

The effects of Pilates exercise and caraway supplementation on the levels of prostaglandin E₂ and perception dysmenorrhea in adolescent girls non-athlete

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ABSTRACT: Menstrual fact inevitable part of the lives of young women across the world. The aim of this study was to investigate the effect of eight weeks of training Pilates and caraway supplementation in reducing dysmenorrhea in adolescent girls was inactive. Research method is quasi-experimental. For this purpose, 44 subjects with age range 13-15 years, were randomly selected and then randomly divided into four groups: pilates +supplements (n=11), supplements (n=11), pilates (n=11) and control (n=11). Physiological variables and the pain in two stages of pre-test and post-test were measured using the McGill Pain Questionnaire. Blood samples to measure blood levels of PGE₂ was done in the 48 hours before and after training. The results showed that after eight weeks of supplementation with Pilates exercise Cumin pain in the three experimental groups decreased significantly ($P \leq 0.05$). Also prostaglandin E₂ levels in the experimental groups Pilates and Pilates with caraway supplements decreased significantly ($P \leq 0.05$). All the variables in the control group during the period, did not change significantly. Pilates exercises with supplementation better cumin or caraway supplements alone to improve blood variables and reduce the perception of pain during menstruation is secondary girls ($P \leq 0.05$). The eight-week Pilates exercise with caraway supplementation reduces the perception of pain, levels of prostaglandin E₂ teenage girls during menstruation is disabled.

KEY WORDS: Pilates exercise, supplements cumin, menstruation, dysmenorrhea, prostaglandin E₂

INTRODUCTION

Menstruation is one of the stages of puberty in girls. The girls are from the age of 16-8 and the average age of menarche is 12 years. The amount of bleeding in a menstrual period is 130-50 ml per day. The length of the menstrual period is 7-3 days (4).

Dysmenorrhea is very common and about 50% of women have experienced some degree of it. Dysmenorrhea is divided into two primary and secondary types. Initial dysmenorrhea starts at the same time or hours before starting menstruation and lasts for 12 to 72 hours, similar to labor pain associated with suprapubic cramps. Secondary dysmenorrhea is a pain caused by an organic pelvic or non-pelvic cause (13).

The mechanism of primary dysmenorrhea is the reduction of progesterone in the late stages of the luteal phase, which results in rupture of lysosomes and subsequent release of phospholipase A₂ from the

endometrium. Phospholipase A₂ also increases prostaglandins (18). The concentration of prostaglandins FA₂, E₂ is related to the severity of dysmenorrhea. In general, women with higher levels of prostaglandin FA₂, E₂ in their menstrual fluid period experience severe degrees of pain (4). Primary painful menstruation is due to decreased progesterone and vasoconstriction of uterine and ischemic muscles, usually 2 to 3 years after the menarche (7).

One of the ways to improve dysmenorrhea without side effects is exercise and physical activity. Pilates exercise is a collection of specialized exercises and a combination of both elements of the body and mind. In this method, the exercise focuses on the center of the body, including the abdomen, the pelvis, and the spine. The main purpose of these exercises is to increase strength, flexibility, endurance, balance and physical condition. In fact, Pilates exercise is a suitable method for practicing mind-body awareness and controlling state movements. The

effect of these types of exercises was shown on health-related fitness indicators and increased immunoglobulins and sex hormones of female students (16).

In various studies, stretching exercises and aerobic exercises have been introduced as useful exercises to improve dysmenorrhea (17). Physical activity improves the symptoms of menstruation (increased pain tolerance, decreased anxiety, depression and other problems) by increasing endorphins and decreasing adrenal cortisol (16). Aerobic exercise improves depression and psychological problems by increasing β -endorphin levels (20). Aerobic exercises activate beta-endorphins and relieve pain (4).

Pilates exercises have a more positive effect on reducing the symptoms of premenstrual syndrome compared to aerobic exercises (16). Homemade exercise (walking or cycling) can significantly improve the pain of primary dysmenorrhea in women (12).

The most common side effect of prostaglandin-inducing drugs is mild digestive discomfort as nausea, indigestion and vomiting. With these interpretations, they turned to herbal medicines and vitamin therapy (8). Among the plants traditionally used to treat menstrual disorders such as dysmenorrhea, the cumin is a *cuminum cyminum* plant. Green cumin is a one-year-old herb with a very fragrant smell and a bitter, bitter taste. This plant is native to Egypt but it is found in different parts of Iran. The part used for this plant is seed containing 5% essential oil. Among the compounds present in this plant are trappen, called karun or mirsen, limonen, alpha and beta pinn. Studies have shown that alpha and beta nuclide have anti-inflammatory properties, and that caron and limonene also deal with the effects of prostaglandins. This herb is recommended in traditional Iranian medicine sources and in the Bible Medical Herbs for colic, dysmenorrhea, amenorrhea, inflammation and spasticity, and postpartum problems. Cumin is used in modern medicine to treat indigestion, breastfeeding, painful menstruation and to regulate menstruation. Cumin is a non-toxic and edible spice and has not been mentioned in the available sources and there is no drug interference from the concomitant use of this herb with drugs (14).

Cysts are used with antispasmodic mechanism for the treatment of chest pain and colic and pain in menstruation (19). Alcoholic extracts of cumin on isolated male guinea pigs have antispasmodic effects (2). The cumin capsule can reduce the severity of IUD-induced menstrual pain similar to that of the mefenamic acid capsule (14). Considering the potential effect of Pilates and complementary cumin on pain relief, since the present study did not investigate simultaneously the triple effects of Pilates, Cumin and Dysmenorrhea, the aim of this study was to determine the effects of Pilates exercises with supplementation Black cumin is inactive for reducing the menstrual pain of adolescent girls.

METHODS

The present study was a semi-experimental design with pretest-posttest design with control group. A statistical sample of this study included 44 subjects with menstrual pain in the age range of 15 to 13 years old. They were selected by targeted selection after assessing pain severity (based on the McGill Pain Questionnaire). The criteria for entering the research were: A) having dysmenorrhea. B) Single and within the range of 15 to 13 years of age. (C) Be healthy and non-athlete. D) Do not have a history of specific disease and use drugs that affect the factors. To obtain a valid license in order to conduct the research, the consent of the participants in the research project was obtained from the subjects. Prior to the start of the research, the subjects were given relative knowledge about the method and method of performing the research. Then, for measuring the pain caused by dysmenorrhea, the McGill Pain Questionnaire and the level of PGE2 levels were measured by blood tests and by a high-sensitivity monolithic kit of the German country. The questionnaire is valid due to standardization. To assess the reliability of the questionnaire, Cronbach's alpha coefficient was used. The alpha coefficient for all dimensions ranged from 0.83 to 0.87, indicating a good reliability. Subsequently, 44 subjects were randomly divided into three experimental groups (Pilates, Supplement and Pilates with Complement) in each experimental group of 11 patients and one control group ($n = 11$). Pilates group subjects, Pilates training program included eight weeks and three sessions per week for 60-45 minutes. The supplement group also received 20 drops of cumin extract for eight weeks every eight hours, the Pilates group with supplements completed a combination of both complement and pilates. The control group was asked to not engage in any regular or non-regular sport during the implementation of the research. At the end of the study, data were collected by a questionnaire and a blood test. The conditions at this stage were like the first stage.

In this study, we used the Kolmogorov-Smirnov test (KS) and the natural variance of the groups in the study to verify the data of the groups. We used Levin's test. To compare the mean of the four groups in the pre-test, compare the mean difference between the pre-test and the post-test of each four groups, data analysis and significance difference were used by One Way ANOVA. After analyzing the variance test, Tukey's post hoc test was used to examine the differences. The t-test was used to compare the difference from the post-test stage. The significance level is less than 0.05. All calculations and statistical operations were performed using SPSS-20 computer software.

STATISTICAL RESULTS

Participants were between the ages of 13 and 15. ($M = 13.72 \pm 0.77$ years). The results of the Kolmogorov-Smirnov test (K-S) showed that the data are normal. Comparisons within groups (pretest to posttest) were conducted using the Student t-test for normally distributed data, while

comparisons among four groups (Pilates, supplemented with Pilates , supplementation and control) were conducted using the one-way analysis of variance (ANOVA) that were presented in Table.1. There was a significant difference between the amount of pain perception from pretest to post-test in the Pilates groups ($p = 0.0001$), supplementation ($p = 0.0001$) and Pilates + supplementation ($p = 0.0001$). Also there was a significant difference between the levels of PGE2 levels from pretest to post-test in Pilates groups ($p = 0.0001$) and Pilates + Supplement ($p = 0.002$). But there was no significant difference between the amount of pain perception ($P = 0.676$) and the level of PGE2 ($P = 0.875$) in the control group. ANOVA test showed that there was no significant difference between the mean of pain perception before the beginning of the exercise and the use of black parasite in the groups, but after training and using the complement of cumin, the mean of pain perception in the groups was statistically significant has it ($P = 0.001$). According to the results of Tukey's post hoc test, supplementation and exercise with supplements have significantly reduced pain perception compared to the control group ($p = 0.001$). Comparison of pain perception in Pilates experimental groups with control ($p = 0.0001$), supplemented with Pilates + supplementation ($p = .008$), supplemented with control (p

$= 0.0001$), Pilates + supplemented with control ($p = .0001$). Comparison of pain perception in Pilates experimental groups with supplementation ($P = 0.404$), Pilates experiment with Pilates + supplementation ($p = 0.272$) was not significant. ANOVA test showed that there was no significant difference between the mean level of PGE2 levels before the beginning of exercise and the use of black matter in the groups, but after training and using the complement of cumin, the mean level of PGE2 levels in the groups was statistically significant has ($P = 0.001$) it. Comparison of PGE2 levels in Pilates experimental groups with Pilates + Supplement ($p = 0.007$), supplementation with Pilates + Supplement ($p = .0001$), Pilates + Supplement with Control ($p = 0.0001$) was significant. Comparison of levels of PGE2 levels in Pilates experimental groups with supplementation ($P = 0.676$), Pilates experimental groups with control ($P = 0.404$) and complementary control groups ($p = 0.969$) was not significant. In general, the results after 8 weeks of using cumin supplements and training indicate that there is a significant difference in the level of perceived pain and PGE2 levels from pre-test to post-test in experimental groups, but there is no significant difference in control group.

Table 1

Effect of Pilates Training and Supplements Cumin on PGE2 levels and Pain Score

Groups	Pilates		supplements		Pilates+ supplements		Control		P-value
	Pre. Test (M±SD)	Diff. (M±SD)	Pre. Test (M±SD)	Diff. (M±SD)	Pre. Test (M±SD)	Diff. (M±SD)	Pre. Test (M±SD)	Diff. (M±SD)	
PGE2 levels	5.34 ± .99	-3.162 Δ†	5.57±1.04	-1.550 †	5.61±.92	-4.316 Δ*■●	5.26±.86	-.161 †	0.0001
pain score	40 ± 3.16	-24.48 Δ*	39.45±2.76	-19.24 Δ*†	40.18±2.67	-21.46 Δ*■	39.72±2.72	-.430 ■†●	0.0001

* $P < 0.05$ versus control; ● $P < 0.05$ versus Pilates; † $P < 0.05$ versus Pilates+ supplements; ■ $P < 0.05$ versus supplements Δ $P < 0.05$ pretest versus post test

DISCUSSION

Dysmenorrhea is one of the most problematic issues in women and can be considered as one of the most common causes of women's referral to a physician; therefore, the use of a treatment that can have less side effects while having the same efficacy than the cost of treatment greatly reduces. Since some people with dysmenorrhea do not respond to commonly used therapies, and drugs that have a good therapeutic response are usually severe side effects, there is still no need for new

therapies in this area. For this reason, we tried to investigate Pilates exercises and use of cumin seed herb in this study.

The results of this study indicated that the mean score of pain before exercise and the use of complementary cumin in four groups of Pilates, supplementation, Pilates exercises with supplementation and control were not significantly different, but after training and using complementary cumin Black mean score of pain was significantly decreased. Also, the mean score of pain score in Pilates and Pilates +

supplementation was lower than only supplemental and in all three groups lower than control group. Regarding the results, it seems that the effect of Pilates training with supplementation of Cumin on pain reduction is related to the probable supplementation of Cumin and Pilates exercises in relieving pain. The effect of complementary black cumin may secondarily be related to its spasmolyticity due to the presence of compounds in the cumin, which is a kind of terpene, called caron or mirsen, limonene, alpha and beta nuclide. Alpha and beta nuclide have anti-inflammatory properties, and Karun and Limonen also deal with the effects of prostaglandins, which reduce pain. Studies have also shown that black cumin is able to control the contraction of smooth uterine muscle due to oxytocin and prostaglandin, which can also reduce pain. In addition, new studies have shown that complementary anti-spasm effects of cumin blacken through contraction of the prostaglandin (11). Regular muscle contractions also contribute to angioedema in physical activity, resulting in prostaglandin it increases the amount of other substances and prevents accumulation in the pelvis and reduces the back pain and abdominal discomfort. Therefore, Pilates exercises, which are a series of muscle contractions, also contribute to the muscular endurance of the abdominal region and, on the other hand, help the movement of prostaglandin, which can reduce muscle pains in the upper body, especially the abdomen and lower back. On the other hand, the positive effects of Pilates exercises on physical symptoms can also be justified from another point of view. Through deep breathing exercises and aperture in Pilates exercises, the level of epinephrine light hormone decreases during rest and in turn can decrease the beat rate the heart and blood pressure rest at rest; hence, these exercises can be useful for reducing the heartbeat of people with dysmenorrhea. Increasing renin-angiotonid activity and decreasing estrogen and progesterone levels have been mentioned as factors affecting serum level of aldosterone at the end of luteal phase. Increasing the serum level of aldosterone leads to increased sodium and water reabsorption and, consequently, edema and the appearance of physical symptoms. According to Neo et al., 10 weeks of Pilates training led to a significant increase in immunoglobulin and progesterone hormone (10.). On the basis of this, it is likely that these exercises will reduce the level of renin and increase estrogen and progesterone. As a result, the level of aldosterone and as a result of sodium reabsorption and water reabsorption decreases and thus reduces edema and improves physical symptoms (21).

The results of this study were consistent with the results of research in reducing pain and physical symptoms. The results of this study showed that supplementation of Cumin with Pilates exercises had a greater effect on reducing the amount of pain perception, which was similar to the results of Zoorob(21), Tavassoli(19)and Hejazi(3) research.

Zoorob extract of a herbal combination of cumin, thyme and marijuana can relieve the pain of menstruation (21). Cysticulus capsule delivery has been effective in reducing the pain of menstruation (19).

Hejazi et al. Also examined the effect of daily intake of 3,000 milligrams of green cumin compared with the daily consumption of 600 mg ibuprofen in students with primary dysmenorrhea. This study showed that both drugs had a similar effect in reducing menstrual pain (3). Therefore, the combination of Pilates and Cumin Supplement can be a more effective factor in reducing the amount of pain in menstruation.

In the present study, the positive effect of exercise on reducing the amount of pain perception was observed, which is consistent with the results of Omidali(11), Saadat Abadi and colleagues (15). Omid Ali showed that Pilates exercises with fennel extract can have favorable effects on symptoms of premenstrual syndrome in four weeks (11). By increasing the flexibility of the abdominal and pelvic muscles, the spasticity and contractility of the muscles decrease, and as a result, the pain decreases. Therefore, considering the nature of Pilates exercises that focus on the elasticity and elasticity of the muscles, in particular of the pelvic floor muscles, the exercise may reduce the severity of the menstrual pain, so that Saadat Abadi and his colleagues examined the effect of a six-week training program, including stretching The abdominal, waist, hamstring and hip joints showed a significant decrease in the amount of menstrual pain (15).

There was little research about PGE2 levels, or the researcher could not find any further research, the research might be limited to the PGE2 levels of the difference in menstrual cycle and the difficulty accessing subjects with menstrual cycles, but the research results It was suggested that although in the mean score of the levels of prostaglandin E2 levels before exercise and the use of complementary cumin, there was no significant difference between the four groups of Pilates, supplementation of Cumin, Pilates with complementary cumin and control, but after training and the use of complementary cumin means the average of the levels of prostaglandin in Pilates and Pilates + supplements religious groups had a significant decrease. The highest decrease was observed in the Pilates + supplementation group.

Regarding the results, it seems that the effect of Pilates training with supplementation of Cumin on the reduction of the levels of prostaglandin E2 to the probable mechanism of cumin and Pilates training is related to the relief of pain. According to Khan et al., A 12-week combined Pilates, Tai Chi and Yoga training program in 34 adults increased flexibility and muscle strength in the waist, weight loss, body mass index, fat percentage (hips) and anxiety (6). Occurrence of physical symptoms such as swelling, weight gain, headache, breast pain may be related to increased activity in the system of aldosterone-renin-angiotensin, prolactin, prostaglandin E2, vitamin B6 deficiency and magnesium (5). Repeated muscle contraction in physical activity can help to reduce the vaginal

reversibility and thus increase the movement of prostaglandins and other substances and prevent their aggregation in the pelvic region and reduce back pain and abdominal discomfort (1). The present study was observed Pilates exercise combined with cumin supplementation reduced the levels of prostaglandins during menstruation in non-athletic teenage girls.

Considering that dysmenorrhea affects the occupational, social, and interpersonal and familial relationships of girls and women, research is a research project that studies the effect of dysmenorrhea on the individual and social life of non-athlete girls. Regarding the results of Pilates training alone and complementary to cumin and Pilates exercises, they managed to reduce the severity of symptoms of dysmenorrhea and PGE2 levels, which had a greater effect on exercise than supplementation with cumin.

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