Article

THE ADMINISTRATION OF RED FRUIT EXTRACT (*Pandanus conoideus Lamk.*) TO REDUCE MENSTRUAL PAIN AMONG ADOLESCENT GIRLS

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A B S T R A C T

Menstrual pain or dysmenorrhea is felt by many young women and this can hinder their activities, including learning tasks at school and at home. Therefore, alternatives to overcome pain are always being developed, one of which in this study is the red fruit extract which is known to contain vitamin E with tocopherol as a substance that can inhibit inflammation. Using a pre- and posttest design, this study was divided into two samples (respondents), namely the intervention group by giving red fruit extract for 3 menstrual cycles and the control group that was without treatment. This study used measuring instrument in form of the observation sheet and a numeric rating scale (NRS) 0-10 for pain scale. Processing and data analysis used the SPSS program through editing, coding, scoring, and tabulating activities. Data were analyzed using univariate analysis and bivariate analysis with independent smaple t-test, Kolmogorov Smirnov and Mann-Whitney. The results obtained were that there was a change in the majority of respondents in the intervention group from the majority of pain in the moderate category to the mild category. These results were significantly different when looking at the results in the control group. Therefore, red fruit extract is recommended to be a useful alternative in reducing menstrual pain.

1. INTRODUCTION

y from parents is one of the causes for the low knowledge of adolescents about sex11. In women, puberty is characterized by the occurrence of menstruation (Coast, Lattof, & Strong, 2019). During menstruation, the problem experienced by many women is discomfort or intense pain (Laux-Biehlmann, d' Hooghe, & Zollner, 2015). This is commonly called dysmenorrhea which is a detrimental condition for many women and has a major impact on health-related quality of life (Terranova, 2015). Dysmenorrhea makes women unable to carry out normal activities, for example students who experience primary dysmenorrhea cannot concentrate on learning and learning motivation decreases because of the pain they feel (Jewitt & Ryley, 2014).

In Indonesia, the prevalence of dysmenorrhea is 64.25% consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea (Larasati and Alatas, 2006). Primary dysmenorrhoea is experienced by 60-75% of adolescents, with three quarters of these adolescents experiencing mild to severe pain and another quarter experiencing severe pain. The symptoms of dysmenorrhea are pelvic or lower abdominal pain (generally lasting 8–72 hours), which radiates to the back and along the thighs, occurring before and during menstruation (Parks, 2007). In addition, it is not accompanied by an increase in menstrual blood counts and peak pain often occurs when the bleeding is still small. The longer menstruation occurs, the more frequent the uterus contracts, the consequently the more prostaglandins are released. The result of excessive prostaglandin production is pain (De Ziegler, Streuli, Santulli, & Chapron, 2014). In addition, the continuous uterine contractions also cause the blood supply to the uterus to temporarily stop, resulting in primary dysmenorrhea.

Handling dysmenorrhea can be done in two ways, namely by pharmacological therapy and non-pharmacological therapy (Kartal & Akyuz, 2018). Basic pharmacological therapy can be with the provision of non-steroidal anti-inflammatory drugs (NSAIDs). Some drugs that are used as treatments for dysmenorrhoea pain, such as non-steroidal anti-inflammatory drugs, have serious side effects such as gastrointestinal bleeding, kidney dysfunction, platelet preforation and dysfunction that can lead to bleeding. Several other methods of reducing the prevalence of dysmenorrhoea pain, such as hormonal contraceptive pills, stretch therapy, acupuncture, and TENS (Transcutaneous electrical nerve stimulation) therapy have not been able to suppress dysmenorrhoea pain. For non-pharmacological therapy, there are several ways, namely by warm water compresses, exercise, and adequate sleep.

Tocopherol has inhibitory abilities in inflammatory processes, cell membrane damage and platelet regulation (Reiter, Jiang, & Christen, 2007). In the case of dysmenorrhoea, high prostaglandin activity can result in an increased inflammatory response in the uterus. Damage to the uterine wall due to myometrial contraction directly modulates cylooxygenase and increases pain. Vitamin E has the ability to inhibit the rate of inflammation by suppressing the rate of transcription of NFkB-dependent genes, inhibiting the action and expression of COX2 (Cyclooxygenase) and NOX2 (Nitric Oxide) genes (Reiter E, 2007). Giving vitamin E before

menstruation until the end of menstruation was proven to be beneficial in reducing menstrual pain (dysmenorrhea) (Pakniat, Chegini, Ranjkesh, & Hosseini, 2019).

One of the plants that are currently being researched because many are empirically used as traditional medicine by local Papuans is red fruit (Septyaningsih, 2010). The red fruit plant (Pandanus conoideus Lam) is well known in Papua and to be used by Papuans. Broadly speaking, red fruit is used in four ways, namely as food ingredients, natural dyes, handicraft ingredients, and as medicinal ingredients for various types of diseases. This fruit is believed to contain vitamin E, including tocopherols. The components of red fruit include carotenoids, beta-carotene, tocopherol, alpha tocopherol, and fatty acids which act as anti-free radical compounds to control various diseases such as cancer, hypertension, lung and infection. The content of antioxidants, especially β carotene and α tocopherol, in red fruit is higher than other fruits and vegetables.

Based on a preliminary study conducted on 69 female students of SMA Negeri 2 Sorong Regency, there were 46 (67%) that experienced menstrual pain felt almost in every menstruation. Furthermore, interviews were conducted about the treatment that was carried out to reduce pain: 43% used painkillers, 5% used herbal medicine, and the rest did not take any action. This study aimed at determining the impacts of of red fruit extract consumption on dysmenorrhea pain in female adolescents.

2. METHODS

This quasi-experimental study used pre and posttest control group design, which is a design used to measure the effect of treatment on the experimental group by comparing the results of the treatment between before being treated and after being treated. The population of this study was all 31 students in a high school who experienced moderate to severe dysmenorrhea at the time of menstruation. Incusive criteria consisted of having regular menstrual cycles of at least 3 months (28-30 days), never having married and giving birth, and not using drugs to reduce dysmenorrhea, while the exclusion criteria were students suffering from reproductive infections.

Respondents were divided into 2 groups (with the same number), namely the intervention group (given red fruit extract capsules that are ready to use and given at a dose of 2 capsules per day --- 1 capsule contains 100 IU of tocopherol, which was given on 2 days. before menstruation until the end of menstruation for 3 menstrual cycles) and the control group (not given red fruit extract) using consecutive sampling, which is taking samples based on affordable populations who meet the criteria to be the study sample.

The measuring instrument was the observation sheet and the pain scale employed a numeric rating scale (NRS) 0-10. Processing and data analysis used the SPSS program through editing, coding, scoring, and tabulating activities. Data were analyzed using univariate analysis and bivariate analysis with independent smaple t-test, Kolmogorov Smirnov and Mann-Whitney.

Researchers have submitted a request for ethical clearance to the ethics commission of Sorong Health Polytechnic, Ministry of Health.

RESULT

Respondent Characteristics
This study used 30 samples of female adolescents who experienced dysmenorrhoea on a moderate scale who had met the inclusion and exclusion criteria as the study sample. The research subjects were divided into two treatment groups, namely 1) the control group that was not given any treatment and 2) the intervention group that was given red fruit extract (Table 1).

Table 1. Characteristics of respondents by age and BMI

Characteristic	Control	Intervention	Total	%
Age				
16 yo	2	0	2	6.7
17 yo	11	11	22	73.3
18 yo	2	4	6	20
BMI				
Thin	0	2	2	6.7
Normal	15	13	28	93.3

Based on table 1, it can be seen that the majority of the respondents were 17 years old (73.3%) and had a normal BMI (Body Mass Index) (93.3%).

Effect of red fruit extract on menstrual pain
In this study, the intervention group was given red fruit extract ready-to-use and given in a dose of 2 capsules per day, given 2 days before menstruation until the end of menstruation for 3 menstrual cycles. Dismenorhoe assessment was carried out before treatment and after three treatments. Table 2 shows menstrual pain before and after treatment.

Table 2. Respondents' menstrual pain before treatment

Pain Scale	Group			
	Control		Intervention	
	f	%	f	%
0	0	0	0	0
1-3	0	0	0	0
4-6	10	66.7	9	60
7-9	5	33.3	6	40
10	0	0	0	0
Total	15	100	15	100

Based on table 2, it can be seen that before the treatment in the control group the most experienced pain was moderate (66.7%) and severe (33.3%). Likewise, in the treatment group the most experienced pain was moderate (60%) and pain was severe (40%).

Table 3. Respondents' menstrual pain after treatment

Pain Scale	Group			
	Control		Intervention	
	f	%	f	%
0	0	0	5	33.3
1-3	2	13.3	9	60
4-6	10	66.7	1	6.7
7-9	3	20	0	0
10	0	0	0	0
Total	15	100	15	100

Based on table 3, it can be seen that after being treated in the control group the most experienced pain was moderate (66.7%) and the least experienced pain was mild (13.3%), while in the treatment group the most experienced pain was mild (60%) and the least experienced pain was moderate (6.7%).

Furthermore, the data normality test was carried out using the Kolmogorov Smirnov test with a p-value of 0.049, meaning that the data were not normally distributed so that the hypothesis test used the Mann Whitney test. Based on the results of the Mann Whitney test, it was obtained a p-value of 0.000, meaning that Ha was accepted and Ho was rejected, so that there was an effect of giving red fruit extract on menstrual pain among the respondents.

DISCUSSION

The research was conducted for female adolescents by assessing menstrual pain before and after treatment. The treatment was giving red fruit extract capsules. Assessment of menstrual pain and adherence to drinking red fruit extract was carried out by enumerators. There were two enumerators to assess menstrual pain who had a background in health education and one enumerator to take supplements for adherence who was a student classroom teacher. Prior to the study, a meeting was held with enumerators to equalize perceptions about menstrual pain and the rules for taking supplements. In the process of this research, the teacher acted as an enumerator who gave direction and observed students drinking red fruit capsules at the scheduled time, so that students were considered obedient to drinking red fruit capsules.

The results of this study indicated that there was an effect of providing red fruit extract on menstrual pain in young girls. Dysmenorrhoea is menstrual pain before or during menstruation, until the woman is unable to work and has to sleep. Pain is frequently accompanied with nausea, headache, faint, or irritability. Dysmenorrhoea is pain during menstruation caused by spasm of the uterine muscles. This pain is felt in the lower abdomen. Pain can be felt before and during menstruation (Oyelowo, 2007; Kannan & Claydon, 2014).

Research conducted in recent years has shown that increased levels of prostaglandins play an important role as a cause of menstrual pain (Chrisler & Gorman, 2016). The occurrence of myometrial spasm is stimulated by substances in menstrual blood, similar to natural fats which are later known as prostaglandins. The levels of these substances increase in menstrual pain and are found inside the uterine muscles. Prostaglandins cause increased activity of the uterus and pain-stimulating terminal nerve fibers. The combination of increased prostaglandin levels and increased myometrial sensitivity creates intrauterine pressures of up to 400 mmHg and causes severe myometrial contractions. On that basis, it is concluded that prostaglandins produced by the uterus play a role in causing myometrial hyperactivity. Myometrial contraction caused by prostaglandins will reduce blood flow, resulting in ischemia of myometrial cells resulting in spasmodic pain. If excessive amounts of prostaglandins are released into the bloodstream, there will be systemic effects such as diarrhea, nausea, or vomiting (Curry, et.al., 18981).

Relationship between tocopherol and inflammation, in this case menstrual pain due to prostaglandins, is classified as a primary dysmenohrea, where there is an increase in

adequate uterine muscle contraction as a result of excessive prostaglandin secretion. Primary menstrual pain only occurs in the ovulatory cycle (Terranova, 2015). Menstrual pain only occurs when the uterus is under the influence of progesterone. Meanwhile, prostaglandin synthesis is related to ovarian function. Low progesterone levels will cause the formation of large amounts of prostaglandins. Low progesterone levels due to corpus luteum regression cause disruption of lysosomal membrane stability and also increase the release of the enzyme phospholipase-A2 which acts as a catalyst in prostaglandin synthesis by converting phospholipids to arachidonic acid.

Red fruit (Pandanus conoideus Lamk.) or by the people of Wamena, Papua, known as Kuansu, is a native Papuan plant that is widely found in the Jayawijaya mountains (Wamena and Tolikara), Manokwari, Jayapura, Timika, Nabire, and Sorong (Kennedy & Clarke, 2004). Red fruit is also very useful as a medicinal plant because its nutritional content is rich in antioxidants such as carotene, beta-carotene and tocopherol. Red fruit contains natural substances that can boost the immune system and metabolic processes. According to Pohan et al. (2006), the components of red fruit compounds include carotenoids, beta-carotene, tocopherol, alpha tocopherol, and fatty acids which act as anti-free radical compounds to control various diseases such as cancer, hypertension, lung and infection.

Tocopherol has inhibitory abilities in inflammatory processes, cell membrane damage and platelet regulation. In the case of dysmenorrhoea, high prostaglandin activity can result in an increased inflammatory response in the uterus. Damage to the uterine wall due to myometrial contraction directly modulates cylooxygenase and increases pain. Tocopherol has the ability to inhibit the rate of inflammation by suppressing the rate of transcription of NFkB-dependent genes, inhibiting the action and expression of COX2 (Cyclooxygenase) and NOX2 (Nitric Oxide) genes (Reiter, Jiang, & Christen, 2007). Tocopherol γ,α is known to be a type of tocopherol which is strong in suppressing the rate of cyclooxygenase to form prostaglandins. In a study conducted by Jiang et al (2000), the activity of tocopherol γ,α in suppressing inflammatory reactions was quite high. The highest inhibitory activity occurs in the inflammatory reaction which contains epithelial cells and macropag cells. In this study it was also found that tocopherol had a more significant effect in suppressing the rate of inflammation.

As tocopherol contained in Vitamin E is one of the compounds found in the red fruit, it is apparent that this study can be important information that the red fruit extract capsules can be used as an alternative to reduce menstrual pain as shown in this study. Further studies focusing on the analysis of the only red fruit extract with larger samples is worth doing to support this finding.

CONCLUSION

Before treatment, the majority of the intervention group respondents experienced moderate menstrual pain. However, after the treatment, the majority turned out to experience midl menstrual pain. Therefore, there was an effect of giving red fruit extract on menstrual pain among adolescent girls.

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