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The role of vitamin D and E in dysmenorrhea: a narrative review

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Abstract

Background. Dysmenorrhea, one of the most common gynecological problems, significantly reduces patients' quality of life. Standard therapy is based on the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives, however it is associated with adverse effects. Alternative treatment methods are being sought, including vitamin supplementation, particularly vitamin D and E.

Aim. The aim of this study was to evaluate the role of vitamin D and E supplementation in dysmenorrhea.

Material and methods. In March 2026, the PubMed database was searched. The following strategies were applied: (Dysmenorrhea OR "menstrual pain") AND ("Vitamin D" OR cholecalciferol OR "vitamin D3" OR "25-hydroxyvitamin D" OR 25(OH)D) and (Dysmenorrhea OR "menstrual pain") AND ("Vitamin E" OR tocopherol OR alpha-tocopherol). Studies published in English within the last 10 years were included. After screening titles and abstracts, full-text analysis was performed. Ultimately, 12 publications were included.

Results. An association between vitamin D levels and the severity of menstrual pain was demonstrated, and supplementation led to symptom reduction. Beneficial effects were also observed with the combined use of vitamins D and E, suggesting a possible synergistic effect. The results regarding vitamin E are inconsistent - some studies indicate its effectiveness, particularly in combination with other compounds (e.g., omega-3 fatty acids or vitamin C), which may be related to its antioxidant properties. However, not all studies confirm this relationship.

Conclusions. Vitamin D and E supplementation may be an effective adjunct in the treatment of dysmenorrhea. However, further studies on larger populations are required.

Key words: dysmenorrhea; menstrual pain; vitamin D; vitamin E; micronutrients

1. Introduction

Dysmenorrhea is defined as pain occurring during menstruation and is one of the most common gynecological problems among women of reproductive age. Despite its high prevalence, this condition is still considered underdiagnosed, as many women do not seek medical care. It is associated with a significant negative impact on patients' quality of life [1]. Two forms of dysmenorrhea are distinguished: primary and secondary. Primary dysmenorrhea is characterized by painful uterine contractions without the presence of identifiable uterine pathology and is not associated with other diseases [1-3]. Although its etiology is not fully understood, a key role is attributed to increased production of prostaglandins and leukotrienes [4].

The main treatment methods include the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives, and in selected cases also surgical interventions [5]. These therapies are associated with a number of potential adverse effects, which in the case of NSAIDs may include, among others, gastric ulcers and renal impairment [6].

Therefore, alternative methods of alleviating menstrual pain are being explored, including heat therapy, acupuncture, behavioral interventions, and supplementation with selected nutrients such as magnesium [1]. Increasing attention is also being paid to the role of micronutrients, the deficiencies of which are common among women of reproductive age. Due to the wide availability of micronutrients, including vitamins, it seems important to present comprehensive data on their effectiveness, dosage, and supplementation regimens in dysmenorrhea [7].

Although several vitamins, including vitamins D, B1, E, C, and K, are considered potentially effective in alleviating menstrual pain, vitamins D and E are the most extensively studied [8-11]. Therefore, the present review focuses on these two vitamins in order to provide a detailed analysis of their role in dysmenorrhea. The aim of this study is to evaluate their potential effectiveness, mechanisms of action, and the possibility of their use as monotherapy or in combination with other substances, which may contribute to reducing the adverse effects of standard treatments and improving therapeutic outcomes.

2. Materials and methods

In March 2026, an electronic search of the PubMed database was conducted. The following search strategies were applied to ensure a comprehensive and objective selection of studies. The search included the following keyword combinations: (Dysmenorrhea OR "menstrual pain") AND ("Vitamin D" OR cholecalciferol OR "vitamin D3" OR "25-hydroxyvitamin D" OR 25(OH)D); (Dysmenorrhea OR "menstrual pain") AND ("Vitamin E" OR tocopherol OR alpha-tocopherol). Studies published within the last 10 years in English were analyzed. An initial screening was performed based on titles and abstracts, followed by a full-text review of previously selected articles. Review articles and case reports were excluded. Ultimately, 12 publications meeting the inclusion criteria were included in the analysis.

3. Results

3.1. Vitamin D

Vitamin D is a hormone synthesized in the skin under exposure to sunlight and also obtained through the diet, and is commonly associated with calcium metabolism [12]. However, its functions extend far beyond calcium homeostasis. Vitamin D deficiency predisposes individuals to the development of neoplastic, cardiovascular, inflammatory, and autoimmune diseases and is highly prevalent [13]. It is also a common phenomenon among women, both adolescents and young adults [14]. In recent years, increasing attention has been paid to the role of vitamin D in pain management, suggesting its influence primarily on nociceptive and inflammatory pain [15].

Kucukceran et al. conducted a study aimed at assessing vitamin D levels in patients with primary dysmenorrhea and evaluating the effect of its supplementation on symptoms. The study included patients aged 18–30 years, in whom pain intensity was assessed using the Visual Analog Scale (VAS), and serum vitamin D levels (25(OH)D) were measured. The supplementation dose was adjusted according to the baseline 25(OH)D concentration. After a three-month follow-up period, 25(OH)D levels were reassessed and VAS scores were evaluated following supplementation therapy. A decrease in 25(OH)D levels was found to correlate with an increase in VAS scores. Conversely, vitamin D supplementation resulted in a reduction in

VAS scores in groups with insufficient, deficient, and severely deficient 25(OH)D levels. The greatest reduction in VAS scores was observed in patients with severe deficiency prior to supplementation. The authors reported a significant negative correlation between vitamin D levels and the severity of dysmenorrhea symptoms, concluding that vitamin D supplementation may be an effective method for reducing symptoms [16].

Similar conclusions were reached by Zeynali et al., who also investigated the relationship between the severity of menstrual pain and serum vitamin D levels in a cohort of young women. A total of 372 participants with mild, moderate, and severe dysmenorrhea were assessed using the VAS, and serum 25(OH)D levels were measured. Among the participants, 26.34% had severe deficiency, 36.55% moderate deficiency, and 37.09% vitamin D insufficiency. A negative correlation was observed between pain intensity and 25(OH)D levels. Furthermore, the study demonstrated a positive association between pain intensity and body fat percentage, as well as hip and waist circumference, while no significant relationship was found between pain and Body Mass Index (BMI) or Waist-to-Hip Ratio (WHR) [17].

In a double-blind, randomized, placebo-controlled trial conducted in 2021, the effect of vitamin D supplementation on systemic symptoms and pain in patients with dysmenorrhea was investigated. The study included 116 regularly menstruating women aged 18–32 years with vitamin D deficiency (<30 ng/mL) who reported menstrual pain of at least 4 on the Numeric Rating Scale (NRS). Participants were randomly assigned in equal numbers (n = 58 per group) to receive either vitamin D supplementation (50,000 IU) or placebo. As expected, serum 25(OH)D levels increased in the supplementation group from approximately 20.0 ng/mL to 37.2 ng/mL; however, 24.0% of participants still exhibited low levels after 8 weeks. A significant reduction in pain intensity was observed in the vitamin D group at both 4 and 8 weeks, whereas no significant changes were noted in the placebo group. No significant difference in pain intensity was found between participants who achieved sufficient 25(OH)D levels and those who remained deficient after 8 weeks. Additionally, the supplementation group showed a significant reduction in the number of days with pain and in the daily use of analgesics, which was not observed in the placebo group. The findings suggest that 8-week supplementation with vitamin D at a dose of 50,000 international units (IU) per week may reduce dysmenorrhea-related pain, regardless of whether full correction of deficiency is achieved. Furthermore, improvements in systemic symptoms, including nausea, vomiting, diarrhea, fatigue, and headache, were reported following vitamin D supplementation [18].

The prospective study by Donayeva et al. included participants aged 12–18 years with normal BMI and regular menstrual cycles who had vitamin D deficiency and primary dysmenorrhea lasting at least six months. Exclusion criteria also included other hormonal disorders and prior supplementation with steroids or vitamin D. In all participants, pelvic abnormalities were ruled out using ultrasonography. The participants received vitamin D supplementation at a dose of 50,000 IU per week for five months, with assessment of its effectiveness conducted at six months. Pain intensity before and after supplementation was evaluated using the VAS and the Multidimensional Verbal Rating Scale (VMS). The mean serum 25(OH)D level increased from approximately 13.5 ng/mL at baseline to 58.4 ng/mL after supplementation. In contrast, VAS and VMS scores decreased from 8.7 and 2.65 to 4.8 and 0.8, respectively. Consequently, the study demonstrated a significant negative association between serum 25(OH)D levels and both VAS and VMS scores [10].

In a study by Donayeva et al., the relationship between serum 25(OH)D levels and primary dysmenorrhea was also investigated, with particular attention to the vitamin D receptor (VDR) polymorphism TaqI (rs731236). The study included a cohort of 415 Asian adolescents aged 12–18 years, divided into a dysmenorrhea group and a control group without the condition. Inclusion criteria comprised a VAS score of at least 5, a BMI below 30 kg/m², and regular menstrual cycles. Vitamin D deficiency was defined as serum 25(OH)D levels below 20 ng/mL. Ultimately, serum 25(OH)D levels were low in both groups, amounting to 16.17 ng/mL in the dysmenorrhea group and 17.65 ng/mL in the control group. Correlation analysis revealed a significant negative association between serum 25(OH)D levels and VAS scores during dysmenorrhea. Furthermore, specific VDR polymorphisms (T/t and t/t), which were associated with significantly lower vitamin D levels, were found to increase the likelihood of painful menstruation [19].

In a prospective study conducted in 2021, the effect of vitamin D supplementation on symptoms associated with leiomyoma was evaluated in a group of women with hypovitaminosis D. The study included 30 premenopausal women with a mean age of approximately 37.16 years, in whom serum vitamin D levels and pain intensity were assessed using the VAS. All participants received vitamin D3 at a dose of 60,000 IU weekly for 8 weeks, followed by 60,000 IU every two weeks for the subsequent 8 weeks. At baseline, the women reported low back and pelvic pain, and the mean serum 25(OH)D level was approximately 17.44 ng/mL. A significant negative correlation was also observed between vitamin D levels and fibroid volume. Assessments were performed after 8 and 16 weeks of treatment. The mean

25(OH)D level increased to approximately 39.8 ng/mL. A significant percentage reduction was observed in blood loss, dysmenorrhea, pelvic pain, and back pain, by 29.89%, 44.12%, 35%, and 50%, respectively; however, no significant differences were found between the 8-week and 16-week measurements. No significant reduction in mean fibroid volume was observed after 16 weeks of supplementation. Nevertheless, an overall improvement in well-being was reported by most participants, with 48% indicating improved self-perceived health. Overall, the study demonstrated that 16-week vitamin D3 supplementation may effectively reduce symptoms associated with leiomyoma. Additionally, lower baseline vitamin D levels were associated with greater treatment response [20].

A single-blind clinical trial conducted in 2016 compared the effects of vitamin D, vitamin E, and ginger supplementation in the treatment of dysmenorrhea symptoms. The study included 200 women aged 18–25 years, who were divided into four groups: vitamin D supplementation, vitamin E supplementation, ginger supplementation, and placebo. Pain intensity in dysmenorrhea was assessed over two consecutive menstrual cycles using the VAS and a questionnaire. The results showed the greatest reduction in mean pain intensity in the ginger group (from 7.08 to 3.72), followed by the vitamin D group (from 7.01 to 5.44) and the vitamin E group (from 7.20 to 5.84). Based on these findings, it was concluded that among the tested interventions, ginger may be the most effective in alleviating dysmenorrhea symptoms, while vitamin D supplementation appears to be more effective than vitamin E in this context [21].

Hosseini et al. also evaluated the use of vitamins D and E in the treatment of dysmenorrhea symptoms, specifically in the context of simultaneous supplementation. In a double-blind, randomized controlled trial, 106 participants with primary dysmenorrhea were randomly assigned to a group receiving a combination of vitamin D (50,000 IU) and vitamin E (400 IU) weekly or to a placebo group. The initial intervention lasted 8 weeks, followed by an additional 2 months during which vitamin D was supplemented on a monthly basis. Supplementation was initiated two days before the onset of menstruation and continued until the fifth day of the cycle. Pain intensity in both groups was assessed before and after supplementation using the Numeric Pain Rating Scale (NPRS). The severity of premenstrual symptoms was also evaluated using the Premenstrual Symptoms Screening Tool (PSST). The NPRS score decreased from an initial value of 7.85 to 3.75. A greater improvement was observed after 4 months of supplementation compared to 2 months. Similarly, the premenstrual syndrome (PMS) score in the intervention group decreased from 32.42 to 9.02, with a more

pronounced improvement after 4 months than after 2 months. The study suggests that combined supplementation with vitamins D and E may be beneficial in alleviating symptoms of dysmenorrhea and PMS. Additionally, an inverse relationship was observed between serum vitamin D levels and pain intensity in dysmenorrhea, suggesting a potential role of this vitamin in the pathophysiology of the condition [22].

The studies described consistently indicate a significant association between serum vitamin D levels and the severity of menstrual pain. They suggest the potential use of vitamin D therapy, which may be helpful in alleviating symptoms of dysmenorrhea. However, limitations related to relatively small study groups should be taken into account, and the need for further research on larger cohorts should be emphasized.

3.2. Vitamin E

Vitamin E, comprising tocopherols and tocotrienols, is the main fat-soluble antioxidant in the human body. It is primarily located within the phospholipid bilayer of cellular membranes. The most clinically relevant form is α-tocopherol, and its main source is the diet. Although clinical manifestations of deficiency are rare, it has been shown that insufficient intake may be associated with an increased risk of inflammatory diseases [23]. In recent years, attention has also been drawn to the role of vitamin E in women's reproductive health [24]. There is also a growing body of research evaluating the effect of its supplementation on menstrual pain [25-28].

A randomized, double-blind, placebo-controlled study conducted by Sadeghi et al. evaluated the effect of supplementation with vitamin E alone, vitamin E combined with omega-3 fatty acids, and omega-3 fatty acids alone on pain in dysmenorrhea. The study included 100 participants aged 18–25 years who assessed pain intensity using the VAS as mild (0–3), moderate (3.1–6), or severe (6.1–10). Participants were then randomly assigned to four groups (n = 25 each): those receiving omega-3 fatty acids only (180 mg EPA and 120 mg DHA), vitamin E only (200 IU), a combination of vitamin E and omega-3 fatty acids, or placebo. Supplementation was administered for two days before and three days after the onset of menstruation, and pain intensity was reassessed after 8 weeks. Ultimately, both vitamin E and omega-3 fatty acids reduced pain intensity in dysmenorrhea, with decreases from approximately 7.93 to 6.03 and from approximately 7.89 to 6.00, respectively. However, the

greatest effect was observed with the combined supplementation, which reduced the mean pain intensity from approximately 7.00 to 4.09 [25].

Bahrami et al. evaluated the relationship between menstrual cycle irregularities and serum levels of vitamins E and A. The study included a cohort of 897 adolescent girls, divided into groups with primary dysmenorrhea (n = 322), PMS (n = 134), both conditions (n = 293), and healthy controls (n = 148). Serum levels of vitamins A and E were assessed, showing that participants with prolonged menstrual bleeding had lower levels of vitamin E compared to those with a normal duration of menstruation. However, no significant association was found between serum vitamin E levels and the presence of PMS or primary dysmenorrhea. In contrast, an inverse relationship was observed between vitamin A levels and the occurrence of PMS [26].

A randomized, placebo-controlled clinical trial conducted in 2021 evaluated the effect of vitamin E and vitamin C supplementation on pain reduction in women with endometriosis, as well as their impact on oxidative stress markers. Women aged 15–45 years were randomly assigned to either a group receiving a combination of vitamin E (800 IU/day) and vitamin C (1000 mg/day) or a placebo group. Pain intensity was assessed using the VAS before the study and subsequently every two weeks over an 8-week period. It was observed that 8 weeks of combined vitamin C and vitamin E supplementation significantly reduced pain intensity on the VAS. Furthermore, the combination significantly decreased levels of malondialdehyde and reactive oxygen species, without affecting total antioxidant capacity. These findings suggest that the analgesic effect of these vitamins may be related to their antioxidant properties [27].

An interesting approach was presented by Mohammadzadeh et al., who compared the effect of vitamin E supplementation with acupressure at the Spleen-10 (SP-10) point on pain intensity in primary dysmenorrhea. In this quasi-experimental study, 70 young women were divided into a group treated with acupressure (20-minute sessions) and a group receiving vitamin E supplementation. Pain intensity was assessed using the VAS at the onset of pain and immediately after the intervention. The interventions were performed over two consecutive menstrual cycles. The results indicated a significant reduction in pain intensity in both groups; however, no statistically significant difference in pain reduction was observed between them. In the vitamin E group, pain intensity decreased from 6.14 at baseline to 5.83 after the first intervention and to 3.80 after the second. In the acupressure group, the corresponding values were 6.17, 5.48, and 3.89, respectively. However, the interpretation of the results should take

into account the study's limitations, such as the lack of random assignment of participants to groups and the self-reported nature of the outcome measures [28].

The results of the studies evaluating the effectiveness of vitamin E in the management of dysmenorrhea are not consistent. Most of them suggest a potential benefit of its supplementation in this condition, particularly when used in combination with other components such as omega-3 fatty acids or vitamin C. This effect is likely related to its antioxidant properties. However, some studies do not confirm a significant association between vitamin E and the severity of menstrual pain. Due to the still limited number of studies addressing this topic, as well as their limitations - such as small sample sizes and variability in supplementation protocols - further well-designed studies in this field are required.

4. Discussion

The pathophysiology of primary dysmenorrhea involves increased secretion of prostaglandins F2α and E2 in the uterus. During endometrial exfoliation, as progesterone levels decline, there is an increase in prostaglandin synthesis, which intensifies uterine contractility and constricts blood vessels, resulting in ischemia and hypoxia of the uterus. Consequently, the release of anaerobic metabolites and inflammatory mediators stimulates pain receptors and induces peripheral nerve hypersensitivity. Women with dysmenorrhea present higher prostaglandin levels [2, 29–33]. Increased markers of oxidative stress - particularly lipid peroxidation - and a relative deficiency of antioxidants have been observed in women with primary dysmenorrhea, which may exacerbate inflammation and pain [34-35].

Vitamin D reduces inflammation by decreasing prostaglandin production in the uterus through the inhibition of cyclooxygenase-2 and prostaglandin receptor expression, as well as by increasing prostaglandin degradation via 15-dehydrogenase. Additionally, it inhibits the cascade of inflammatory cytokines, such as IL-1β, IL-6, TNF-α, and IL-8, by regulating intracellular signaling pathways. Vitamin D-dependent calcium homeostasis plays a role in modulating uterine contractility by reducing contractions induced by Ca^{2+} influx through L-type channels [36-37]. The expression of the VDR in normal endometrium and ovaries supports the activity of vitamin D and its role in local immunity and inflammatory cytokine regulation [19]. Reduced prostaglandin production, inhibition of inflammatory cytokines, and decreased contractility all contribute to a pain-relieving effect [19, 36–37].

The activity of vitamin E is based on its role as a potent lipid-soluble antioxidant. By maintaining the integrity of long-chain polyunsaturated fatty acids in cell membranes, it helps preserve their bioactivity by limiting the peroxidation of membrane phospholipids [38]. Additionally, vitamin E can modulate arachidonic acid metabolism, partly by inhibiting its secretion and by influencing the lipoxygenase pathways, which may affect the production of prostaglandins and other eicosanoids [11].

The results of the studies appear to be consistent, indicating that lower serum 25(OH)D concentrations are associated with higher scores on pain assessment scales. Regarding vitamin E, the results of studies on its supplementation for dysmenorrhea appear to be less consistent.

In the studies, vitamin D deficiency was defined as a serum 25(OH)D concentration <30 ng/mL or <20 ng/mL [16–18,19]. Pain intensity was measured using the VAS, NRS/NRPS, or VMS scales [10,16–22]. The vitamin D supplementation dose was adjusted according to the baseline 25(OH)D concentration or was 50,000–60,000 IU weekly for 8 weeks to 5 months [10,16,18–20,22]. Serum vitamin D concentrations and pain assessment were performed after a follow-up period ranging from 4 weeks to 6 months [10,16,18-22]. Vitamin D supplementation, which increased serum 25(OH)D levels, resulted in significant relief of menstrual pain, as indicated by lower scores on the VAS, NRS, or VMS scales in groups with varying degrees of 25(OH)D deficiency [10,16,18–22]. Women with lower baseline vitamin D concentrations showed a better response to treatment [16,20]. A significant reduction in menstrual pain following supplementation was not dependent on full correction of vitamin D deficiency [18]. Supplementation was also associated with a reduction in the number of days with pain, a decreased use of painkillers, and an improvement in systemic symptoms such as gastrointestinal complaints, fatigue, and headache [18]. Furthermore, one study reported a decrease in menstrual bleeding, pelvic and back pain, and an improvement in patients' well-being and subjective perception of health [20]. VDR polymorphisms (T/t and t/t), associated with significantly lower vitamin D levels, increased the probability of painful menstruation [19]. In one study comparing the effects of ginger, vitamin D, and vitamin E, ginger was shown to be the most effective in alleviating dysmenorrhea, while vitamin E was the least effective [21]. Simultaneous supplementation with vitamins D and E demonstrated a positive effect in alleviating painful menstruation and PMS, with a more significant improvement after 4 months than after 2 months [22]. Detailed data are presented in Table 1.

Author, year	Title	Objective	Study population	Type of study	Assessment method	Supplementation period and dose	Results
Kucukceran et al., 2019 [16]	*The impact of circulating 25-hydroxyvitamin and oral cholecalciferol treatment on menstrual pain in dysmenorrheic patients*	To assess vitamin D levels in patients with primary dysmenorrhea and to evaluate the effect of vitamin D supplementation on its symptoms	100 female patients (18-30 years) with primary dysmenorrhea, no history of another disease, and 25(OH)D level <30ng/mL	Observational study	VAS	Replacement therapy administered for 2 months depending on 25(OH)D level: * Insufficient (21–29 ng/mL): 8–7 drops of vitamin D3/day * Deficient (10–20ng/mL): 15–19 drops of vitamin D3/day * Severely deficient (<10ng/mL): 16–23 drops of vitamin D3/day. Maintenance treatment administered for 1 month: 6 drops of vitamin D3/day.	A significant negative correlation was found between vitamin D levels and symptoms associated with dysmenorrhea. Decreased 25(OH)D levels were associated with increased VAS scores (r = 0.320; p = 0.002). A significant reduction in VAS scores was observed following vitamin D treatment. Vitamin D replacement therapy led to a significant alleviation of primary dysmenorrhea symptoms.
Zeynali et al., 2019	*Is there a relationship between*	To assess the relationship	372 women (<30 years old) with	Descriptive-analyti	VAS	No supplementation was administered in this	A negative correlation was found between serum 25(OH)D levels

[17]	*serum vitamin D with dysmenorrhea pain in young women?*	between the severity of menstrual pain and serum vitamin D levels in a group of young women	dysmenorrhea	c study		study.	and pain indices (PV: 0.044).
Rahnemaei et al., 2021 [18]	*Vitamin D supplementation for primary dysmenorrhea: a double-blind, randomized, placebo-controlled trial*	To assess the effect of vitamin D supplementation on systemic symptoms and pain in patients with dysmenorrhea	116 female students (18-32 years old) with primary dysmenorrhea and vitamin D deficiency (25 (OH)D <30 ng/mL)	Double-blind, randomized, placebo-controlled trial	NRS	Participants received capsules containing 50,000 IU of vitamin D3 (cholecalciferol) or a placebo every week for 8 consecutive weeks.	Participants taking vitamin D showed a significant reduction in pain intensity ($p < 0.001$), the number of days with pain ($p < 0.001$), the number of pain medications taken ($p < 0.001$), and the severity of systemic symptoms ($p < 0.001$).
Donayeva et al., 2023 [10]	*The effect of vitamin D on adolescents' primary dysmenorrhea*	To evaluate the effect of vitamin D on adolescents' primary dysmenorrhea and the	85 adolescent girls (12-18 years) with regular menstrual cycles, normal BMI (18.5-24.9 kg/m2),	Prospective cohort study	VAS and VMS	50,000 IU of vitamin D weekly for 5 months	A significant negative association between serum 25(OH)D levels and scores on both the VAS and VMS scales was demonstrated.

		relationship between vitamin D and adolescents ' primary dysmenorrhea	experiencing primary dysmenorrhea for ≥ 6months and having vitamin D deficiency				
Donayeva et al., 2023 [19]	*Vitamin D and vitamin D receptor polymorphism in Asian adolescents with primary dysmenorrhea*	To detect the relation between serum 25(OH)D and primary dysmenorrhea in Asian Adolescents	205 adolescents complaining of primary dysmenorrhea (study group) compared to matched controls (210 controls)	Prospective study	VAS	No supplementation was administered in this study.	Serum 25(OH)D concentrations were significantly lower in the group of patients with dysmenorrhea compared with the control group. Patients with dysmenorrhea who had VDR T/t and t/t (TaqI) genotypes had significantly lower serum 25(OH)D concentrations compared to the control group. The VDR T/t and t/t polymorphisms significantly increase the risk of primary

							dysmenorrhea.
Suneja et al., 2021 [20]	*Effect of Vitamin D3 Supplementation on Symptomatic Uterine Leiomyoma in Women with Hypovitaminosis D*	To evaluate the effect of Vitamin D3 on symptoms, uterine and leiomyoma volume in women with symptomatic leiomyoma and hypovitaminosis D	30 premenopausal women with uterine leiomyoma and concomitant hypovitaminosis D (<30 ng/mL)	Pilot, interventional, prospective study	VAS	60,000 IU of vitamin D3 weekly for 8 weeks, followed by 60,000 IU every 2 weeks for the next 8 weeks	A significant negative correlation was observed between baseline 25(OH)D levels and the volume of leiomyomas ($p < 0.001$). A significant reduction in menstrual blood loss, as well as a reduction in the severity of dysmenorrhea, pelvic pain, and back pain was observed after 16 weeks of vitamin D supplementation.
Pakniat et al., 2019 [21]	*Comparison of the effect of vitamin E, vitamin D and ginger on the severity of primary dysmenorrhea: a single-*	To investigate the individual effects of vitamin E, vitamin D and ginger supplementation on dysmenorrh	200 female medical students (18-25 years old) suffering from moderate to severe dysmenorrhea, with regular menstrual cycles of 21-35 days, menstrual period of 3-7 days, and	Single-blind clinical trial	VAS	The participants were divided into 4 groups: * Ginger group: 500 mg of ginger per day * Vitamin E group: 100-unit of vitamin E * Vitamin D group: dose reported as 1,000 mg of vitamin D in original study	The mean reduction in pain intensity on the VAS scale after the first and second months of supplementation was 3.36, 1.56, and 1.36, and 3.88, 1.8, and 1.88, respectively, in the groups taking ginger, vitamin D, and vitamin

	blind clinical trial	ea	generally in good health			* Placebo group: a placebo capsule Each group was additionally given 250 mg of mefenamic acid twice daily	E ($p < 0.05$) Ginger was the most effective of the supplements administered in alleviating dysmenorrhea. Vitamin D appeared to be more effective than vitamin E.
Hosseini et al., 2025 [22]	*Effect of vitamin D and E supplementation on pain relief and premenstrual symptoms in primary dysmenorrhea: a randomized controlled trial*	To investigate the effects of vitamin D and E supplements combination on pain intensity and premenstrual symptoms in individuals with primary dysmenorrhea	106 women with a regular menstrual cycle, primary dysmenorrhea and serum 25(OH)D level ≤ 30 ng/mL	Double blinded randomized controlled trial	NPRS	Participants in the intervention group received 400 IU of vitamin E daily and 50,000 IU of vitamin D once a week for 8 weeks. After the first 8 weeks, participants continued to take vitamin D tablets once a month for the next two months. Supplementation began two days before the onset of menstruation and continued until the fifth day of menstruation.	After 4 months of vitamin D supplementation, the NPRS score decreased from 7.68 to 6.02 in the control group and from 7.85 to 3.75 in the intervention group. A significant inverse relationship was found between vitamin D levels and menstrual pain (Pearson correlation coefficient = 0.768, P-value = 0.001).

Table 1. Summary of studies on vitamin D supplementation for the treatment of dysmenorrhea included in the narrative review.

Vitamin E has been studied as a single supplement [25,28], as well as in combination with omega-3 fatty acids [25] and vitamin C [27]. Additionally, research has been conducted on the relationship between vitamin E and menstrual cycle irregularities, PMS [26], pain in patients with endometriosis, and its effect on markers of oxidative stress [27]. Vitamin E was administered at a dose of 200–800 IU. Pain intensity was assessed after 8 weeks of supplementation or 2 consecutive menstrual cycles. Assessments were made using the VAS scale. Studies have shown that vitamin E may reduce the severity of pain associated with dysmenorrhea [25,27,28]. The combination of vitamin E with omega-3 fatty acids demonstrated a better pain-relieving effect than each of these substances alone [25]. The combination of vitamin E with vitamin C also significantly reduced pain intensity and additionally lowered levels of reactive oxygen species and malondialdehyde [27]. Conversely, in another study, the presence of primary dysmenorrhea was not significantly associated with vitamin E levels. However, lower concentrations of vitamin E were associated with prolonged menstrual bleeding [26]. The antioxidant effect of vitamin E is noted, which may contribute to alleviating the symptoms of painful menstruation [27].

Author, year	Title	Objective	Study population	Type of study	Assessment method	Supplementation period and dose	Results
Sadeghi et al., 2018 [25]	*Vitamin E and fish oil, separately or in combination,*	To investigate the adjuvant effect of vitamin E and	100 female students (18-25 years old) with primary dysmenorrhe	Randomized double-blinde	VAS	Participants were divided into 4 groups, receiving: * 300 mg of omega-3	A significant reduction in menstrual pain in the intervention groups was noted.

	on treatment of primary dysmenorrhea : a double-blind, randomized clinical trial	omega-3 fatty acids, separately or in combination, supplements on pain in the treatment of primary dysmenorrhea	a	d placebo-controlled trial		(180 mg EPA and 120 mg DHA) * 200 IU vitamin E * 300 mg of omega-3 (180 mg EPA and 120 mg DHA) and 200 IU vitamin E * placebo. Supplementation was administered for 5 days (2 days before and 3 days after the beginning of menstruation).	The strongest effect on menstrual pain was observed in the group receiving a combination of vitamin E and omega-3 fatty acids.
Bahrami et al., 2020 [26]	*Menstrual problems in adolescence: relationship to serum vitamins A and E, and systemic inflammation*	To investigate the associations between vitamins A and E concentrations and biomarkers of inflammation and antioxidant status with menstrual characteristics, primary dysmenorrhea and PMS in healthy adolescents	897 adolescent girls suffering from PMS (n = 134), primary dysmenorrhea (n = 322), PMS and primary dysmenorrhea (n = 293) or healthy adolescents	Cross-sectional study	Self-reported questionnaire	No supplementation was administered in this study.	The group with prolonged menstrual bleeding had lower mean serum vitamin E concentrations compared with the group with normal menstrual bleeding duration ($P < 0.05$) No association was found between serum vitamin E concentration and the presence of PMS or

			(n = 148)				primary dysmenorrhea.
Amini et al, 2021 [27]	*The Effect of Combined Vitamin C and Vitamin E Supplementation on Oxidative Stress Markers in Women with Endometriosis: A Randomized, Triple-Blind Placebo-Controlled Clinical Trial*	To assess the role of supplementation with antioxidant vitamins on the indices of oxidative stress as well as the severity of pain in women with endometriosis	60 reproductive-aged women (15–45 years old) with pelvic pain and 1–3 stages of laparoscopic-proven endometriosis	Randomized, Triple-Blind Placebo-Controlled Clinical Trial	VAS	Participants were randomized into 2 groups, who were given the following daily for 8 weeks: * a combination of vitamin C (1000 mg/day, 2 tablets of 500 mg each) and vitamin E (800 IU/day, 2 tablets of 400 IU each) * placebo pills.	Vitamin C and vitamin E supplementation effectively reduces markers of systemic oxidative stress in women with endometriosis. Administration of a combination of vitamin C and vitamin E statistically significantly reduced levels of malondialdehyde ($p = 0.002$) and reactive oxygen species ($p < 0.001$) compared to placebo, but did not affect overall antioxidant capacity.
Mohammadzadeh et al., 2022 [28]	*Comparing the Effect of Acupressure at the Spleen-10 (Xuehai) Acupoint and Vitamin E on Primary Dysmenorrhea*	To assess the effect of acupressure at Spleen-10 (SP-10), compared to vitamin E on the pain severity of primary dysmenorrhea	70 female students (18-26 years old) with primary dysmenorrhea (VAS score ≥4), regular menstrual cycles, good general health, and	Quasi experimental study	VAS	The participants were divided into 2 groups: * acupressure group, receiving a 20-minute acupressure treatment at the SP-10 point on both legs * vitamin E group, given 1 capsule containing 200 IU of	Vitamin E resulted in a significant reduction in pain intensity among patients with primary dysmenorrhea. No statistically significant difference in pain reduction was observed between the

			no reproductive system disorders			vitamin E. In both groups, the procedures were performed over the course of 2 consecutive menstrual cycles.	group receiving vitamin E and the group undergoing acupressure at the SP-10 point.

Table 2. Summary of studies on vitamin E supplementation for the treatment of dysmenorrhea included in the narrative review.

This narrative review has several limitations. When interpreting the results, limited statistical significance and the possible generalization of findings should be considered due to the relatively small samples in most of the included studies. Differences in vitamin doses, duration, and supplementation regimens limit the direct comparability between studies. The inherent subjectivity of menstrual pain perception and the use of various tools for its assessment may also complicate the comparability of pain severity measurements and increase the risk of measurement bias. No clear conclusions are possible due to the lack of standardized protocols regarding dosage and duration of supplementation, outcome assessment, and follow-up, which reduces the overall consistency of the evidence. Further research in this field is needed, including larger randomized controlled trials with standardized supplementation protocol, as well as investigation of underlying mechanisms and the role of genetic factors (e.g. VDR polymorphisms).

5. Conclusions

With growing interest in alternative treatment methods for dysmenorrhea, vitamin supplementation appears to be a promising therapeutic approach. The presented studies indicate a significant association between higher serum vitamin D levels and reduced severity of menstrual pain, also suggesting a potentially beneficial effect of its combination with vitamin E. In the case of vitamin E, study results remain inconclusive - most suggest possible benefits,

particularly when combined with omega-3 fatty acids or vitamin C, which may be related to its antioxidant properties. However, some studies do not confirm a significant association between serum vitamin E levels and menstrual pain severity. Further studies conducted on larger cohorts are necessary to confirm the effectiveness of vitamin D and E supplementation and to establish optimal supplementation regimens. In the future, such supplementation may represent a valuable adjunct to standard dysmenorrhea therapy.

Disclosure Section

Conceptualization: K.C., P.B.; methodology: B.P., A.D.; investigation: K.C., P.B, B.P., A.D, N.P., D.P..; resources N.P., D.P.; writing—original draft preparation: K.C., P.B., B.P., A.D., N.P., D.P.; writing—review and editing: K.C., P.B; visualization: B.P., A.D.; supervision: K.C., P.B.

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