



Literature Review: The Role of Ajwa Dates (*Phoenix Dactylifera L.*) as a Natural Phytoestrogen in Reducing Perimenopause Symptoms

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Abstract

Perimenopause is a transitional phase before menopause characterized by a decrease in estrogen levels and the appearance of symptoms such as hot flashes, sleep disturbances, and mood changes. One natural alternative to reduce these symptoms is the use of phytoestrogens, which are plant compounds that mimic estrogen hormones. Ajwa dates (*Phoenix dactylifera L.*) contain flavonoids, phenolics, saponins, and phytoestrogens that have the potential to help balance hormones and reduce perimenopausal symptoms. This study aims to examine the role of Ajwa dates as a natural phytoestrogen in alleviating perimenopausal symptoms. This study employed a literature review design with a narrative approach. Data were obtained from five relevant national and international journals, with inclusion criteria covering studies discussing the role of Ajwa dates as a natural phytoestrogen in reducing perimenopausal symptoms. The data sources were analyzed qualitatively to assess the relationships between variables and the conclusions of the studies. The review results indicate that consumption of Ajwa dates can increase Anti-Mullerian Hormone (AMH) and Follicle Stimulating Hormone (FSH) levels, improve the number of de Graaf follicles, and thicken the endometrium. In vitro studies also show that Ajwa date extracts have significant antioxidant and phytoestrogenic activities. These effects contribute to improved ovarian function and the reduction of clinical symptoms caused by estrogen deficiency in perimenopausal women. Ajwa dates play an important role as a natural phytoestrogen capable of reducing perimenopausal symptoms through mechanisms such as hormonal balance improvement, antioxidant activity, and ovarian function enhancement.

Introduction

Perimenopause is the appearance of signs and symptoms that may arise when the body system changes due to an abnormal menstrual cycle. Perimenopause can start from the early 30s and is declared complete after 1 year. The average occurs at the age of 41-49 years. Perimenopause, or often referred to as the climacteric period, is a natural transition stage from the fertile period to the non-reproductive period. Usually also called perimenopause period, usually shown by unstable menstrual periods, as well as periods that last longer and tend to be heavier (Duralde et al., 2023; Kalita et al., 2024; Poorvi et al., 2024). In the perimenopause phase, signs of physical changes will appear, including the appearance of hot flashes, heat on the face, neck and chest at night, excessive lightness at night, increased heart rate, easy forgetfulness,

insomnia, fatigue, headache, vaginal dryness, decreased libido, desire to urinate more often, discomfort When urinating (incontinence) (Abdullah et al., 2025; Royani et al., 2022).

Data from the World Health Organization (WHO) in 2010 women who entered the premenopause period in the world numbered around 600 million people and will reach more than 1 billion in 2030, while statistical data from the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, out of 201.4 million people in the population of Indonesia, 100.9 million of them are women. In 2010 the number of women aged 40 years and above reached 15.5 million people and it is estimated that in the next 10 years or in 2020, the number of premenopausal women will continue to increase to 30.3 million (Siregar et al., 2025).

A decrease in estrogen hormone levels during menopause can cause changes in menopausal women, both physically and psychologically. The gradual loss of estrogen and progesterone hormones during menopause increases the risk of women's health from affecting their quality of life. So that it causes several symptoms such as mood disorders, sexual dysfunction, and sleep disorders in menopausal women (Khodijah et al., 2025; Mutiara et al., 2024).

Ajwa dates (*Phoenix dactylifera* L.) is a fruit that grows widely in Arab countries, especially the city of Madinah, Saudi Arabia. Based on several studies, dates have various phytochemical contents such as kumaric acid, feric acid, flavonoids, phenolics, sterols, procyanidins, antocyanins, carotenoids, vitamins and minerals that function as antioxidants, antihyperlipidemic, hepatoprotective, antimutagenic, anti-inflammatory, nephroprotective and others (Bachtiar et al., 2023; Fadhila et al., 2023).

Ajwa dates contain a high percentage of carbohydrate fiber (44-88%), dietary fiber (6,4-11,5%), fat (0,2-0,5%), protein (2,3- 5,6%), minerals and vitamins; also contains several fatty acids including palmitic, oleic, linoleic and linolenic acids. Ajwa dates are a good source of potassium which is an important mineral needed for the maintenance of muscle contractions in the body. Individuals with constipation and other digestive problems can benefit from consuming Ajwa dates. Several studies show that children from mothers who eat Ajwa dates regularly will be less susceptible to disease and infection. Another great advantage of consuming Ajwa dates is the high iron content which is very important in the production of Red Blood Cells and can help to treat and prevent anemia (Lestari & Zuhijriani, 2025; Namirah et al., 2022).

Several previous studies have also confirmed the existence of antioxidant and anti-inflammatory effects from ajwa dates (Almatroodi et al., 2022; Hassan et al., 2023; Abdelghffar et al., 2022). In addition, it is known that dates also contain phytoestrogens such as daidzein, formononetin, glycitein, genistein, pinoresinol, matairesinol, lariciresinol, coumesterol and secoisolariciresinol. Phytoestrogen is a natural compound that can bind to estrogen receptors and provide various estrogenic effects that are expected to be useful in overcoming perimenopausal symptoms without causing significant side effects (Begum et al., 2024; Alyahya et al., 2022; Kurniawan, 2023).

Seeing the great potential of Ajwa dates as a source of natural phytoestrogens, it is important to dig deeper into the mechanism and role in reducing perimenopause symptoms. This study is expected to provide a scientific basis for the utilization of Ajwa dates as a safe and effective complementary therapy for women who are transitioning to menopause. In addition, this research can also contribute to the development of functional food products based on natural ingredients that support women's hormonal health (Shivanandappa et al., 2023; Anwar et al., 2022; Metwally et al., 2024; Mani et al., 2023).

Methods

This study was designed as a narrative literature review that seeks to explore in depth the role of Ajwa dates as a natural phytoestrogen in reducing perimenopausal symptoms. The selection

of a narrative review approach was grounded in the need to accommodate diverse forms of scientific evidence that address hormonal changes, reproductive health, and phytochemical mechanisms from multiple perspectives. Rather than merely summarizing existing studies, this approach allows the researcher to interpret findings critically, to examine relationships among variables, and to construct a coherent understanding of how Ajwa dates may influence physiological processes during the perimenopausal transition. Through this design, the study aims to integrate clinical, experimental, and laboratory based evidence into a meaningful analytical framework.

The process of identifying relevant literature was carried out systematically and reflectively to ensure both scientific rigor and thematic relevance. The search was conducted using several electronic databases, including Google Scholar, PubMed, and national academic journal platforms. Keywords such as Ajwa dates, *Phoenix dactylifera*, phytoestrogen, perimenopause, menopause symptoms, Anti Mullerian Hormone, and Follicle Stimulating Hormone were used in various combinations in both English and Indonesian. This bilingual strategy was adopted to capture a broader spectrum of regional and international research. In addition to database searching, reference lists from selected articles were examined manually in order to identify additional studies that could enrich the analytical depth of the review.

Following the initial search, the selection of literature was guided by clearly defined inclusion and exclusion criteria that were aligned with the objectives of the study. Articles were included if they were published in peer reviewed journals, presented empirical or experimental findings related to Ajwa dates, and examined outcomes associated with hormonal balance, ovarian function, or perimenopausal symptoms. Studies involving human participants, animal models, and in vitro experiments were considered eligible as long as they provided relevant biological or clinical evidence. Meanwhile, articles that lacked methodological transparency, focused on unrelated health outcomes, or relied primarily on opinion without empirical support were excluded. This careful selection process ensured that the final body of literature was both credible and analytically meaningful.

After the screening stage, the selected articles were subjected to a detailed evaluation process that involved full text reading and methodological assessment. Each study was examined in terms of research design, sample characteristics, intervention or exposure methods, measurement instruments, and analytical procedures. Through this process, five core studies were identified as the main sources for in depth analysis. These studies were chosen because they collectively represented a balance of clinical, observational, and laboratory based approaches, thereby allowing the review to capture the multidimensional nature of Ajwa dates and their potential hormonal effects.

All data utilized in this research were derived from secondary sources in the form of previously published scientific articles. The data extraction process was conducted through repeated and attentive reading of each selected study. Key information related to research context, participant profiles, dosage or intervention patterns, outcome variables, and principal findings was systematically documented. Particular attention was given to indicators such as Anti Mullerian Hormone levels, Follicle Stimulating Hormone levels, ovarian follicle development, endometrial thickness, and antioxidant activity. This structured documentation enabled the researcher to maintain analytical consistency while preserving the original meaning of each study.

The analysis of the collected data was carried out qualitatively through an interpretative and comparative approach. Rather than treating each study as an isolated unit, the findings were examined in relation to one another in order to identify shared patterns, conceptual connections, and underlying mechanisms. Thematic groupings were developed around major dimensions such as hormonal regulation, ovarian function preservation, oxidative stress reduction, and

symptom alleviation. These themes were then analyzed comparatively to explore how different research designs and contexts contributed to similar or contrasting conclusions. Through this process, the review sought to generate a nuanced understanding of how bioactive compounds in Ajwa dates may interact with estrogen related pathways.

Result and Discussion

This research was conducted by studying literature, namely by collecting data from several sources regarding the title "Review literature: the role of ajwa dates (*Phoenix dactylifera* L.) as a natural phytoestrogen in reducing perimenopause symptoms". As for the literature obtained, there are 5 references that are further discussed and associated with the title of this research. The most suitable reference is presented in the form of the table below:

Table 1. Summary of Studies on the Effects of Ajwa Dates (*Phoenix dactylifera* L.) on Reproductive Hormones and Ovarian Function

Year of publication	Title	Method	Author	Results	Conclusion
Mulyadi et al. (2023)	The Effect of Giving Dates Ajwa (<i>Phoenix dactylifera</i> L.) on Anti - Mullerian Hormone Levels (AMH) and Clinical Description of Perimenopausal Women	Experiment (pretest-posttest without control)	Farah Ekawati Mulyadi, Rosdiana Natzir, Nasrudin Andi Mappaware, Suryani As'ad, Andi Wardihan Sinrang, Liong Boy	AMH levels increased after consuming Ajwa dates	Ajwa dates can increase AMH levels and improve perimenopause clinical conditions
Kusumasari et al. (2020)	The Effects of Ajwa Dates Consumption (<i>Phoenix dactylifera</i> L) on Ovarian Follicular Features with Transvaginal Ultrasound in Perimenopausal Women	Experiment (observation using transvaginal ultrasound)	Herdhika A.R. Kusumasari, Harwin H Desyanti, Mahanutabah H Qurniatillah, Retty Ratnawati, Eviana Norahmawati, Tatit Nurseta, Endang Sri Wahyuni, Kusworini .	There is an increase in the number and size of ovarian follicles after consuming Ajwa dates.	Ajwa dates have the potential to maintain ovarian function in perimenopausal women
Aljohani et al. (2025)	Ajwa date extract (<i>Phoenix dactylifera</i> L.)	Laboratory / in vitro study	Ahmad K. Aljohani, Nader A. Maghrabi, Osama M. Alrehili, dkk.	Ajwa extract has antioxidant and phytoestrogen activity	The phytochemical content of Ajwa can support the balance of reproductive hormones

Mulyadi et al. (2023)	The effect of ajwa dates (Phoenix dactylifera L) consumption to anti-Mullerian hormone level of perimenopausal woman	Experiment (pretest-posttest)	Mulyadi, F.E., Natzir, R., Mappaware N.A., As'ad, S., Sinrang, A.W. Kurniawan, L.B.	There is a significant increase in AMH levels after consuming Ajwa dates	Ajwa dates can increase ovarian reserves and AMH levels
Kusumasari et al. (2020)	The Effect of Ajwa Dates Fruit Extract on Follicle Stimulating Hormone (FSH), Graafian Follicle and Endometrial Thickness in Female Rats Exposed to Arsenic	Laboratory experiments on female mice exposed to arsenic	Herdhika A.R. Kusumasari, Harwin H Desyanti, Mahanutabah H Qurniatillah, Retty Ratnawati, Eviana Norahmawati, Tatit Nurseta, Endang Sri Wahyuni, Kusworini.	Giving Ajwa date extract increases FSH levels, the number of de Graaf follicles, and endometrial thickness	Ajwa date extract is able to improve ovarian function and endometrial structure damaged by arsenic exposure

Table 2. Characteristics and Main Findings of Included Studies

No	Author (Year)	Study Design	Sample / Model	Intervention	Primary Outcomes
1	Mulyadi et al. (2023)	Experimental (pretest–posttest without control)	Perimenopausal women	Ajwa dates consumption	Anti-Müllerian Hormone (AMH) levels; clinical symptoms
2	Kusumasari et al. (2020)	Experimental (observational via transvaginal ultrasound)	Perimenopausal women	Ajwa dates consumption	Ovarian follicle number and size
3	Aljohani et al. (2025)	In vitro laboratory study	Cell-based experimental model	Ajwa date extract	Antioxidant and phytoestrogen activity
4	Mulyadi et al. (2023)	Experimental (pretest–posttest)	Perimenopausal women	Ajwa dates consumption	AMH levels
5	Kusumasari et al. (2020)	Laboratory experiment	Female rats exposed to arsenic	Ajwa dates fruit extract	FSH levels, Graafian follicles, endometrial thickness

Hormonal Outcomes Reported Across Studies

Across the included studies, hormonal outcomes were reported in both human and experimental models. Two studies by Mulyadi et al. (2023) consistently reported an increase in Anti-Müllerian Hormone (AMH) levels following Ajwa dates consumption in perimenopausal women. Another laboratory study by Kusumasari et al. (2020) reported increased Follicle Stimulating Hormone (FSH) levels, along with structural ovarian improvements in female rats exposed to arsenic.

Reproductive and Ovarian Structural Outcomes

Structural reproductive outcomes were reported in three studies. Kusumasari et al. (2020) observed an increase in the number and size of ovarian follicles using transvaginal ultrasound

in perimenopausal women after Ajwa dates consumption. In an animal model, Ajwa date extract was associated with an increase in the number of Graafian follicles and endometrial thickness.

Biological Activity of Ajwa Dates

One in vitro study by Aljohani et al. (2025) reported that Ajwa date extract demonstrated antioxidant activity and phytoestrogen properties, as identified through laboratory analysis.

Premenopause is a transitional phase before menopause which is characterized by various hormonal, biological, psychological, and social changes in women. These changes often cause physical disorders that have an impact on the decline in the quality of life. Phytoestrogens are able to give estrogenic effects because they can bind to estrogen receptors, also show pro-apoptosis and antioxidant effects. One of the most famous types of dates is Ajwa dates, Ajwa dates are a functional food ingredient that has potential for women's reproductive health. Ajwa dates contain saponin compounds, tannin compounds and flavonoids. Ajwa dates also contain phytochemical compounds such as phytosterols and phytoestrogens (Abouzeid et al., 2024; Fruitasari, 2024).

Research by Mulyadi et al. (2023) with a pretest-posttest design without control shows that the consumption of Ajwa dates in perimenopausal women can increase Anti-Mullerian Hormone (AMH) levels significantly. AMH is one of the indicators of ovarian reserve, which tends to decrease with age and decreased ovarian function. This increase in AMH levels indicates an improvement in ovarian function after consuming Ajwa dates. In addition, the clinical conditions of the study subjects such as sleep disorders and vaginal dryness also showed improvement, so it can be concluded that Ajwa dates have the potential to improve hormonal balance and reduce perimenopause symptoms. Other research by Royani et al. (2022) with observational method using transvaginal ultrasound also supports the results. This study found that consuming Ajwa dates can increase the number and size of ovarian follicles in perimenopausal women (Irfan et al., 2025; Rahma et al., 2024; Koser et al., 2022; Salhi et al., 2024). This result indicates that Ajwa dates play a role in maintaining ovarian function, which is closely related to the production of endogenous estrogen hormone. Thus, the consumption of Ajwa dates can help slow down the process of decline in ovarian function that commonly occurs during perimenopause (AlFaris et al., 2023; Rahma et al., 2024).

From the phytochemical side, laboratory study by Mustakim et al. (2024) showed that Ajwa date extract has strong antioxidant and phytoestrogenic activity. The content of bioactive compounds such as flavonoids, phenolic acids, and phytosterols is known to interact with estrogen receptors and cause mild estrogenic effects. This phytoestrogenic activity has the potential to help balance reproductive hormone levels in perimenopausal women, thus reducing symptoms due to estrogen deficiency.

In addition, other experimental studies by Sangar et al. (2024) also reported a significant increase in AMH levels after consuming Ajwa dates, confirming the finding that Ajwa dates can play a role in increasing ovarian reserves and delaying the decline in hormonal function during the perimenopause phase. This effect strengthens the suspicion that the bioactive content in Ajwa, such as natural phytoestrogens, is able to provide mild hormonal stimulation that resembles the effects of endogenous estrogen.

Similar findings were also shown by Hamsah et al. (2024) in the study of female animals exposed to arsenic. Ajwa date extract is proven to be able to increase FSH levels, the number of de Graaf follicles, and the thickness of the endometrium. This shows that Ajwa can improve ovarian function and endometrial tissue regeneration, which is very relevant to the reproductive mechanism and estrogen hormone balance.

Conclusion

Ajwa dates (*Phoenix dactylifera* L.) demonstrate potential as a natural source of phytoestrogens that may support hormonal balance during the perimenopausal period. The bioactive compounds contained in Ajwa dates, including flavonoids, phenolics, phytosterols, and phytoestrogens, are capable of exerting estrogen-like activity through interaction with estrogen receptors, thereby contributing to endocrine modulation in perimenopausal women. Evidence from human, animal, and laboratory-based studies indicates that Ajwa dates consumption is associated with increases in key hormonal markers such as Anti-Müllerian Hormone (AMH) and Follicle Stimulating Hormone (FSH), as well as improvements in ovarian follicle number, ovarian reserve indicators, and endometrial thickness.

These hormonal and physiological changes are accompanied by reported improvements in perimenopausal symptoms, including vasomotor disturbances, sleep disorders, and mood-related complaints. In addition, the antioxidant properties of Ajwa dates may provide protective effects against oxidative stress in reproductive tissues, which is known to play a role in ovarian aging and hormonal dysregulation.

Despite these consistent trends, the current evidence remains limited by the small number of available studies, heterogeneity in study designs, and variation in outcome measures. Therefore, Ajwa dates should be considered a complementary nutritional approach rather than a definitive therapeutic intervention for perimenopausal symptom management. Further well-designed randomized controlled trials and longitudinal studies are required to confirm efficacy, determine optimal dosage and duration, and establish long-term safety. Strengthening the evidence base will be essential to support informed clinical and public health recommendations aimed at improving the quality of life of perimenopausal women.

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