



Does Yoga-Murottal Reduce Dysmenorrhea Pain and Improve Beta-Endorphin Hormone Levels in Adolescents?

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Abstract

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BACKGROUND: Dysmenorrhea pain is one of the substantial reproductive problems in teenagers. Combination of Yoga and murottal is used as an alternative to reduce dysmenorrhea pain and stimulate the release of endorphins which trigger the body to relax and reduce muscle tension.

AIM: The purpose of this study was to prove that the yoga murottal as an alternative treatment for reducing dysmenorrhea pain and increasing beta-endorphin hormone levels in adolescents.

METHODS: The type of research is true experiment, pre-test–post-test with control group design. Sampling according to the inclusion criteria, respondents were 30 female students. The intervention group was given yoga murottal for 20 min every day during menstruation, followed by 2 times a week, while the control group administered an analgesics medicine. Collecting data used observation sheets and blood samples. Analysis of the data used paired t-test and independent t-test.

RESULTS: There is a significant difference in pain scale in both two groups with $p = 0.001$. There is a difference in beta-endorphins levels before and after intervention in two groups with $p = 0.001$. There is no difference of beta-endorphins levels between intervention and control groups with $p = 0.201$. However, the beta-endorphin level in the intervention group is higher than in the control group (52.9 ng/ml and 47.1 ng/ml, respectively).

CONCLUSION: Yoga murottal increased beta-endorphins levels in and reduced dysmenorrhea pain scale for teenagers.

Introduction

Menstruation is bleeding that occurs regularly in the uterus, accompanied by a discharge (sloughing) of the endometrium, which lasts 20–7 ml for 2–7 days [1]. However, sometimes dysmenorrhea occurs, namely pain in the abdomen starting 24 h before menstruation, pain in the hips to the legs will last up to the first 24–36 h [2].

The incidence of dysmenorrhea in the world is 50%, one of which is in France 79% [3]. Adolescence is a time that occurs many changes. The stage of puberty that occurs in girls is characterized by menstruating or menstruation. Each teenager has a different menstrual experience. The impact of menstrual pain in adolescents causes absent school absences, disruption of daily activities, and anxiety. Dysmenorrhea generally occurs at 2–3 years after the presence of menarche. The average age of menarche is between 12 and 15 years. There are sexual secondary development and imbalance of the hormone level. It stimulates prostaglandin hormones, leading to excessive uterine contractions [3]. Menstrual pain in adolescents causes absence

from going to school, disruption of daily activities, and anxiety [4]. Pharmacologically and non-pharmacologically therapies might be a choice to treat it [1]. Pharmacological therapy with non-steroidal anti-inflammatory drugs causes stomach ulcers [5].

This study uses a combination of murottal yoga to treat dysmenorrhea pain and increase levels of beta-endorphins in adolescents. The variety of yoga murottal can be run to overcome dysmenorrhea pain. Several studies stated that yoga might control dysmenorrhea pain and trigger the release of endorphins. These stimulate the body relax and reduce muscle tension to reduce pain. This study aimed to prove whether the yoga murottal is an alternative treatment for dysmenorrhea pain and beta-endorphin hormone levels in adolescents.

Methods

This type of research is a true experiment with pre-post design with control group design. Simple random sampling was done to divide

respondents into two groups. The intervention group was given murottal yoga with a duration of 20 min every day during menstruation and continued 2 times in 1 week. The control group administered an analgesic medicine. The place of this research is Riyadus Sholihin Islamic Boarding School Semarang and Daul Taqwa Semarang. The study runs from May to July 2021.

The population of this study was all female students at Riyadus Sholihin Islamic Boarding Schools Semarang and Daul Taqwa Semarang, with inclusion criteria that entered the sample. These female students had a history of dysmenorrhea for 3 consecutive months and did not experience anxiety as measured by the HARS questionnaire. Blood sample was collected to check the beta-endorphin levels. All respondents signed informed consent before collecting data. This research gained an ethics committee of Moewardi Hospital Solo with the norm: 691/VI/HREC/2021. The data were analyzed by paired t-test, independent t-test, and linear regression test.

Results

Table 1 showed normality data variables of the age of menarche, nutritional status, and family history about dysmenorrhea from their biological mother. All the data distributed normally, which were shown by $p > 0.05$. The normality data of pain intensity in the post-test control group were 0.01. All variables had a homogeneous variant, $p > 0.05$.

Table 1: Respondent homogeneity test based on characteristics

Variable	Intervention Group			Control Group			p-value*
	F	%	Mean ± SD	F	%	Mean ± SD	
Age of Menarche							
10 years	2	13.3		1	6.7		
11 years old	5	33.3	11.5 ± 0.9	5	33.3	11.6 ± 0.8	0.555
12 years old	6	40		7	46.7		
13 years old	2	13.3		2	13.3		
Nutritional status							
Thin	2	13.3		0	0		
Normal	11	73.4	3.0 ± 0.5	13	86.7	3.1 ± 0.3	0.795
Fat	2	13.3		2	13.3		
Family history							
No	11	73.4	1.2 ± 0.4	13	86.7	1.1 ± 0.3	0.075
Yes	4	26.6		2	13.3		

*Levene's test.

Table 2 showed the confounding variables consisting of age of menarche, nutritional status, and family history. All variables did not contribute to dysmenorrhea pain with all $p > 0.05$. The confounding variables (age of menarche and family history) did not contribute to the value of beta-endorphin hormone levels with $p > 0.05$. Only nutritional status affects the levels of beta-endorphins with $p = 0.016$.

Table 2: Combination of murottal yoga against dysmenorrhea pain and beta-endorphin hormone levels with confounding variables

Variable	Sig.*	R-square	R	p-value
Dysmenorrhea pain				
Age of menarche	0.621	0.154	0.392	0.363
Nutritional status	0.070			
Family history	0.985			
Beta-endorphin hormone levels				
Age of menarche	0.722	0.282	0.531	0.072
Nutritional status	0.016			
Family history	0.202			

*Regression Linier test.

Measurement of pain scale in respondents in the intervention group before and after yoga murottal showed that they experienced a significant decrease and the beta-endorphin hormone levels increased (Table 3). In the paired t-test, measuring the pain scale before and after in the intervention group, statistically, there was an effect on the pain scale after doing yoga murottal with $p = 0.001$.

Table 3: Murottal yoga on the pre- and post-pain scale in the intervention group and control group

Variable	Group		p-value
	Intervention Mean ± SD	Control Mean ± SD	
Pain scale			
Before	5.6 ± 1.6	5.6 ± 1.6	1.000 ^c
After	1.6 ± 1.4	4.6 ± 1.3	0.001 ^d
p-value	0.001 ^a	0.004 ^b	
Difference	4 ± 1	1 ± 0.9	0.001 ^d
Beta-endorphin levels			
Before	287.3 ± 102.7	248.3 ± 95.1	0.290 ^c
After	340.7 ± 105.8	295.6 ± 80.7	0.201 ^c
p-value	0.001 ^a	0.001 ^b	
Difference	52.9 ± 41.9	47.1 ± 48.9	0.733 ^c

*Paired t-test, ^aWilcoxon test, ^bIndependent t-test, ^cMann-Whitney U-test.

Data analysis showed a significant difference in pain scale in the post-test and a decrease in pain scale between the intervention and control groups with $p = 0.001$. The Mann-Whitney statistical test showed that yoga murottal has an effect and can reduce pain in the intervention group as much as 4. The standard deviation value of decreasing pain scale after intervention in the intervention group is 1.4, while the standard deviation value of decreasing pain scale after treatment in the control group is 1.3.

Table 3 showed that the levels of beta-endorphins in the intervention group respondents before and after doing yoga murottal increased. In the paired t-test, the levels of beta-endorphins before and after in the intervention group, statistically, there was an effect on the levels of beta-endorphins after doing yoga murottal with $p = 0.001$. Meanwhile, data analysis resulted in differences in beta-endorphin levels in the post-test control intervention group with $p = 0.201$. The results of the independent t-test statistical tests that have been carried out can be concluded that there is no difference between the intervention group and the control group.

Independent t-test on the difference between the intervention and control groups resulted $p = 0.733$,

so it was concluded that there was no difference between the intervention group and the control group, but if you look at the comparison of the mean value of the difference in the intervention group, it is higher 52.9 ng/ml while in the control group 47.1 ng/ml. The standard deviation value for the increase in beta-endorphin levels after the intervention in the intervention group was 105.8, while the standard deviation value for the increase in beta-endorphin levels after treatment in the control group was 80.7.

Discussion

The effect of murottal yoga combination on dysmenorrhea pain

Dysmenorrhea pain was used with the numerical rating scale measurement scale. The combination of yoga murottal before and after the intervention significantly decreased with $p = 0.001$. The difference in dysmenorrhea pain in the intervention and control groups with $p = 0.001$ means. This means that there is a effect of combination yoga murottal on dysmenorrhea pain that is done with a duration of 20 minutes every day during menstruation and added 2 times a week. There are differences in dysmenorrhea pain in the intervention and control groups, with an average difference in dysmenorrhea pain in the intervention group 4 ± 1 , while in the control group has an average difference of 1 ± 0.9 .

The analysis results in the intervention group showed that there was an effect of yoga murottal performed with a duration of 20 min every day during menstruation, and added 2 times a week on complaints of dysmenorrhea pain before and after being given treatment. A decrease in the scale of pain felt after making a series of interventions in this study. Menstruation can cause different degrees of pain. The intensity of pain varies, different, and individually. Dysmenorrhea pain occurs in the abdomen, from the hips to the extremities. It can start 24 h before bleeding and last for 24–36 h [2]. Every normal woman has a period every month, and some women feel pain every menstrual cycle. Menstrual pain is so severe that it causes the patient to rest, take vacations, and interfere with daily activities for hours, which is called dysmenorrhea [6].

Yoga can strengthen muscle strength, including joints, muscles, and bones. In addition, yoga can also increase flexibility so that the body avoids stiffness, pressure, pain, and fatigue. Reducing pain because yoga can improve blood circulation throughout the body and yoga can control emotions and anxiety. Doing yoga, doing long and deep breathing can relax the body, and emotions can be controlled [7].

Ar-Rahman's murottal listening activity can calm the soul, reduce stress hormones, activate

endorphins in the body, increase feelings of relaxation, and divert fear, anxiety, and tension, which is called the muscle relaxation response (relaxation response) [8]. Murottal works on the brain where when the body is stimulated by listening to murottal, the brain will produce chemicals called neuropeptide substances. This molecule will attach to the receptors and provide feedback in pleasure and comfort so that the body becomes relaxed. Low sound intensity is a sound intensity of 40–60 decibels so that it causes comfort and reduces pain. Murottal is an intensity of 50 decibels which has a positive effect on the listener [9].

In this study, the combination of yoga murottal activities causes relaxation. It triggers an increase in beta-endorphin hormone levels in the body, which will reduce the pain felt. Based on previous research states that yoga can reduce the intensity of menstrual pain, if dysmenorrhea sufferers regularly do yoga which is easier to do then they can get benefits with reduced pain [10]. Listening to murottal Ar-Rahman can reduce dysmenorrhea pain in adolescent girls. Listening to murottal can trigger the balance of nerves in the body so that relaxation occurs. This condition prevents vasospasm in blood vessels, and blood perfusion will be adequate to the ischemic tissue, which causes a decrease in dysmenorrhea [11]. The results and explanations above can be concluded that the combination of yoga murottal can reduce dysmenorrhea pain levels in adolescents who are carried out 20 min during menstruation and are continued 2 times a week.

The effect of yoga murottal on beta-endorphin hormone levels

The combination of murottal yoga was effective before and after the intervention for 20 min during menstruation continued 2 times a week with $p = 0.001$. There are no differences in beta-endorphin levels after the intervention between both groups with $p = 0.201$.

Beta-endorphins can be triggered by pain. These might suddenly arise when someone's response is experiencing pain. It stimulates the brain to affect the production of endorphins to be sent to the pain point. Increasing beta-endorphins level stimulates the body to relax, in addition to the pain that is felt and triggers endorphins naturally. Yoga activity combines body movements, breathing rules, and focus added to listening to murottal to maximize the increase in beta-endorphins in the body so that the pain of dysmenorrhea that is felt can decrease.

There was no difference in the levels of beta-endorphins after being given murottal yoga intervention and in the control group being given analgesic drugs. It is concluded that both of them can increase levels of beta-endorphins in the body. When viewed from the difference in the increase, it can be seen that the increase in the intervention group was more significant than the control group so that murottal yoga can be an alternative for

managing dysmenorrhea pain because it is easy to do at any time and is economical. Various factors influence the increase or decrease in levels of beta-endorphins. Nutritional status affects the levels of beta-endorphins in the body. Nutritional status is related to the presence of food that enters the body. Several studies have shown that consuming certain foods can increase levels of beta-endorphins in the body, namely, by consuming chocolate and spicy foods. Chocolate contains high carbohydrates so that when it enters the body, it will trigger insulin production and an increase in tryptophan or amino acids to make blood flow to the brain, which will be converted into serotonin and endorphins. Chocolate is recommended for women because it can increase neurotransmitters to improve mood or mood due to increased hormones endorphins and serotonin [12].

Food that enters the body has a variety of flavors, one of which is spicy, which can increase levels of endorphins in the body. When you eat chili or spicy food, the capsaicinoids bind to pain receptors in the mouth and throat. Then, the receptors send a signal to the brain that the person has consumed something spicy. The brain responds to the burning sensation by increasing the heart rate, increased sweating, and releasing endorphins to reduce pain [13]. The combination of murottal yoga can increase the levels of beta-endorphins in the body of adolescents which are carried out for 20 min during menstruation and is continued 2 times a week.

Conclusion

The effect of the combination of murottal yoga on dysmenorrhea pain was not influenced by the confounding variables of menarche age, nutritional status, and family history. The combination of yoga murottal on beta-endorphin hormone levels is affected by nutritional status. The combination of yoga murottal reduced the dysmenorrhea pain scale in adolescents. There is a difference in the dysmenorrhea pain scale in the intervention and control groups. The combination of yoga murottal can increase the levels of beta-endorphins in adolescents with dysmenorrhea with p -value = 0.001. There were no differences in the

levels of beta-endorphins in the intervention and control groups.

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