

The Role of Classical Music Therapy on Dysmenorrhea Pain and Anxiety in Pelita Harapan University Medical Students

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Abstract

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Introduction: Dysmenorrhea is menstrual pain that often occurs in young women. The pain felt in every women can be different from one another. Anxiety experienced by each women can also worsen the menstrual pain. Efforts to treat dysmenorrhea can be in the form of non-pharmacological therapy, one of which is music therapy.

Aim: This study uses an experimental method with random allocation to divide 122 respondents who are medical students of Pelita Harapan University into a control group and an intervention group.

Methodology: The intervention group has been given an experiment of random allocation in the form of classical music therapy for 20 minutes on the first day of the respondent getting menstruation. As for the control group given 40Hz sound for 20 minutes. The data analyzed using chi-square and wilcoxon test.

Results: The results of the study found that the average menstrual pain in the control group before the intervention was 6.11 and after the intervention was 6.07. Meanwhile, in the intervention group, the average menstrual pain before being given classical music therapy was 6.46 and after the intervention was 3.39.

Conclusion: So that classical music therapy is effective for reducing anxiety by 0.77 and the menstrual pain scale is 3.07 in the group given classical music therapy with P value <0.001.

Introduction

Dysmenorrhea is defined as difficult menstrual flow characterized by abdominal pain.^{1,2} Symptoms of dysmenorrhea can begin several hours before and/or several hours after the start of menstruation.¹ Dysmenorrhea in general is the most common gynecological disease reported by women.³ According to WHO, the number of dysmenorrhea in the world is very large, on average more than 50% of women in every country experience dysmenorrhea. In

Indonesia, the incidence of dysmenorrhea is quite large, around 60-70% of women experience dysmenorrhea.⁴ The level of dysmenorrhea pain can vary which has an impact on disruption of daily activities such as school attendance. Previous research conducted by Gunawan in 4 junior high schools in Jakarta in 2002 showed that 76.6% of female students were absent from school because of menstrual pain.⁵

Pain that will be felt during menstruation arises because of uterine muscle contractions and vasoconstriction of the blood supply to the endometrium. Pain that arises will activate the sympathetic nervous system to stimulate the adrenal medulla to release epinephrine and norepinephrine to produce a stress response. This physiological response will increase anxiety, muscle tension and facial perception.⁶ Treatment of dysmenorrhea can be overcome, one of which is non-pharmacological therapy, namely music therapy. Non-pharmacological therapy can be recommended because it has few side effects, does not cost money and is easy to do.⁷

Music therapy can release sensory stimuli that can cause the release of endorphins. Endorphins are produced by the brain and function as natural sedatives that work by blocking the transmission of painful stimuli.^{5,8} The psychological effect of music therapy is relaxation which can reduce heart rate, respiratory rate, metabolism, improve physical signs, reduce stress hormones and stabilize vital signs.⁹ Previous studies have reported that different musical characteristics are processed differently in the brain so that different musical characteristics may have different effects.¹⁰ Previous research in Colombia on classical music therapy for dysmenorrheal pain found that the treatment group music pain score on average was lower ($p=0.0006$) than the control group.⁷ Although previous research has been conducted, the effectiveness of classical music therapy on anxiety in dysmenorrheal pain has not been yet discussed. The experimental research involving music conducted between the intervention and control groups necessitates the implementation of randomization to ensure the reduction of research bias. This step is crucial to enhance the validity and reliability of the study findings. This practice aligns with the principles of rigorous scientific inquiry and

contributes to the overall robustness of the research outcomes.

Objective

This study aims to determine the effectiveness of classical music therapy in reducing anxiety and dysmenorrhea pain in Medical Students of Pelita Harapan University.

Material And Methods

Design

This research was randomized clinical trial with experimental study design

Respondents

The sample in this research are 2018-2020 medical students of Pelita Harapan University with the inclusion criteria for this study are people who experienced dysmenorrhea. They agreed to participate in this research when they were given google form which has informed consent. Respondents who met the exclusion criteria such as: deafness that had been diagnosed by a doctor, doing acupuncture, massage, diet and heat compression, were not included in this study. With the classification of research variables in the form of independent variables, it was classical music therapy, and the dependent variable was anxiety and dysmenorrhea pain, as well as confounding variables was use of pain medication and anti-anxiety medication, age at first menstruation <10 years and >16 years, irregular menstrual cycle, menstrual cycle duration <21 days and >35 days, and menstrual duration >7 days.

Method of Collecting The Data

This research data were collected using convenience sampling method from 2018-2020 medical students of Pelita Harapan University who experience dysmenorrhea on the first day of menstruation. The menstrual pain would be assessed by Numeric Rating Scale (NRS) which has a pain scale from 0-10 while for anxiety assessed by Zung Self-Rating

Anxiety Scale (SAS) questionnaire which contains 20 questions.

Method of Collecting The Data

Data obtained were processed and analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) 23.0 by chi-square and Mann Whitney U analysis.

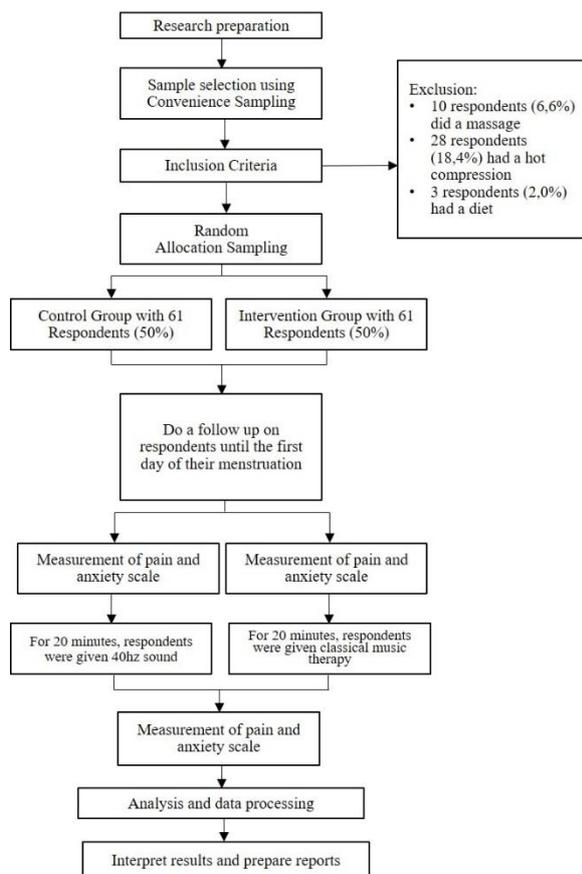


Figure 1. Ways of working and data collection technique

Result

The number of samples included in this study were 122 respondents. Data on respondent's age, age of first menstruation, regular or irregular menstrual cycle, duration of menstrual cycle, duration of menstruation, number of sanitary napkins used in a day, blood clots, and use of pain medication were recorded and shown in the

table of overall research respondent characteristic (Table 1). The sample of this study was 100% women with an average sample age of 19.37 ± 1.069 years. The youngest age in this study was 17 years old and the oldest was 24 years old and the most respondents were at the age of 11-12 years, namely 59 (48.4%) respondents. Furthermore, 122 respondents were divided into two groups, namely 61 respondents (50%) as the control group and 61 respondents (50%) as the intervention group (Table 2).

Table 1. Overall Research Respondent Characteristics

Characteristic	Total (n=122)	
	n (%)	Mean ± SD
Age (years)		
17	1 (8)	
18	26 (21.3)	
19	36 (29.5)	19.37 ±
20	51 (41.8)	1.069
21	6 (4.9)	
24	2 (1.6)	
Age of first menstruation (years)		
<10	6 (4.9)	
11-12	59 (48.4)	12.03 ±
13-14	48 (39.3)	1.366
15-16	7 (5.7)	
>16	2 (1.6)	
Regular menstrual cycle		
Yes	87 (71.3)	
No	35 (28.7)	
Menstrual cycle duration (days)		
<21	13 (10.7)	
21-35	89 (73)	
>35	20 (16.4)	
Menstrual duration (days)		
≤7	99 (81.1)	
> 7	23 (18.9)	
Number of pads in a day		
1-2x	22 (18)	
2-3x	52 (42.6)	
3-4x	42 (34.4)	
≥4x	6 (4.9)	
Blood clots		
Yes	62 (50.8)	
No	60 (49.2)	
Use of pain medication		
Yes	11 (9)	
No	111 (91)	

Table 2. Research Respondents Characteristics by Type of Group

Characteristic	Group, n (%)		P Value
	Intervention (n=61)	Control (n=61)	
Age (years), median (min/max)	19 (18/21)	20 (17/24)	0.519
Age of first menstruation (years)			
<10	4 (66.7)	2 (33.3)	0.236
11-12	28 (47.5)	31 (52.5)	
13-14	27 (56.3)	21 (43.8)	
15-16	1 (14.3)	6 (85.7)	
>16	1 (50)	1 (50)	
Regular menstrual cycle			
Yes	45 (51.7)	42 (48.3)	0.689
No	16 (45.7)	19 (54.3)	
Menstrual cycle duration (days)			
<21	7 (53.8)	6 (46.2)	0.340
21-35	47 (52.8)	42 (47.2)	
>35	7 (35)	13 (65)	
Menstrual duration (days)			
≤7	51 (51.5)	48 (48.5)	0.643
> 7	10 (43.5)	13 (56.5)	
Number of pads in a day			
1-2x	7 (31.8)	15 (68.2)	0.003
2-3x	32 (61.5)	20 (38.5)	
3-4x	22 (52.4)	20 (47.6)	
≥4x	0	6 (100)	
Blood clots			
Yes	31 (50)	31 (50)	1.000
No	30 (50)	30 (50)	
Use of pain medication			
Yes	7 (63.6)	4 (36.4)	0.527
No	54 (48.6)	57 (51.4)	

In this study, menstrual pain was assessed using the Numeric Rating Scale with a pain scale of 0-10. On the first day of menstruation, each respondent assessed for menstrual pain before the intervention and after the intervention, both the control group and the group given classical music therapy. The intervention group will be given classical music therapy for 20 minutes, while the control group will not be given classical music but only given 40Hz sound instead.

In this research, Anxiety was assessed using the Zung Self-Rating Anxiety Scale (SAS) questionnaire. Anxiety was also measured before and after the intervention in both groups on the first day of the respondent getting menstruation.

The level of anxiety will be divided into 4 groups, namely normal, mild-moderate, severe and extreme. From the results of the anxiety data obtained, in the control group and the intervention group, more respondents experienced mild anxiety-moderate. However, after being given classical music therapy for 20 minutes in the intervention group, the anxiety decreased by 9.9% of respondents to 24 respondents who experienced mild-moderate anxiety. Meanwhile, in the control group that was given a voice of 40hz reduced by 1 respondent to become 29 respondents who experienced mild-moderate anxiety.

Table 3. Comparison of anxiety levels in the control group

Anxiety Level (Range 20-80)	Control, n (%)		Δ Delta Anxiety Level
	Before	After	
Normal	7 (11.5)	8 (13.1)	+ 1.6 %
Mild-Moderate	30 (49.2)	29 (47.5)	+ 1.7 %
Severe	23 (37.7)	23 (37.7)	0
Extreme	1 (1.6)	1 (1.6)	0

Table 4. Comparison of anxiety levels in the intervention group

Anxiety Level	Intervention, n (%)		Δ Delta Anxiety Level
	Before	After	
Normal	10 (16.4)	35 (57.4)	+ 41 %
Mild-Moderate	30 (49.2)	24 (39.3)	-9.9 %
Severe	18 (29.5)	2 (3.3)	-26.2 %
Extreme	3 (4.9)	0 (0)	- 4.9 %

Classical music therapy can be said to be effective if there is a minimum pain scale decrease of 1.67 and a minimum decrease in anxiety level of 0.1. Table 5 shows that menstrual pain before in the

control group was 6.11 ± 2.237 with the lowest pain being 2 and 10 being the highest pain. After being given 40Hz sound intervention in the control group, there was a decrease in menstrual pain by 0.05 the average menstrual pain became $6.07 \pm 2,228$ with the lowest and highest pain remaining the same. While the average menstrual pain in the intervention group before was 6.46 ± 1.659 with the lowest pain being 3 and 9 being the highest pain. After being given classical music therapy for 20 minutes, the average menstrual pain scale decreased by 3.07 to 3.39 ± 1.626 with the lowest pain being 0 and the highest pain being 7.

Table 5. Comparison of menstrual pain before and after menstrual pain in both groups.

Menstrual Pain	Before	After	Δ Effectiveness of Menstrual Pain	P Value
Control Group, Mean \pm SD Median (min/max)	6.11 \pm 2.237 6.0 (2 / 10)	6.07 \pm 2.228 6.0 (2 / 10)	0.05	0.366
Intervention Group, Mean \pm SD Median (min/max)	6.46 \pm 1.659 7.0 (3 / 9)	3.39 \pm 1.626 3.0 (0 / 7)	3.07	<0.001

The level of anxiety in both groups decreased but in intervention group the delta effectiveness was greater than the control group. Delta effectiveness in the control group was 0.02 and in the intervention group was 0.77. It was said to be effective at least there is a decrease in anxiety level of 0.1 and the intervention group has a decrease in anxiety level of 0.77 which means it exceeds 0.1 so it can be said to be effective.

The tabulation results shown in table 6 show that there is a significant difference between prior menstrual pain in the control group compared to prior menstrual pain in

the intervention group. In addition, it can also compare menstrual pain after the intervention in the control group compared to menstrual pain after the intervention in the intervention group. The results were analyzed using Mann-U-Whitney and the P Value for the median difference between the control and intervention groups before the intervention was given was 0.337. After 20 minutes of intervention the p value for the median difference between the two groups was <0.001 . This indicates that before the intervention, the two groups were not significantly different, indicating that the two groups had pain that was not much different at first.

Table 6. Comparison of the menstrual pain scale of the control group with the intervention group before and after the intervention

Menstrual Pain	Control Group	Intervention Group	P Value
Before Intervention, Mean \pm SD Median (min/max)	6.11 \pm 2.237 6.0 (2 / 10)	6.46 \pm 1.659 7.0 (3 / 9)	0.337
After Intervention, Mean \pm SD Median (min/max)	6.07 \pm 2.228 6.0 (2 / 10)	3.39 \pm 1.626 3.0 (0 / 7)	<0.001

Furthermore, to find out whether there is a significant difference in menstrual pain before compared to menstrual pain after intervention in the control group, the Wilcoxon statistical test was being done. It can also compare menstrual pain before compared to menstrual pain after being given classical music for 20 minutes which is shown in table 5. It was found that the p value in the control group was 0.366 which means that there was no significant difference between menstrual pain before and menstrual pain after in the control group. Meanwhile, the intervention group had a p value of <0.001 which means a significant difference between menstrual

pain before compared to menstrual pain after being given classical music therapy.

To compare anxiety before in the control group compared to anxiety before in the intervention group, Chi-Square analysis was carried out and the results are in table 7. It can be seen that in both groups there were more respondents who had abnormal anxiety, as many as 54 respondents in the control group and 51 respondents in the intervention group before the intervention. It was found that there was no significant relationship between prior anxiety in the control group and the intervention group because the p value was 0.601. This is a good thing because it indicates that the control group and the intervention group have a level of anxiety that is not much different at first place.

Table 7. Anxiety before intervention in control group and intervention group

Intervention Type	Anxiety Before		Total	OR (95% CI)	P value
	Normal n (%)	Abnormal n (%)			
Control	7 (11.5)	54 (88.5)	61	0.661 (0.234-1.868)	0.601
Intervention	10 (16.4)	51 (83.6)	61		

Table 8. Anxiety after intervention in control group and intervention group

Group	Anxiety After		OR (95% CI)	P value
	Normal n (%)	Abnormal n (%)		
Control	8 (13,1)	53 (86,9)	0,112 (0,046-0,276)	<0,001
Intervention	35 (57,4)	26 (42,6)		

Chi-Square analysis test was also conducted to compare anxiety after intervention in the control group compared to anxiety after in the intervention group. The results are shown in table 8 where there are still more control group respondents who have abnormal anxiety after the intervention, as many as 53 (86.9%). While in the intervention group,

more respondents became normal anxiety after being given classical music therapy. In addition, found p value <0.001 which means there is a significant relationship between anxiety and the type of intervention after classical music therapy intervention.

Furthermore, to find out whether there is a significant difference between menstrual anxiety before compared to menstrual anxiety after intervention in the two groups, the Wilcoxon statistical test was carried out. The results are the p value in the control group is 0.317, which means there is no significant difference between anxiety before compared to anxiety after the intervention. Meanwhile, in the intervention group, a p value <0.001 was obtained, which means a significant difference between menstrual anxiety before compared to menstrual anxiety after being given classical music therapy.

Discussion

From the Mann-U-Whitney test in table 6, it was found that the median pain scale before classical music therapy was performed in the control group was 6 and in the group that would be given classical music therapy was 7. This difference was not statistically significant because p value = 0.337. Then the intervention group was given classical music therapy for 20 minutes and the pain scale after the intervention became 3. While in the control group who was not given classical music therapy intervention, the pain scale was the same as before it was given, namely 6. The median difference in pain between the control group and the control group intervention after being given classical music therapy was statistically significant with p value <0.001.

To see the difference in menstrual pain after getting the intervention in the

control group or the intervention group, a paired T-test can be done. However, the distribution of the data tested using the Kolmogorov-Smirnov got a P value <0.05 , so the Wilcoxon test was carried out. The results in table 5 have p value = 0.366 in the control group so that the average difference is not significant between the pain scales before and after the intervention. Meanwhile, in the intervention group, p value <0.001 was found which was significant between the pain scale before and after classical music therapy was given.

Table 5 also shows the delta of the effectiveness of classical music therapy to reduce the menstrual pain scale. If there is a decrease in the pain scale of 1.76, it can be said to be effective based on previous research conducted by Juan Sebastian Martin-Saaverda and Angela Maria Ruiz-Sternberg. In this study it was found that the average decrease in menstrual pain after classical music therapy was given was 3.07 while the control group who was not given classical music therapy was 0.05. This shows that classical music therapy is effective in reducing menstrual pain.

The results obtained are in accordance with the research journal that has been conducted by Amirul Amalia where the average value of pain before the intervention was 4.84 and the average pain after the intervention was 3.03 with a scale of 1.8 reduction. From the results of the paired t-test, the p value = 0.00 where p <0.05 is statistically significant.

In addition, the research conducted by Dwi Augstiana Sari, Zulkhah Noor and Azizah Khoiriati also got similar results. Dwi's study found that the difference in pain scale before and after the intervention in the control group was not significant. While the difference in pain scale before listening to classical music therapy and after listening to classical music therapy for 15 minutes in the intervention group was significant. The data obtained in the

previous study were the same as this study, namely after being given classical music therapy in the intervention group the results were significant. This is in accordance with the theory that the control group was not given classical music therapy which acts as a non-pharmacological therapy for dysmenorrhea. So that prostaglandins will be produced continuously by the uterus and increase in the blood so that the uterus will still experience contractions and pain occurs during menstruation. While the group given classical music therapy can stimulate relaxation and distract from the pain that is felt. Music therapy can also stimulate endorphins and reduce the production of prostaglandins. This is in accordance with Gate Control theory where classical music therapy works as pain modulation into sensory impulses where these sensory impulses will inhibit pain impulses by closing the gate in gate control theory. So the perception of pain will be reduced because it does not reach the cerebral cortex.^{11,12}

This study can also determine the level of anxiety of the intervention group and control group. To compare anxiety before in the control group and anxiety before in the intervention group, a Chi-Square test was performed with the results listed in table 7. It was found that the intervention group was protective 0.661 times to reduce anxiety compared to the control group with p value = 0.601, which means it is not significant. The insignificant relationship before the intervention is a good thing because it indicates that the control group and the intervention group have a level of anxiety that is not much different at the beginning, namely before the intervention. After that, the intervention group was given classical music for 20 minutes, while the control group was given 40 Hz sound for 20 minutes. To compare anxiety after in the control group compared to anxiety after in the intervention group, it can be seen in table 8. It was found that the intervention group was protective 0.112

times to reduce anxiety compared to the control group with p value <0.001.

To see the difference in anxiety after getting the intervention, the Wilcoxon test can be done because the distribution of data is uneven. From the results, it was found that p value = 0.317 in the control group, so the average difference was not significant between the level of anxiety before and after the intervention. As for the intervention group, p value <0.001 was obtained, so the average difference was significant between the level of anxiety before and after being given classical music therapy. Based on previous research conducted by Juan Sebastian Martin-Saavedra and Angela Maria Ruiz-Sternberg, it is said to be effective if there is a decrease in anxiety levels of 0.1. In this study, it was found that the average decrease in anxiety levels after being given classical music therapy was 0.77, while the control group who was not given classical music therapy was 0.02. This shows that classical music therapy is effective for reducing anxiety during menstruation.

What was obtained was corresponding with the research journal that had been previously conducted by

Juan Sebastian Martin-Saavedra and Angela Maria Ruiz-Sternberg that found a decrease in anxiety levels in the group given classical music therapy compared to the control group with p value = 0.049.⁷ The theory also said that classical music therapy can produce the release of endorphin hormones in the descending control system which will stimulate alpha waves to provide calm and comfort. So that endorphins not only help to reduce pain but also help to reduce anxiety. Another effect of classical music therapy is relaxing because of the activation of the parasympathetic nervous system and decreasing sympathetic stimulation, thereby reducing adrenaline activity and epinephrine levels. This will result in a decrease in respiratory rate, heart rate, neuromuscular tension, oxygen consumption, muscle tension, blood pressure and metabolic rate.^{11,13}

Conclusion

The results showed that classical music therapy was significantly effective in reducing dysmenorrhea pain and anxiety in Medical Students of Pelita Harapan University.

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