

The Effects of Ajwa Dates to Improve Clinical Features in Perimenopausal Women



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Abstract— Objective: Perimenopause, or the menopausal transition, is a period when physiologic changes mark progression toward the end of the menstrual period. Physiological changes in perimenopause produce hormonal changes that manifest invariable symptoms that significantly affect a woman's quality of life, so complex clinical treatment is required. Ajwa dates (*Phoenix dactylifera L.*), one of the alternative treatments for perimenopausal women, have many benefits for reproductive function. The antioxidant and pro-apoptotic effects of ajwa dates are considered to improve the clinical features of perimenopause. **Methods:** This quasi-experimental study with a pre-post control design involved 44 perimenopausal women aged 42–48 years, which were divided into 2 groups randomly (28 subjects consumed 7 ajwa dates daily for 8 weeks as the intervention group, and 16 subjects did not consume any dates as the control group). **Results:** There were significant improvements in sleep disturbances, vaginal dryness, and mood changes in the intervention group compared to the control group ($p < 0.001$, $p < 0.001$, and $p = 0.002$, respectively). There were no significant improvements in irregular menstrual cycles ($p = 0.375$) or vasomotor symptoms ($p = 0.063$). **Conclusion:** Consumption of ajwa dates was effective in improving clinical features and perimenopausal women's quality of life.

Keywords— perimenopause, clinical features, ajwa dates

1. Introduction

Perimenopause, or the menopausal transition, is a period when physiologic changes mark progression toward the end of the menstrual period. This phase begins with the onset of menstrual irregularities and continues until a woman reaches menopause, or one year after amenorrhea occurs (Franciscis et al., 2019). Physiological changes in perimenopause mainly stem from decreased ovarian function and oxidative stress reactions. This is because decreased estrogen levels in perimenopausal women can cause an increase in free radicals and oxidative stress that will trigger DNA apoptosis throughout the cell (Castanho et al., 2012).

Hormonal changes during perimenopause manifest in various symptoms, namely vasomotor symptoms in the form of *hot flashes*, atrophy and dryness of the vagina, sleep disorders and insomnia, mood disorders in the form of depression, and cognitive disorders (Franciscis et al., 2019). Symptoms that arise during perimenopause greatly affect the quality of life of a woman, so complex clinical treatment is needed.

Ajwa dates (*Phoenix dactylifera L.*), one of the alternative treatments for perimenopausal women, have many benefits for reproductive function. Ajwa dates with a high polyphenol content (50.2 mg/g), especially epicatechins and catechins, provide antioxidant effects both in vivo and in vitro. In addition, ajwa dates also contain phytochemical compounds such as phytosterols and phytoestrogens. Phytoestrogens are useful for modulating the body's estrogen and have pro-apoptotic and antioxidant activity. The antioxidant and pro-apoptotic effects of ajwa dates are considered to improve the clinical features of perimenopause.

Various studies to examine the effects of dates on health have been widely developed, including the effect of ajwa dates on women's reproductive health. However, research on the effects of ajwa dates on the clinical symptoms of perimenopausal women is still rarely found. So this study aimed to look at the effect of ajwa dates on improving the clinical symptoms of perimenopausal women.

2. Methods

2.1 Study Design and Population

This quasi-experimental study with a pre-post control design involved 50 perimenopausal women aged 42 – 48, conducted at Sitti Khadijah 1 Muhammadiyah Hospital, Makassar, Indonesia, from January until June 2023. Improvement in clinical symptoms was measured using questionnaires.

Participants were randomly drawn, namely perimenopausal patients at the outpatient of Sitti Khadijah 1 Muhammadiyah Hospital, Makassar, Indonesia. Women were eligible to participate if they met the following criteria: 43-48 years of age; perimenopausal at study commencement; married; have children; have a normal BMI; and be willing to be a sample and sign a statement of willingness to be a respondent. A participant is considered perimenopausal if she reports menstrual irregularities lasting less than 12 consecutive months. Perimenopausal women who met the inclusion criteria were randomly selected to be grouped into an intervention group (30 people) and a control group (20 people).

Patients were excluded if they screened fasting blood glucose test results ≥ 126 mg/dl and oral glucose tolerance test ≥ 200 mg/dl; had a history of ovarian disorders (PCOS) or a history of ovarian surgery; smoked; while using hormonal contraceptives; had a history of suffering from chronic infectious diseases (eg tuberculosis, malaria, thalassemia); and suffering from degenerative non-infectious diseases (cardiovascular disease, cancer, chronic kidney failure, and DM).

2.2 Treatments

Based on the participant criteria, participants who were included in the intervention group were given 7 ajwa dates per day to be consumed every morning before breakfast for 8 weeks. The ajwa dates used in this study were fresh, ripe, medium-sized, and soft-fleshed, weighing 60 - 80 gr/7 dates. Ajwa dates are cultivated in the city of Al Madina Al-Munawwarah and purchased from the date distributor "Al Ma'aliy". Participants included in the control group did not consume any dates.

2.3 Assessments

To calculate BMI, weight measurement is done using a digital weight scale, while height measurement is done using microtoise. Measurements of GDP and TTGO were carried out by taking participants' blood samples. Abdominal ultrasound is done to see if there are any ovary-related abnormalities (PCOS).

Improvement in clinical symptoms was measured using questionnaires. Adherence to ajwa date consumption was evaluated at each follow-up visit through a physician interview. Patients were asked whether they consumed ajwa dates daily and whether they consumed ajwa dates at the prescribed dosage.

2.4 Statistical Analysis

All data were presented as mean±SD. The Mann-Whitney U test was used to compare the intervention and control groups in terms of age, blood pressure, BMI, and contraceptive use. The chi-square test was used to compare the employment status, and the Fisher test to compare education and parity. Clinical features's improvement was analyzed using the McNemar test. All statistical analyses were performed using SPSS 26.0 software.

3. Results

A total of 50 women were considered eligible for inclusion in the study. Of the 30 intervention group subjects, 2 subjects dropped out because they could not be contacted when they were going to do a post-intervention interview, while in the control group, 4 dropped out because they could not be contacted when they were going to do a post-intervention interview. So the total subjects until the end of this study amounted to 44 people, 28 intervention group subjects and 16 control group subjects.

The demographic characteristics of subjects in the intervention and control groups are shown in Table 1. There were no significant differences between the two groups in terms of age, blood pressure, BMI, parity, education, employment status, and contraceptive use.

Table 1. Sample Characteristics

Variable	Intervention Group (n = 28)	Control Group (n = 16)	p-value
Age (years) ^a	44.79±2.28	44.69±2.24	0.719 ^c
Blood Pressure (mmHg) ^a			
Systolic	118.57±10.79	121.25±13.60	0.849 ^c
Diastolic	81.07±7.37	80.00±12.65	0.776 ^c
BMI ^b			
Underweight	2 (7.1 %)	0 (0.0 %)	
Normal	5 (17.9 %)	3 (18.8 %)	
Overweight	4 (14.3 %)	7 (43.8 %)	
Class 1 Obesity	13 (46.4 %)	5 (31.2 %)	
Class 2 Obesity	4 (14.3 %)	1 (6.2 %)	
Parity ^b			0.310 ^d
Primipara	4 (14.3 %)	4 (25.0 %)	
Multipara	24 (85.7 %)	12 (75.0 %)	
Education ^b			0.600 ^d
≤ 9 years	1 (3.6 %)	1 (6.3 %)	
> 9 years	27 (96.4 %)	15 (93.7 %)	
Employment Status ^b			0.932 ^c
Employed	14 (50.0 %)	7 (43.7 %)	
Unemployed	14 (50.0%)	9 (56.3 %)	
Contraceptive Use ^b			0.553 ^c
Non-users	19 (67.9 %)	12 (75.0 %)	

Intrauterine Device	5 (17.9 %)	3 (18.7 %)
Tubectomy	4 (14.2 %)	1 (5.3 %)

^aMean±Standard Deviation, ^bFrequency (%), ^cMann-Whitney U test, ^dFisher test, ^eChi-Square test

Statistical analysis on complaints of sleep disturbances, vaginal dryness, and mood changes improved with the consumption of Ajwa dates for 8 weeks each, with significance values of $p < 0.001$, $p < 0.001$, and $p = 0.002$, respectively, while complaints of irregular menstrual cycles were not statistically significant after consumption of ajwa dates ($p = 0.375$), as well as vasomotor symptoms ($p = 0.063$). In the control group, there was no significant change after the 8-week period for all complaints ($p = 1.000$).

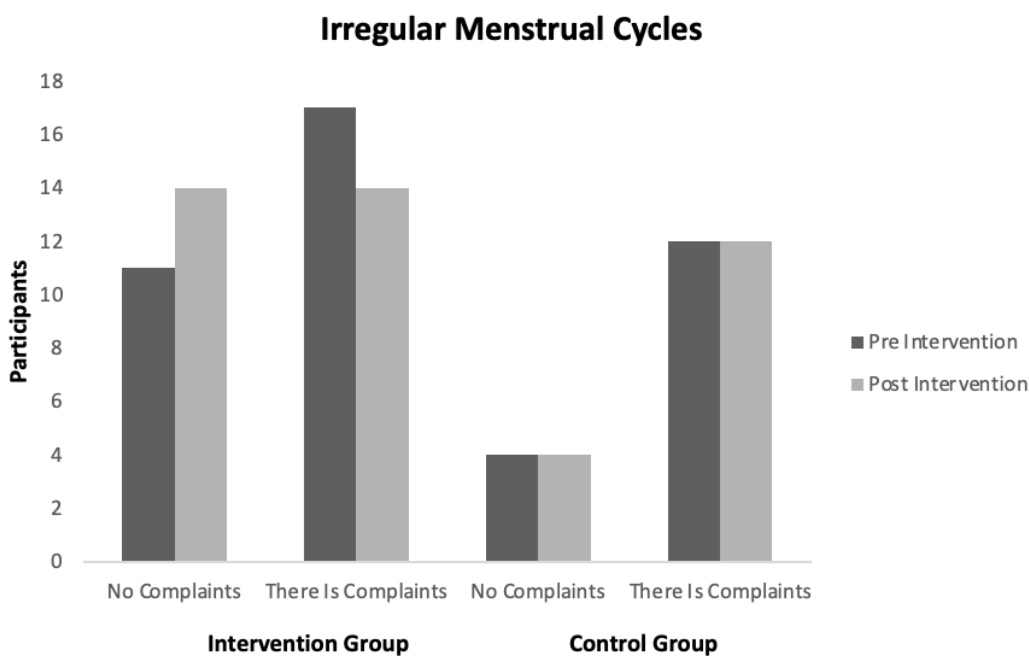


Figure 1. The Changes Between The Mean Number of Participants with Irregular Menstrual Cycles in The Intervention and Control Group

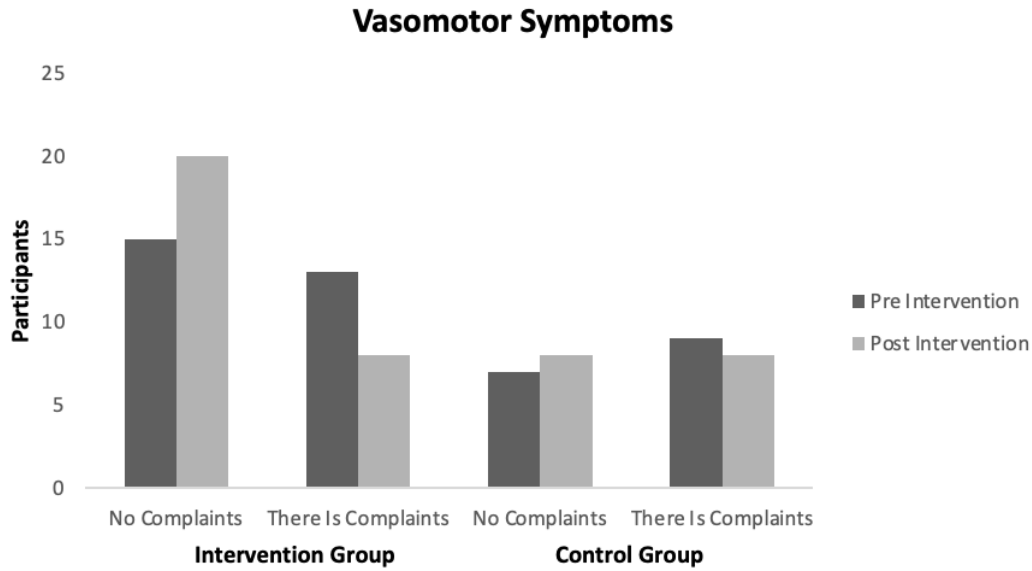


Figure 2. The Changes Between The Mean Number of Participants with Vasomotor Symptoms in The Intervention and Control Group

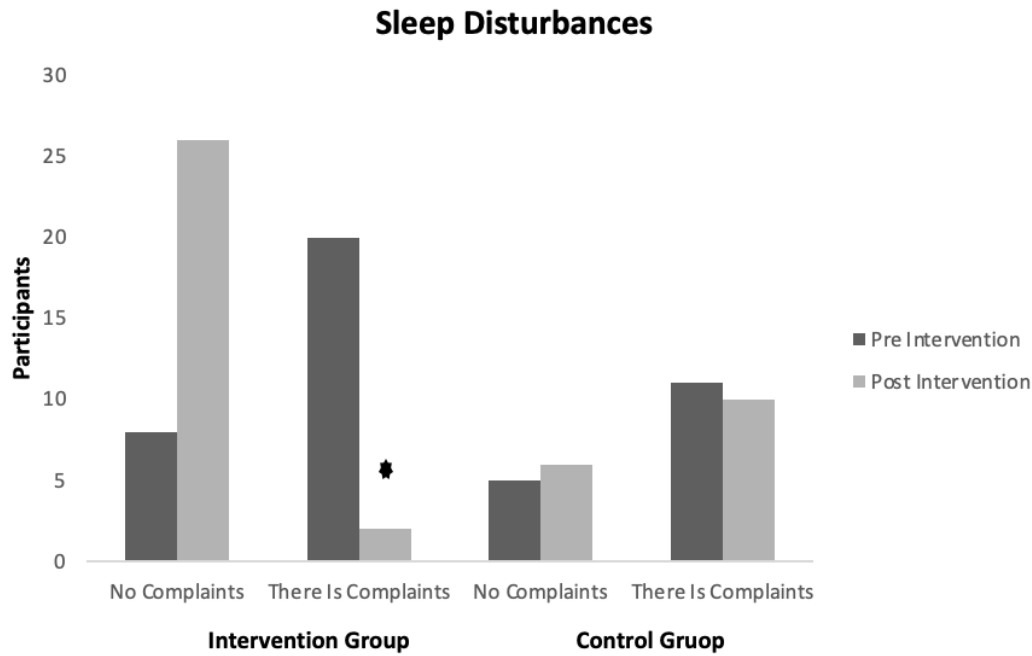


Figure 3. The Changes Between The Mean Number of Participants with Sleep Disturbances in The Intervention and Control Group

*Significant $p < 0,05$

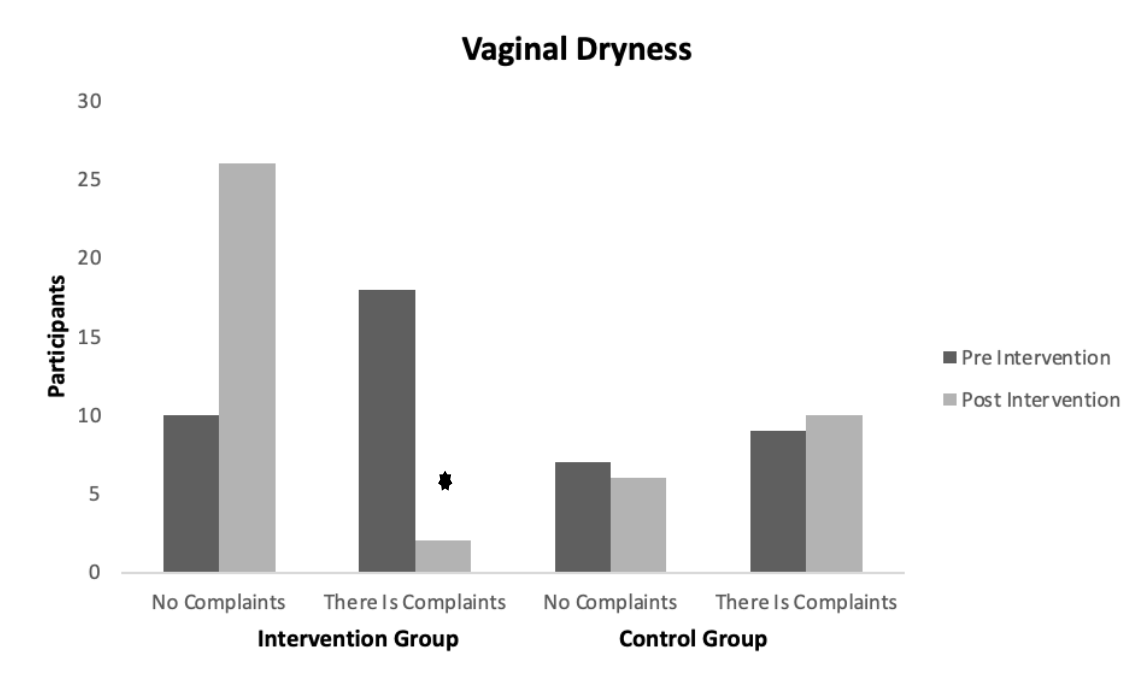


Figure 4. The Changes Between The Mean Number of Participants with Vaginal Dryness in The Intervention and Control Group
 *Significant $p < 0,05$

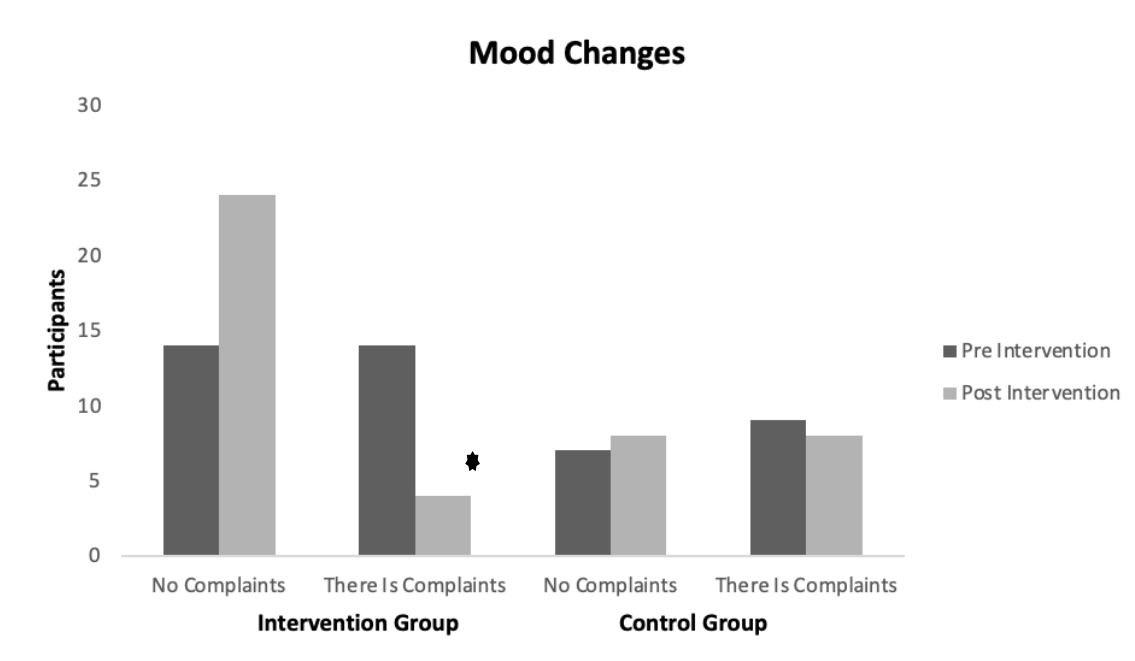


Figure 5. The Changes Between The Mean Number of Participants with Mood Changes in The Intervention and Control Group
 *Significant $p < 0,05$

4. Discussion

Perimenopause, according to the World Health Organization (WHO) is a period before menopause and a period of one year after the last menstruation, due to loss of ovarian follicle activity (Agency for Healthcare Research and Quality, 2013). Physiological changes in perimenopause mainly stem from decreased ovarian function and oxidative stress reactions that will trigger DNA apoptosis throughout the cells (Castanho et al., 2012).

In perimenopausal women, reduced estrogen levels have an impact on the appearance of various perimenopausal symptoms, namely vasomotor symptoms in the form of hot flashes, atrophy and dryness of the vagina, sleep disorders and insomnia, mood disorders in the form of depression, and cognitive disorders (Franciscis et al., 2019). Like an unbroken circle, a decrease in estrogen increases the level of oxidative stress in the body. Estrogen has a pro-oxidant-like effect at low concentrations, especially when its chemical structure contains catechol. This effect causes damage to genetic material, additional DNA formation, and base oxidation (Wang et al., 2011). This suggests an opportunity for antioxidant utilization in reducing perimenopausal symptoms.

Various studies related to natural products are increasingly being developed, one of which is ajwa dates (*Phoenix dactylifera* L). Ajwa dates have been known as one of the alternative treatments that have many health benefits, including antihyperlipidemic effects (Alqarni et al., 2019), antioxidant, anti-inflammatory (Zhang et al., 2013) (Rahmani et al., 2014a) (Royani et al., 2019); antimicrobial (Al Jaouni et al., 2019); hepatoprotective (Sheikh et al., 2014); nephroprotective (Ali & Abdu, 2011); and anticancer (Khan et al., 2016) (Rahmani et al., 2014b); even against reproductive function (Moshfegh et al., 2016).

Ajwa dates with a high polyphenol content (50.2 mg/g), especially epicatechins and catechins, provide antioxidant effects both in vivo and in vitro. In addition, ajwa dates also contain phytochemical compounds such as phytosterols and phytoestrogens. Phytoestrogens are useful for modulating the body's estrogen and have pro-apoptotic and antioxidant activity.

Research conducted by Dijazi et al. in 2020 documented that supplementation of 200 µg selenium and 400 units of vitamin E can increase ovarian reserve, as evidenced by a significant increase in the number of antral follicles and AMH levels in the intervention group. These results support our findings because analysis of the mineral content of ajwa dates has also revealed the presence of a selenium content of 0.24–0.4 mg/100g of Ajwa dates (Al-Farsi & Lee, 2008). Selenium plays a role in forming the structure of the enzyme selenoprotein GPX1, which is one of the important cofactors in antioxidant enzymes. This enzyme in the ovaries accumulates in healthy and large follicular granulosa cells but is not found in small and atretic follicles (Ceko et al., 2016).

The protective role of Ajwa dates on the ovaries can also be caused by the quercetin content ($1,219 \pm 0.071$ mg/100g) (Hamad et al., 2015) Quercetin is a bioactive form of flavonoid and has extensive biological benefits, including antioxidant, anti-inflammatory, antiapoptotic effects, and stimulating mitochondrial biogenesis (Yang et al., 2021) (Xu et al., 2019) In laboratory animals, quercetin has been shown to increase ovarian volume and prevent follicular cell degeneration, hemorrhage, vascular congestion, and edema while decreasing follicular cell apoptosis.

Years before the last menstruation, ovarian function begins to decline, and estrogen levels fluctuate dramatically (Franciscis et al., 2019), causing perimenopause transition cycle irregularities to become common. Consumption of ajwa dates does not provide significant improvement against complaints of irregular menstrual cycles and hot flashes. Although the exact mechanism for a hot flush is unknown,

serotonin receptors in the hypothalamus are involved in thermoregulation. A decrease in estrogen levels leads to a decrease in serotonin levels, which leads to increased regulation of serotonin receptors. It increases the release of serotonin and norepinephrine and increases stimulation in the hypothalamus, which then lowers the temperature set point in the thermoregulatory nucleus and results in the body's function to cool the body by sweating (Berendsen, 2000).

In our study, 92.9% of subjects complained of difficulty sleeping. Studies involving multiethnic women worldwide found that 37% of women between the ages of 40 and 55 reported difficulty sleeping, with the highest rates recorded in Caucasian and Hispanic women (Kravitz & Joffe, 2012a). Sleep disorders are strongly associated with vasomotor and psychological symptoms and lifestyle factors related to stress and health. With severe vasomotor complaints, a woman is more likely to report insomnia. However, vasomotor symptoms alone do not explain all sleep changes during perimenopause. Hormone levels are not associated with sleep disorders. Sleep disturbances before this transition period are predictors of worsening sleep symptoms during menopause (Kravitz & Joffe, 2012b). Sleep disturbances are associated with mood changes, while mood changes during the perimenopausal period seem to greatly affect a woman's quality of life (Delamater & Santoro, 2018). This study showed that the consumption of 7 ajwa dates per day for 8 weeks reduced complaints of sleep disorders and mood problems.

Vaginal dryness is associated with decreased collagen and elastin content, epithelial thinning, and increased vaginal pH associated with decreased estrogen (Kim et al., 2015). Consumption of ajwa dates provides benefits in reducing complaints of vaginal dryness. Further research is needed to determine the underlying mechanism, but this effect is thought to be through the phytoestrogen content in ajwa dates.

5. Conclusion

Consumption of ajwa dates 7 eggs per day for 8 weeks can improve clinical symptoms in perimenopausal women, especially symptoms of vaginal dryness, sleep disturbances, and mood changes. This is due to the high antioxidant and anti-inflammatory content possessed by ajwa dates. More research is needed to measure the antioxidant and anti-inflammatory biomarkers affected by ajwa dates.

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