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Yoga exercise and the provision of vitamin E to decreasing dysmenorrhea

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ABSTRACT

Dysmenorrhea is an excessive disorder during menstruation which causes women to recover or engage in activities which results in increased ability and affects academic and social activities. In non-pharmacology, yoga exercises can increase the endorphin hormone in the body so that it can reduce pain during menstruation. And vitamin E has a role in inhibiting prostaglandin synthesis, while prostaglandin is associated with the onset of pain when attacked. The purpose of this research was to learn how yoga exercises and the provision of vitamin E to reduce dysmenorrhea in the female. This type of research was pre-experimental with two groups of pretest-posttest design. The population of this research was all the S-1 female students of the Health Promotion Program at the Poltekkes Kemenkes Padang with a sample of 32 people. Data was collected by filling in the numerical rating scale. Data analysis using dependent T-Test and independent T-Test. The results of the independent T-Test were obtained on average before and after yoga practice (mean=1.438, t=11.223, p= 0.00) and after the provision vitamin E (mean=2.688, t=17.885, p= 0.00). The results of the dependent T-Test were obtained on yoga practice and the provision vitamin E (p= 0.039). The conclusions in this research are yoga exercises and the provision of vitamin E are equally effective in reducing dysmenorrhea. The provision of vitamin E has more effective in reducing dysmenorrhea compared to yoga exercises.

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INTRODUCTION

Dysmenorrhea is the problem most often experienced by young women. Several studies of dysmenorrhea in adolescents show a high prevalence. According to WHO, 1,769,425 people (90%) experienced women with dysmenorrhea with 10-15% experiencing severe dysmenorrhea. The incidence of menstrual pain in the world is quite large, on average more than 50% of women in each country experience menstrual pain. In America the percentage is around 60%, in Sweden around 72%. While in Indonesia the figure is estimated at 55% of women of childbearing age who are tortured by pain during menstruation.(1,2) The incidence of primary dysmenorrhea in Indonesia is around 54.89%. Dysmenorrhea occurs in adolescents with a prevalence ranging from 43-93%, where around 74-80% of adolescents experience mild dysmenorrhea, 25-38% with pelvic pain. According to Ayu's

research, et al in 2015 who conducted research on 555 pre-clinic students of Andalas University medical education found that the incidence of dysmenorrhea was 55.49% (308 female students), with 84 respondents (27.3%) mild pain, 189 respondents (61.4%) moderate pain and 35 respondents (11.4%) severe pain.(2,3)

Menstrual pain (dysmenorrhea) experienced by young women needs to be dealt with immediately because it affects the declining quality of life of young women. Pain during menstruation causes discomfort in daily physical activity. This complaint is related to absence repeatedly at school or at work, so that it can interfere with productivity. Women during reproduction experience of menstrual pain (40-70%), and as much as 10% experience it to interfere with daily activities. Approximately 70-90% of cases of menstrual pain occur at the age of adolescents and adolescents who experience menstrual pain will be affected by academic, social and sports activities.(4)

Handling to reduce or eliminate pain can be done pharmacologically or non-pharmacologically. Pharmacological treatment, namely handling dysmenorrhea by administering drugs, supplements, etc. The drugs most often used include Non-Steroid Anti-Inflammation Drug (NSAID) which works by inhibiting the activity of the cyclooxygenase enzyme so that production of prostaglandins is reduced. Provision of Vitamin B1, Magnesium, Vitamin E, also shows effects that can reduce menstrual pain.(5,6) Vitamin E can reduce menstrual pain, through inhibition of prostaglandin biosynthesis where Vitamin E will suppress the activity of the enzyme's phospholipase A and cyclooxygenase through inhibition of post translational cyclooxygenase activation so that it will inhibit prostaglandin production. All dysmenorrhea women experience lower abdominal discomfort before and during menstruation and often nausea in severe categories of dysmenorrhea so they must rest and leave work daily in a few hours or days.(5,7–9) Based on Fahmi's research in 2013 which conducted a study on the effect of giving vitamin E in reducing menstrual pain (dysmenorrhea) in young women who were assessed by visual analog scale at the University of North Sumatra. The results of the study are that vitamin E is effective in reducing menstrual pain (dysmenorrhea). Based on the results of the study the percentage of the degree of pain before being given vitamin E is 69% and after the percentage given vitamin E is 58.6%. This means there is a decrease in the percentage of menstrual pain (dysmenorrhea) after being given Vitamin E.(7)

Non-pharmacological treatments that can be used in women suffering from dysmenorrhea include exercise. Regular exercise/ exercise can reduce stress and fatigue so that it also indirectly reduces pain. Getting used to moderate exercise and regular physical activity at the time before and during menstruation can make the flow of blood in the muscles around the uterus to be smooth, so that pain can be overcome or reduced. Sports/ gymnastics can increase endorphin production produced by the brain and spinal cord nerves which can function as a natural body pain reliever, giving rise to a relaxed and comfortable feeling, and exercise/ gymnastics can increase serotonin levels that function as the body's natural antidepressants. So that by exercising/ exercising can reduce physiological pain, stress, and anxiety by diverting one's attention from pain. Sports/ gymnastics is at least 20-60 minutes with a frequency of 3-5 times a week.(1,8,9) Yoga gymnastics has been proven to improve, strengthen and maximize muscle flexibility. It is believed that doing yoga during menstruation will reduce fluid accumulation in the waist which causes pain during menstruation (dysmenorrhea), mood swings, restlessness, and discomfort due to spending too much blood. Yoga can also stimulate to release endogenous opioids, endorphins and enafafal (compounds that function to inhibit pain).(10) Based on Syafitri's research in 2011 which conducted research on the effect of yoga exercises on the decline in dysmenorrhea in students of SMA Negeri 2 Pariaman, West of Sumatera. The results of the study showed that there was a decrease in the average degree of dysmenorrhea in respondents before and after yoga exercise intervention, which was obtained a value of $p = 0.003$ ($p < 0.05$). This means that there is a significant influence

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between the degree of dysmenorrhea before and after yoga exercises.(11) The purpose of this research was to learn how yoga exercises and the provision of vitamin E to reduce dysmenorrhea.

METHOD

This type of research is pre-experimental research design with Two Group Pretest-Posttest Design. In the design of this study, the assessment of pain intensity was carried out twice, before and after treatment. Assessment of pain intensity that is done before treatment is called pretest and assessment of pain intensity that is done after treatment is called posttest. Treatment in the form of treatment of dysmenorrhoea by doing yoga exercises and giving vitamin E. The Subject for this research is female students of *S-1 Health Promotion Program at Health Polytechnic of Ministry of Health Padang.* Based on the Federrer formula, this study has a sample of 16 people with an additional 10% reserve, so the total sample is 18 people for one group, so total sample is 32 people and 4 for reserve. This Study has criteria inclusion are willing to be a respondent, students with regular menstrual cycles every month, students who experience dysmenorrhea on the first and second days of menstruation, and willing to not use either pharmacological therapy or other non-pharmacological therapy other than the therapy determined by the researcher. The exclusion criteria have been diagnosed with secondary dysmenorrhea, have been diagnosed with certain gynecological diseases. This research had ethical cleareance from RSUP. DR M. Djamil Padang.

RESULTS

Data collection was carried out on 32 female students of *S-1 Health Promotion Program at Health Polytechnic* of Poltekkes Kemenkes Padang as follow:

Table 1. Difference in mean intensity of dysmenorrhea before and after given yoga exercise and vitamin E

	n	Mean	Nilai t	Sig. (2-tailed)
Yoga Gymnastic	16	1.438	11.223	.000
Vitamin E	16	2.688	17.855	.000

Table 1 shows the results of paired sample T-Tests on the mean pain intensity of dysmenorrhea in the yoga gymnastics group before and after the intervention, the results of p value < 0.05 is 0,000. the results of paired sample T-Test on mean pain intensity of dysmenorrhea in the vitamin E group before and after the intervention, the results of p value < 0.05 is 0,000.

Table 2. Differences in the effectiveness of yoga exercise and the provision of vitamin E to decreasing dysmenorrhea

Group	n	Mean	SD	*p-value*
Yoga Gymnastic	16	3.13	1.668	0.039
Vitamin E	16	1.94	1.436	

Based on table 2, the p-value < 0.05 is 0.039, which means that there are differences in the effectiveness of yoga exercises and the provision of vitamin E to reduce menstrual pain in female students.

DISCUSSION

The result show is that average before doing yoga exercises is 4.56 and after treatment decreasing became 3.13 and T test show p value 0.000. It's mean yoga exercise can reducing dysmenorrhea. Dysmenorrhea can be treated with two treatments, pharmacological and non-pharmacological. Handling with non-pharmacological include Transcutaneous Electrical Nerve Stimulation (TENS), warm compresses or cold compresses, acupressure, Mozart music therapy and yoga exercises. Yoga exercises during menstruation consist of physical movements, deep breathing, and meditation to alleviate problems that arise during menstruation. The yoga position that is performed while menstruating consists of positions that relax the body with a breathing method that can make mental conditions much better. Yoga positions for menstruation can provide strength and stimulate the brain, chest, lungs, and liver, and can maintain hormonal balance in the body.(12) Yoga exercises divert attention from pain into pleasant sensations, break the anxiety over pain, and improve the functioning of the endocrine (hormonal) glands in the body. This happens because by doing yoga exercises, stretching occurs on the body so that helps expedite blood flow and stimulate the hormonal glands (endocrine) in the body. Endorphin functions as a natural sedative produced by the brain that gives birth to a sense of comfort. [10] Yoga exercises are proven to increase endorphin levels four to five times in the blood. When doing gymnastics, the endorphin will come out and be captured by receptors in the hypothalamus and limbic system that functions to regulate emotions. Increased endorphins have been shown to be closely related to decreased pain, increased memory, improved appetite, sexual ability, blood pressure and breathing.(10)

From the univariate results showed there was a decrease in the intensity of dysmenorrhea felt by female students before and after yoga exercises, evidenced by the large number of female students who felt mild pain after an intervention and it was known that prior to the intervention there were female students who experienced severe pain, but after the intervention there were no more female student who experienced severe pain. The other result show is that average before provision Vitamin E is 4.63 and after treatment decreasing became 1.94 and T test show p value 0.000. It's mean Vitamin E can reducing dysmenorrhea. Based on research conducted by Fahmi in 2013 on the Effects of Provision of Vitamin E in Reducing Menstrual Pain (Dysmenorrhea) in Young Women Assessed by Using Visual Analog Scale (VAS), the results of this study are that before being given vitamin E it is known that 24.1% experienced mild pain, 69% experienced moderate pain, and 6.9% experienced severe pain.(7) Dysmenorrhea is caused by psychological and endocrine factors. Adolescent girls are emotionally unstable, so with a little pain stimulation they will feel pain. Dysmenorrhea is also associated with poor uterine contractions. This is closely related to the influence of hormones. Increased prostaglandin production will cause uncoordinated uterine contractions causing pain.(13)

From the data obtained the level of menstrual pain experienced by undergraduate students Applied Health Promotion varies starting from mild pain to severe pain. This is a physiological condition for young women who experience pain during menstruation. Because during menstruation, estrogen levels in the body are at their lowest. While the prostaglandin hormone in the body increases. In this study after being given an intervention about 68.8% of female students experienced mild pain and more compared to the Fahmi study. This difference may be caused by other factors, namely individual response factors to pain and treatment of pain. Everyone has a different response to pain depending on endurance and body response to pain management. Pharmacological treatment of dysmenorrhea by administering drugs and supplements, including drugs such as pain relievers (analgesics) of Non-Steroid Anti Inflammation Drug (NSAID) groups such as paracetamol or acetaminophen, mefenamic acid, ibuprofen, metamizole or metairie and other pain relievers. Giving vitamins is also one pharmacological therapy that is proven to

be able to prevent pain during menstruation, one of which is vitamin E.(2,5,6) Vitamin E can reduce menstrual pain by inhibiting prostaglandin production. Prostaglandins are one of the many arachidonic acid products found in the phospholipid membrane. Vitamin E is an antioxidant that can inhibit the release of arachidonic acid, by inhibiting the release of arachidonic acid, prostaglandin release is also inhibited. Conversely, vitamin E also increases vasodilator production which serves to relax the smooth muscle of the uterus. With the mechanism of effect of vitamin E in the biosynthesis of prostaglandins, where prostaglandins play a role in causing pain sensations, vitamin E has a role in reducing menstrual pain.(5, 14)

From the results of univariate analysis showed a decrease in the intensity of dysmenorrhea felt by female students after being given vitamin E as evidenced by the greater number of female students who felt mild pain after being given an intervention. Obtained female students who no longer felt dysmenorrhea after being given an intervention and there were no female students who felt severe pain after being given the intervention. The number of female students who experienced mild and moderate pain and the absence of female students who experienced severe pain was due to the mechanism of action of vitamin E in inhibiting prostaglandin biosynthesis so reduce pain during menstruation in college girls. Based on the Saphiro-Wilk normality test on the pain intensity data of yoga gymnastics groups before and after the intervention obtained significance values of 0.271 and 0.487 where $p > 0.05$ so that it can be concluded that the data were normally distributed then the hypothesis testing was continued with paired sample T-Test. In table 2 after doing yoga exercises, a decrease in the mean intensity of dysmenorrhea from the previous average of 4.56 becomes 3.13 and a p-value of $0.000 < 0.05$ is obtained, so it can be concluded that there is a mean difference between the intensity of pain before and after yoga exercises. This shows that yoga exercises are effective in reducing the intensity of dysmenorrhea. The results of this study are consistent with Rahayu's 2018 study on the Effects of Yoga Gymnastics on Menstrual Pain in Class X Girls in MAN 2, Probolinggo City, the results of the study decreased the mean intensity of dysmenorrhea and obtained a p-value of 0,000 <0.05. This shows that yoga exercises are effective in reducing the intensity of dysmenorrhea.

The results are in accordance with the theory which states that doing yoga exercises with a frequency of three to five times a week with a duration of at least 20-60 minutes can reduce physiological pain, stress, and anxiety by diverting one's attention from pain. This is because yoga can stimulate the release of endogenous opioids namely endorphins and enafafal (compounds that function to inhibit pain). These substances have morphine-like properties with analgesic effects that form a pain suppression system.(4,10,15) Practicing yoga regularly will provide great benefits for the body. The benefits include increasing the work function of endocrine glands (hormonal) in the body, increasing blood circulation to all body cells and brain, forming a firmer body posture and more flexible muscles, reducing body, mind and mental tension and making it stronger when deal with stress and reduce menstrual pain.(10,16) The results of other related studies conducted by Akhlaghi et al in 2009 in Iran with the administration of vitamin E 200 IU for 5 days in young women aged 19-25 years, after 2 months of administration obtained a decrease in the degree of pain with VAS from 5.18 to 3,40.(17) As well as research conducted by Ziaei in 2005 in which observations were conducted on women who experience menstrual pain aged 16-18 years by administering vitamin E at a dose of 500 IU two days before menstruation and for three consecutive days during menstruation. Before being given vitamin E, a VAS value of 5.5 was obtained and after vitamin E administration there was a decrease in the value of the VAS to 3.5.(18) Vitamin E has an important function which is to prevent menstrual disorders. Vitamin E is known to inhibit prostaglandin biosynthesis, where vitamin E will suppress the activity of the enzymes phospholipase A and cyclooxygenase by inhibiting activation of post translational cyclooxygenase so that it will inhibit prostaglandin production. Conversely

vitamin E also increases prostacyclin production and PGE2 which functions as a vasodilator which can relax the smooth muscle of the uterus.(19) By doing yoga exercises can reduce pain during menstruation. The movements in yoga exercises stimulate the body to release endogenous opioids namely endorphins and enafafal (compounds that function to inhibit pain). So by doing yoga exercises the body will produce endorphins produced in the brain and spinal cord. Endorphin will produce comfort in the body and reduce pain when the uterine muscles contract. By doing yoga exercises, endorphin levels in the body will increase four to five times in the blood. When someone does gymnastics, then the endorphin will come out and be captured by receptors in the hypothalamus and limbic system that functions to regulate emotions. Increased endorphins have been shown to be closely related to decreased pain, increased memory, improved appetite, sexual ability, blood pressure and breathing.(10)

Vitamin E can reduce menstrual pain, based on the mechanism of action of vitamin E against menstrual pain through inhibition of prostaglandin biosynthesis. Vitamin E suppresses the activity of the enzymes phospholipase A and cyclooxygenase by inhibiting activation of post translational cyclooxygenase so will inhibit prostaglandin production. Conversely vitamin E also increases prostacyclin production and PGE2 which functions as a vasodilator that can relax the smooth muscle of the uterus. With the mechanism of effect of vitamin E in the biosynthesis of prostaglandins, where prostaglandins play a role in causing pain sensations, vitamin E has a role in reducing menstrual pain.(5,14)

CONCLUSION

The conclusions in this research are yoga exercises and provision of vitamin E are equally effective to reducing dysmenorrhea, but vitamin E has more effective. By this research, sufferers can use Vitamin E as an alternative in reducing dysmenorrhea.

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