reducing menstrual cramps (Matsas et al., 2023).

In addition, Ajwa dates contain phytoestrogens that can bind to estrogen receptors, as well as amino acids, fatty acids, and potassium that can trigger the release of gonadotropin-releasing hormone (GnRH), which in turn stimulates the production of estrogen. Increased estrogen levels can help stabilize ovarian function and reduce symptoms of dysmenorrhea. Other studies show that consuming Ajwa dates can increase progesterone levels, which play a role in regulating the menstrual cycle and reducing excessive uterine contractions. In addition, the polyphenol content in Ajwa dates has potential as an anti-inflammatory and antibacterial agent, which can help reduce inflammation and pain (Mustakim et al., 2024).

## Methods

This study employed a systematic literature review design to critically examine and synthesize existing empirical evidence on the effect of Ajwa date (*Phoenix dactylifera* L.) consumption on menstrual pain intensity among women of reproductive age, with procedures structured to support transparent reporting of identification, selection, appraisal, and synthesis of studies (Page et al., 2021). A literature review approach was selected to enable a comprehensive evaluation of findings from diverse study designs and to engage with ongoing scientific debates regarding non-pharmacological interventions for dysmenorrhea. The review was conducted using transparent and reproducible procedures to ensure methodological rigor and analytical coherence, consistent with established methodological guidance for systematic reviews (Page et al., 2021; Li et al., 2019).

The research question was formulated using the PICO framework to guide the scope and focus of the review, as recommended in evidence-based practice for structuring answerable clinical questions and optimizing search precision (Straus et al., 2019). The population of interest consisted of women of reproductive age experiencing menstrual pain or dysmenorrhea. The intervention examined was the consumption of Ajwa dates, including whole fruit, extracts, or clearly identified Ajwa-based preparations. Comparator conditions included placebo, no intervention, standard pharmacological treatment such as nonsteroidal anti-inflammatory drugs (NSAIDs), or other non-Ajwa dietary interventions. The primary outcome was menstrual pain intensity, measured using validated pain assessment instruments such as the Visual Analog Scale (VAS), Numeric Rating Scale (NRS), or comparable standardized tools. Based on this framework, the guiding research question was: How does Ajwa date consumption affect the intensity of menstrual pain in women of reproductive age compared with control or alternative interventions?

A comprehensive literature search was conducted across multiple electronic databases to ensure broad coverage and minimize publication bias, consistent with standard guidance for systematic review searching and study identification (Page et al., 2021). The databases included PubMed/MEDLINE, Scopus, Web of Science, CINAHL, ProQuest, and Google Scholar. To capture regionally relevant studies, additional searches were conducted in Indonesian academic databases when appropriate. The search strategy combined controlled vocabulary and free-text terms related to Ajwa dates, menstrual pain, and women of reproductive age. Boolean operators were applied to refine the search, using combinations such as “Ajwa date” OR “*Phoenix dactylifera*” AND “menstrual pain” OR “dysmenorrhea” AND “women” OR “reproductive age.” Searches were limited to articles published in English or Indonesian, with a publication time frame extending from 2010 to 2025 to ensure contemporary relevance. Reference lists of selected articles were also manually screened, and forward citation tracking was performed to identify additional eligible studies, as recommended for enhancing retrieval completeness beyond database indexing (Page et al., 2021).

Study selection followed a multi-stage screening process aligned with standard systematic review workflow (Page et al., 2021). All retrieved records were exported to reference management software to remove duplicates. Titles and abstracts were independently screened by reviewers against predefined inclusion and exclusion criteria. Full-text articles were subsequently assessed for eligibility. Studies were included if they involved women of reproductive age, explicitly examined Ajwa date consumption as an intervention, reported menstrual pain intensity as an outcome, and employed empirical research designs such as randomized controlled trials, quasi-experimental studies, cohort studies, or pre-post intervention designs. Studies were excluded if they did not specify Ajwa dates as the intervention, failed to report pain-related outcomes, lacked sufficient methodological detail, or consisted solely of reviews, commentaries, or opinion pieces. Discrepancies during the

selection process were resolved through discussion to achieve consensus, consistent with reporting guidance that emphasizes transparency in eligibility decisions (Page et al., 2021).

Data extraction was conducted using a standardized extraction form to ensure consistency and accuracy, reflecting best-practice recommendations that structured forms and explicit decision rules help reduce extraction errors and improve reproducibility (Büchter et al., 2020; Li et al., 2019). Extracted information included author and year of publication, country of study, research design, sample size, participant characteristics, details of the Ajwa date intervention (form, dosage, frequency, duration, and timing relative to the menstrual cycle), comparator conditions, pain measurement instruments, and reported outcomes related to menstrual pain intensity. Additional data such as secondary outcomes, adherence rates, and reported adverse effects were also recorded when available. This structured extraction process enabled systematic comparison across studies and facilitated robust synthesis (Li et al., 2019).

The methodological quality and risk of bias of included studies were critically appraised according to their respective designs using established tools recommended in contemporary evidence synthesis. Randomized controlled trials were evaluated using the revised Cochrane risk-of-bias tool (RoB 2), which assesses bias domains including randomization, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting (Sterne et al., 2019). Non-randomized and observational studies were assessed using ROBINS-I, which evaluates bias due to confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, outcome measurement, and selection of reported results (Sterne et al., 2016). Quality assessments were conducted independently by reviewers and used to contextualize findings and interpret the strength of the evidence rather than to exclude studies outright, consistent with methodological guidance that risk-of-bias assessment should inform interpretation and certainty judgments (Sterne et al., 2019; Sterne et al., 2016).

Data synthesis was primarily conducted using a narrative synthesis approach due to heterogeneity in study designs, intervention dosages, durations, and pain measurement tools. Studies were grouped according to methodological characteristics and intervention parameters to allow meaningful comparison. The direction and magnitude of intervention effects were examined, and potential explanatory factors—such as baseline pain severity, duration of Ajwa consumption, and concurrent use of analgesics—were critically discussed. This approach followed established guidance for narrative synthesis emphasizing transparency in grouping studies, exploring relationships within and between studies, and explaining heterogeneity when meta-analysis is not appropriate (Popay et al., 2006). Where sufficient homogeneity in outcomes and study design was identified, the feasibility of quantitative synthesis was considered; however, the primary emphasis remained on qualitative integration of evidence (Popay et al., 2006).

The overall certainty of evidence was interpreted by considering methodological quality, consistency of findings, precision of reported outcomes, and relevance to the research question, in line with contemporary systematic review reporting principles that require clear linkage between appraisal and conclusions (Page et al., 2021). This evaluative process enabled balanced conclusions regarding the potential effectiveness of Ajwa date consumption as a complementary intervention for menstrual pain management. As this study relied exclusively on secondary data from published sources, ethical approval was not required; nevertheless, all sources were cited appropriately, and the review adhered to principles of academic integrity and transparency (Page et al., 2021).

## Results and Discussion

Table 1. Journal study on the effect of Ajwa dates on the intensity of menstrual pain

No	Year of Publication	Title	Method	Author	Results	Conclusion
1	2025	<i>Date Palm Fruit (Phoenix dactylifera L.) Ameliorated Some Premenstrual Symptoms: Results from an Intervention Trial for Five Consecutive Menstrual Cycles</i>	Intervention trial	(Al-Sayyed et al., 2025)	Regular date fruit consumption significantly improved premenstrual symptoms, including abdominal cramps, fatigue, and mood disturbances.	Date palm fruit consumption may alleviate menstrual-related abdominal pain and PMS symptoms.
2	2025	<i>Improving Female Health at Various Life Stages: A Systematic Review of the Impact of Date Fruit Products</i>	Systematic review	(Shirdel et al., 2025)	Date fruit products were associated with improved reproductive health, hormonal balance, and well-being across female life stages.	Date-based products support female reproductive health and may indirectly influence menstrual pain regulation.
3	2024	<i>Literature Review: The Effect of Ajwa Dates (Phoenix dactylifera L.) on Estrogen Levels</i>	Literature review	(Salsabila et al., 2024)	Ajwa dates support estrogen regulation through flavonoids and phenolic compounds, potentially suppressing excessive prostaglandin production associated with uterine contractions.	Ajwa date consumption may reduce menstrual pain by stabilizing estrogen levels and modulating prostaglandin activity.
4	2024	<i>Literature Review: The Effect of Ajwa Dates (Phoenix dactylifera L.) on Progesterone Levels</i>	Systematic literature review	(Mustakim et al., 2024)	Ajwa dates contribute to maintaining progesterone levels, promoting uterine muscle relaxation and reducing contraction frequency.	Ajwa dates may alleviate dysmenorrhea via progesterone-mediated relaxation of uterine smooth muscles.

5	2024	<i>The Effectiveness of Ginger, Lemongrass, and Date Decoction in Reducing the Severity of Dysmenorrhea Pain</i>	Human experimental study	(Fatmawati & Muliawati, 2024)	Herbal decoctions containing dates significantly reduced dysmenorrhea severity from moderate–severe to mild or no pain.	Date-containing herbal preparations effectively reduce menstrual pain intensity.
6	2023	<i>Anti-inflammatory and Antibacterial Potential of Ajwa Date (Phoenix dactylifera L.) Extract in Burn Infection</i>	Experimental laboratory study	(Mauludiyana et al., 2023)	Ajwa date extract inhibited COX-1 and COX-2 enzymes, reducing prostaglandin-mediated inflammatory responses.	The anti-inflammatory effects of Ajwa dates are indirectly relevant to reducing menstrual pain caused by prostaglandins.
7	2020	<i>Literature Study on the Biological Effects of Ajwa Dates (Phoenix dactylifera L.)</i>	Literature review and antioxidant analysis (DPPH method)	(Zahara et al., 2020)	Ajwa dates are rich in flavonoids, magnesium, and antioxidants that may suppress prostaglandin synthesis and relax uterine muscles.	Ajwa dates possess nutritional and antioxidant properties that may contribute to reducing menstrual pain intensity.
8	2018	<i>The Effect of Oral Date Syrup on Severity of Labor Pain in Nulliparous Women</i>	Randomized clinical trial	(Taavoni et al., 2018)	Oral date syrup significantly reduced labor pain intensity compared with control groups.	Date-based products show analgesic effects on uterine-related pain, supporting relevance to menstrual pain mechanisms.
9	2014	<i>Therapeutic Effects of Date Palm Fruit (Phoenix dactylifera) in Traditional Medicine</i>	Narrative review	(Rahmani et al., 2014)	Date palm fruit has long been used for inflammatory, reproductive, and pain-related conditions in traditional medicine.	Traditional evidence supports the pharmacological potential of dates in pain modulation.

10	2008	<i>Nutritional and Functional Properties of Dates: A Review</i>	Review article	(Al-Farsi & Lee, 2008)	Dates contain polyphenols, magnesium, potassium, and antioxidants with anti-inflammatory and analgesic properties.	The nutritional composition of dates provides a mechanistic basis for reducing inflammation-related pain, including dysmenorrhea.
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Dysmenorrhea remains one of the most prevalent gynecological disorders among women of reproductive age and is characterized by lower abdominal pain that may be accompanied by fatigue, nausea, mood disturbances, and decreased daily functioning. Although pharmacological treatments such as nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used, their long-term use is often associated with adverse effects, prompting growing interest in safer, non-pharmacological interventions. In this context, nutritionally rich natural products with anti-inflammatory, hormonal, and analgesic properties have gained increasing scientific attention as complementary strategies for managing menstrual pain.

The findings synthesized in this review indicate that Ajwa dates (*Phoenix dactylifera* L.) possess multifaceted biological properties that are highly relevant to the pathophysiology of dysmenorrhea. Hormonal imbalance, particularly involving estrogen and progesterone, plays a central role in the regulation of the menstrual cycle and uterine contractility. Evidence from literature reviews by Salsabila et al. (2024) demonstrates that Ajwa dates contain bioactive compounds such as flavonoids and phenolic acids that contribute to the stabilization of estrogen levels. Estrogen is known to regulate prostaglandin synthesis, and balanced estrogen levels help suppress excessive prostaglandin production, thereby reducing uterine hypercontractility and pain intensity. This hormonal pathway provides a plausible explanation for the potential analgesic effects of Ajwa dates during menstruation.

Complementing the role of estrogen, progesterone has a well-established function in relaxing uterine smooth muscle and counteracting excessive contractions. Mustakim et al. (2024) reported that regular consumption of Ajwa dates may help maintain or increase progesterone levels through their rich nutritional and phytochemical composition. The calming effect of progesterone on the uterus reduces contraction frequency and intensity, which directly contributes to alleviating menstrual pain. The combined regulation of estrogen and progesterone suggests that Ajwa dates may act through synergistic hormonal mechanisms, offering a more comprehensive natural approach to dysmenorrhea management than single-pathway interventions.

Beyond hormonal regulation, inflammatory processes are widely recognized as a key contributor to menstrual pain, particularly through the overproduction of prostaglandins mediated by cyclooxygenase (COX) enzymes. Experimental evidence provided by Mauludiyana et al. (2023) revealed that Ajwa date extracts exhibit significant anti-inflammatory activity by inhibiting COX-1 and COX-2 enzymes. This inhibition directly reduces prostaglandin synthesis, which is the primary biochemical trigger of uterine contractions and pain during menstruation. These findings strongly support the hypothesis that Ajwa dates can alleviate dysmenorrhea through anti-inflammatory mechanisms that parallel, yet potentially avoid the adverse effects of, conventional NSAIDs.

The nutritional composition of Ajwa dates further strengthens their potential role in menstrual pain reduction. Zahara et al. (2020) highlighted that Ajwa dates are rich in antioxidants, flavonoids, magnesium, potassium, vitamins B-complex, and natural sugars. Magnesium and

potassium play crucial roles in neuromuscular function and smooth muscle relaxation, particularly in the uterus, thereby reducing menstrual cramps. Meanwhile, antioxidants help mitigate oxidative stress and inflammatory responses in uterine tissue, which are known to exacerbate pain perception. Natural sugars such as glucose and fructose provide rapid energy replenishment, helping to counteract fatigue and weakness commonly experienced during menstruation, indirectly improving pain tolerance.

Clinical and quasi-clinical evidence further supports the relevance of date-based interventions in pain modulation related to female reproductive physiology. Fatmawati and Muliawati (2024) demonstrated that herbal decoctions containing dates significantly reduced dysmenorrhea severity in women, suggesting that dates contribute meaningful analgesic and anti-inflammatory effects even when used in combination with other herbs. Additionally, an intervention trial by Al-Sayyed et al. (2025) showed that regular consumption of date palm fruit significantly improved premenstrual symptoms, including abdominal cramps, across several menstrual cycles. Although the study focused on premenstrual symptoms rather than dysmenorrhea exclusively, abdominal cramps share overlapping physiological mechanisms with menstrual pain, reinforcing the relevance of date consumption.

Analogous evidence from obstetric research also provides valuable mechanistic insight. Taavoni et al. (2018) reported that oral date syrup significantly reduced labor pain intensity in nulliparous women. While labor pain and menstrual pain differ in intensity and context, both are fundamentally linked to uterine contractions and prostaglandin-mediated pathways. This finding supports the broader hypothesis that date-based products exert analgesic effects on uterine smooth muscle activity, lending indirect yet biologically plausible support to their use in dysmenorrhea management.

Systematic and narrative reviews further consolidate the role of date fruit in female reproductive health. Shirdel et al. (2025) concluded that date fruit products positively influence hormonal balance and reproductive well-being across different life stages, while Rahmani et al. (2014) documented the long-standing use of date palm fruit in traditional medicine for inflammatory and pain-related conditions. Moreover, Al-Farsi and Lee (2008) emphasized the high content of polyphenols and minerals in dates, which underpin their anti-inflammatory and analgesic potential. Together, these reviews provide a strong theoretical and empirical foundation supporting the role of Ajwa dates in alleviating menstrual pain.

Overall, synthesis of the ten reviewed studies indicates that Ajwa dates may reduce menstrual pain intensity through three interrelated mechanisms: (1) hormonal regulation via stabilization of estrogen and progesterone levels, (2) inhibition of inflammatory pathways through suppression of COX enzyme activity and prostaglandin production, and (3) nutritional and antioxidant support that promotes uterine muscle relaxation, reduces oxidative stress, and enhances pain tolerance. The convergence of these mechanisms positions Ajwa dates as a promising, safe, and culturally acceptable non-pharmacological intervention for dysmenorrhea in women of reproductive age. Nevertheless, despite the encouraging evidence, further well-designed randomized controlled trials focusing specifically on Ajwa dates and menstrual pain outcomes are required to confirm causality and establish standardized dosage recommendations.

This discussion synthesizes evidence derived from ten key studies that collectively examine the role of Ajwa dates (*Phoenix dactylifera* L.) in relation to menstrual pain intensity and its underlying physiological mechanisms. These studies encompass literature reviews, experimental laboratory research, clinical and quasi-clinical interventions, systematic reviews, and traditional medicine perspectives. Although the designs and outcome measures vary across the reviewed literature, the convergence of findings consistently supports the biological plausibility and potential effectiveness of Ajwa date consumption as a complementary non-

pharmacological approach to dysmenorrhea management. By integrating hormonal, inflammatory, nutritional, and clinical evidence, this review provides a comprehensive interpretation of how Ajwa dates may influence menstrual pain among women of reproductive age.

## Conclusion

Based on the results of a literature review of five journals analyzed, it can be concluded that consumption of Ajwa dates (*Phoenix dactylifera* L.) has the potential to provide real benefits in reducing the intensity of menstrual pain (dysmenorrhea) in women of childbearing age. This effect occurs through complementary mechanisms, namely hormonal regulation, inhibition of the inflammatory process, and nutritional support.

The bioactive compounds in Ajwa dates, such as flavonoids and phenols, play a role in increasing estrogen and progesterone levels, which suppress prostaglandin production and relax the uterine muscles. In addition, the anti-inflammatory activity of these compounds inhibits cyclooxygenase (COX-1 and COX-2) enzymes, thereby reducing the inflammatory process that triggers menstrual pain. Nutrients such as carbohydrates, vitamins, and minerals also provide natural analgesic effects and support the body's physiological balance during menstruation.

Thus, Ajwa dates can be considered as a safe, natural, and effective non-pharmacological alternative therapy to help reduce menstrual pain and improve the quality of life of women of reproductive age.

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