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ORIGINAL RESEARCH

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## EFFECT OF HARIRING KABAYAN INSTRUMENTAL MUSIC THERAPY ON PAIN AND ANXIETY LEVEL IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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### Abstract

**Background:** Death due to acute myocardial infarction (AMI) continues to increase every year. Efforts to prevent AMI complications through the control of pain and anxiety with the approach of classical music therapy have been widely practiced, but the approach through local music has not been much done when transcultural nursing theory emphasizes the importance of cultural approaches in nursing care, while Indonesia has a lot of local music that is a cultural potential which needs to be developed.

**Objective:** This study aims to know the effect of Hariring Kabayan instrumental music therapy in reducing pain and anxiety of AMI patients after 24 hours of CICU admission.

**Methods:** This was a quasi-experimental study with pretest-posttest control group design. There were 32 participants selected using consecutive sampling, which 16 assigned in an experiment group and a control group. Hariring Kabayan therapy was played at 60 BPM using headphones connected to the MP3 player for 30 minutes. Numerical Pain Rating Scale (NPRS) was used to measure pain and Numerical Rating Scale Anxiety (NRS-A) was used to measure anxiety. Data were analyzed using Paired t-test and Independent t-test.

**Result:** Hariring Kabayan instrumental music therapy given for 30 minutes gave a significant change on pain in the respondents ( $p = 0.005$ ), but it did not give a significant change on anxiety ( $p = 0.053$ ), with significant value of 0.05.

**Conclusion:** Hariring Kabayan instrumental music therapy is effective in reducing pain in AMI patients but ineffective in anxiety reduction.

**Keywords:** acute myocardial infarction; pain; anxiety; instrumental music; Hariring Kabayan

## INTRODUCTION

The World Health Organization (WHO) stated that the cause of death worldwide has shifted from infectious diseases to non-communicable diseases (NCD) (MOH, 2012). Deaths due to NCD are mostly caused by heart disease, which is equal to 39% (17.5 million cases). Of these heart diseases, 60% is Acute Myocardial Infarction (AMI), 30% of heart failure and 10% of heart disease. AMI mortality rate is predicted to continue to increase along with other NCDs, which in 2030 is estimated to reach 23.3 million cases

of deaths (MOH, 2014). The Center for Health Data and Information of Indonesia mentions that in the United States each year 565,000 people experience a new AMI and 300,000 people have a reinfarction (REAMI), which every 26 seconds one person has AMI, and every one minute causes one person to die (MOH, 2014).

Increases in mortality are also predicted to occur in developing countries on various continents, including in Asia. In Southeast

Asia in 2013, the average of deaths due to AMI was 1.8 million cases. In Indonesia, based on Basic Health Research in 2013, there were approximately 883,447 patients with AMI based on diagnostic categories and around 2.6 million AMI patients based on diagnostic and symptomatic categories.

At the provincial level, the mortality rate in West Java is still considered high, above the national average, reaching 0.5% (1,500 patients) based on diagnosis category, or 1.6% or (4,800 patients) based on diagnosis and symptoms ([MOH, 2013](#)).

Acute Myocardial Infarction is a heart disorder caused by an imbalance between oxygen supply and oxygen demand resulting in irreversible cell damage and death of the heart muscle ([Morton & Fontaine, 2008](#)). In developed countries, AMI patients visit the hospital on average within 6 to 12 hours after heart attack, while in developing countries with limited transportation access and lack of emergency services, AMI patients can be more than 24 hours to the hospital. Patients will be given major medical management to maintain heart function in the emergency room and after 24 hours the patient is confirmed to be in intensive room for treatment with strict observation ([Anderson et al., 2007](#)).

Patients with acute myocardial infarction are closely related to specific chest pain, and as a factor of anxiety ([Moradian & Msc, 2011](#); [Morton & Fontaine, 2008](#)). Study concluded that anxiety is a universal phenomenon in AMI patients ([Sugiarto, Anies, Julianti, & Mardiyono, 2015](#)). This is similar with the phenomenon in CICU of Hasan Sadikin Hospital in West Java, which the average number of AMI patients was 40 persons/month with pain and anxiety as the main complaint. Chest pain and anxiety peak at 12 hours after the onset, and after 24 hours the patient undergoes a gradual decrease in pain and anxiety ([Jia et al., 2012](#)). Chest pain in AMI patients is described with a very severe sensation in the arm and chest that spreads to the back, neck and jaw. While anxiety is due to a severe pain sensation and

threats such as helplessness, failure, loss of control to death threats ([Morton & Fontaine, 2008](#)).

Pain and anxiety affect the work of the sympathetic nervous system that responds to an increase in heart working frequency characterized by increased vital signs such as pulse, blood pressure, breathing and cardiac output, if not properly treated will increase the heart muscle workload and increase the use of oxygen which may aggravate myocardial infarction ([Morton & Fontaine, 2008](#)). Management of pain and anxiety during the 24-hour period of patients treated in ICU is pharmacologically performed with sedation, but pharmacological therapy does not completely solve the problem, new problems such as respiratory depression and cardiac instability often appear, with non-pharmacological therapy approach ([Hong, Flood, & Diaz, 2008](#); [Ruan, 2007](#)).

Music has been used since primitive period as a relaxing therapy. The power of music has been used in hospitals since Florence Nightingale era to help the healing process. This therapy continues to be developed until now including in the intensive room because it can reduce pain, anxiety and other psychological disorders ([Mahdipour & Nematollahi, 2012](#); [Suhartini, 2010, 2011](#)).

The characteristics of music therapy is direct, low-pitched, has a tempo of 60-80 beats, flowing melody, regular rhythm and good tone quality ([Chlan, 2009](#); [Morton & Fontaine, 2008](#)). Previous study stated that music therapy for 30 minutes can reduce pain and vital signs ([Liu & Petrini, 2015](#)). Supported by another study mentioned that music therapy for 20-90 minutes can affect the limbic system and stimulate alpha brainwaves that play a role in generating feelings of comfort, then stimulate the parasympathetic nerve to inhibit sympathetic nervous work to lower pulse, blood pressure and breathing ([Darliana, 2008](#)). However, a music used for therapy is the music that is familiar to patient according to Indonesian and its cultural context.

Cultural sensitivity in nursing is very important ([Morton & Fontaine, 2008](#)). The Leininger Transcultural Nursing Theory states that nursing care should be tailored to the beliefs, culture, values and lifestyle of individuals ([Giger, 2016](#)). The culture in West Java is one of the cultural diversities in Indonesia. The people of West Java, mostly Sundanese, are very familiar with Sundanese flute traditional music that has special meaning for the Sundanese people. Its seductive play seemed to bring in a peaceful, green, vast atmosphere with a calm wind ([Dienaputra, 2011](#)). Previous study revealed that Sundanese flutes are able to lower blood pressure ([Supriadi, Hutabarat, & Monica, 2015](#)) as one of the targets of nursing interventions in management pain and anxiety in AMI patients ([Cutshall et al., 2011](#); [Liu & Petrini, 2015](#)).

Instrumental music of Hariring Kabayan is a combination of Sundanese flute music and the sound of nature. Hariring Kabayan music has the characteristics of music therapy that presents the natural atmosphere of West Java that has a calming effect. Hariring Kabayan music is expected to provide the calm atmosphere that AMI patients desperately need to control pain and anxiety to avoid complications ([Cutshall et al., 2011](#)). This study aimed to examine the effect of Hariring Kabayan music therapy on pain and anxiety levels of patients with acute myocardial infarction.

## METHODS

### *Study design*

This study employed a quasi-experimental method with pretest posttest control group design. The study was conducted in the CICU of Dr. Hasan Sadikin Hospital Bandung. The study began on February 17, 2017 until March 14, 2017.

### *Sample*

The population in this study were all AMI patients treated in the CICU, Hasan Sadikin Hospital Bandung in the period of 17

February to 14 March 2017. Consecutive sampling was used to select samples. There were 32 participants selected, which 16 were assigned in the experiment and control group. The inclusion criteria of the sample included patients with AMI diagnosis, first incidence of attack, received anxiolytic & analgesic therapy, showed a pain score of at least 3 of the 0-10 Numerical Pain Rating Scale (NPRS), anxiety score at least 3 from 0- 10 Numerical Rating Scale Anxiety (NRSA), male, loved Sundanese music, got family support and able to communicate verbally. The exclusion criteria consisted of AMI patients who refused to be respondents, patients with hearing loss and unconscious.

### *Intervention*

This research was done by the researchers without research assistant. In the intervention group, respondents were recommended to take most comfortable position and emphasize to concentrate and focus during music therapy. Hariring Kabayan was played at 60 BPM using headphones connected to the MP3 player for 30 minutes. However, because respondents had different age levels then the volume was controlled by the respondents. The intervention was done in each patient's room, not in the special place. But although each patient had his own room with a glass wall but problems arisen where the researcher could not create a conducive environment for music therapy. There was a noise from CICU devices such as ventilator alarms and health practitioners' activities although efforts to minimize noise through headphones use had been made. While control group was given a deep breathing technique.

### *Instrument*

Numerical Pain Rating Scale (NPRS) was used to measure pain ([Sugiarto et al., 2015](#)). The scale ranges from 0 to 10, the number 0 indicates no pain and the number 10 indicates very pain. The patient was given the discretion to show the scale that represents his condition.

Numerical Rating Scale Anxiety (NRS-A) was used to measure anxiety ([Mardiyono, Songwathana, & Petpichetchian, 2011](#)). The scale ranges from 0 (no anxiety) to 10 (severe anxiety). Patients were given discretion to demonstrate the scale representing their condition. NRS-A had been used to assess S-Anxiety within 48 hours in patients with AMI and showed low anxiety (3.08; SD = 2.62). The relationship between NRS-A and S-anxiety scale was quite positive ( $r = .52$ ,  $p < 0.001$ ). It shows that NRS-A can replace S-Anxiety scale. The advantage of NRS-A is the timeliness of measurements that only take a while and do not burden the patient.

#### *Ethical consideration*

The study has been approved by the Research Ethics Committee of Poltekkes Kemenkes Semarang (Approval No: 014 / KEPK / Poltekkes-SMG / EC / 2017). Prior to data collection, each respondent was given an informed consent providing information on the purpose, benefits and research procedures.

#### *Data analysis*

Data processing and data analysis used SPSS. Pair group analysis of the variables of pain,

anxiety, diastole and pulse was performed using Wilcoxon test, while unpaired group test used Mann-Whitney test. Analysis of paired pairs of systole and pulse variables using Paired sample t-test, while unpaired test using independent sample t0test with significance value  $< 0.05$ .

## RESULTS

Table 1 shows that the average of respondents in the experiment group aged 58.88 year ranging from 41-73 years old, while in the average age of the control group was 59.19 years old ranging from 45.75. Homogeneity test showed p-value 0.920 ( $> 0.05$ , which indicated that there was no significant difference of age of the participants in both groups.

Table 2 shows that most of the respondents are STEMI patients and most of them are married. Both of these characteristics in both groups show an equal number respectively. There was no significant difference between the two groups ( $p = > 0.05$ )

**Table 1** Characteristics of participants based on age

Age	n	Mean	SD	Min-Max	p-value
Experiment	16	58.88	9.106	41-73	0.920
Control	16	59.19	8.384	45-75	

**Table 2.** Characteristics of respondents based on type of AMI and marital status

Variable	Experiment		Control		p-value
	n	%	n	%	
Type of AMI					
NSTEMI	7	46	6	38	0.465
STEMI	9	56	10	62	
Marital Status					
Married	11	68.75	10	62.5	0.710
Widower	5	31.25	6	37.5	

**Table 3** Paired t-test in the experiment and control group

Variable		Experiment (n=16)			Control (n=16)		
		Mean	SD	p-value	Mean	SD	p-value
Pain	Pre	3.81	± 0.65	0.005	3.88	± 0.71	0.157
	Post	3.31	± 0.71		3.63	± 0.61	
Anxiety	Pre	3.81	± 0.834	0.008	3.88	± 0.719	0.157
	Post	3.38	± 0.719		3.75	± 0.683	
Systole	Pre	124.50	±15.24	0.002	123.81	±13.5	0.109
	Post	120.94	±13.94		123.56	±12.61	
Diastole	Pre	81.88	±5.53	0.317	81.44	±7.16	0.317
	Post	81.81	±5.49		81.38	±7.33	
Pulse	Pre	93.50	±18.52	0.015	88.56	±17.6	0.085
	Post	90.19	±15.52		87.00	±16.03	
Respiration	Pre	22.25	±4.55	0.007	21.31	±4.79	0.317
	Post	21.19	±4.50		21.25	±4.69	

**Table 4** Independent t-test in the experiment and control group

Variable	Experiment (n=16)		Control (n=16)		Z/t	p-value
	Mean Rank/ Mean	Sum Rank/ SD	Mean Rank/ Mean	Sum Rank/ SD		
Pain	19.50	312.00	13.50	216.00	-2.252	0.024
Anxiety	19.00	304.00	14.00	224.00	-1.935	0.053
Systole	3.56	±3.759	1.25	±2.933	1.940	0.062
Diastole	16.50	264.00	16.50	264.00	0.000	1.000
Pulse	3.31	±4.799	±3.386	1.192	1.192	0.244
Respiration	20.69	331.00	12.31	197.00	-3.081	0.002

## DISCUSSION

### Effect of Hariring Kabayan instrumental music therapy on pain

Findings of this study showed that there was a significant effect of Hariring Kabayan music therapy in reducing pain. The significant decrease in pain in this study however is related to the mechanism of guide imagery or diversion through the music so that the respondents concentrate on the strains of Hariring Kabayan Instrumental music rather than the pain. In addition, Hariring Kabayan Instrumental music therapy composed of relaxation music, which is able to activate alpha wave on limbic that gives stimulus for the body to relax so as to enable the parasympathetic nerve impulse ([Bunt & Stige, 2014](#)).

It also relates to the Gate Control theory which mentions that, at one time, only one

impulse can travel from the bone marrow to the brain, if this impulse is filled with another mind then the pain sensation is not sent to the brain so the pain can be reduced ([Morton & Fontaine, 2008](#)). Pain in AMI patients are a typical acute pain characterized by a blockage of coronary arteries that spur anaerobic metabolism due to a lack of oxygen supply, the effect of anaerobic metabolism is the buildup of lactic acid. Lactic acid then responds to pain mediators such as histamine, bradykinin, serotonin, prostaglandin and calcium ions which then stimulate pain receptors and activate the sympathetic nerves. From the sympathetic nerve, it is then passed on to the spinal cord, the reticular activation system, the thalamus, the hypothalamus, the somatosensory cortex limbic system and finally the pain is perceived ([Morton & Fontaine, 2008](#)). The parasympathetic nerve is a part of the opposite neural function and can block the sympathetic nerve so that the



transmission is not passed on as pain. The parasympathetic nervous system is active when the mood is good, concentration on the other and the presence of analgesics ([Macintyre & Schug, 2014](#)).

The results of this study were in line with support previous study indicated that music therapy given for 20 minutes in patients after heart surgery could significantly reduce pain compared to the control group who did not use therapy music ([Cutshall et al., 2011](#)). Similar with the other study stated that the role of music in intensive care medicine in 30 minutes is capable of reducing cortisol levels in cardiac patients. Music with beat, frequency, rhythm composition, slow rhythms can affect the brain and heart that produce calm that affects the physical, emotional, mental, social, aesthetic, and spiritual ([Trappe, 2012](#)).

Findings of this study also support Suhartini's ([2011](#)) study that examines the patient's comfort in intensive unit indicated that music therapy in 25-30 minutes can reduce pain so greatly contribute to patient comfort. AMI patients are patients with critical organ disorders that require a comfortable environment for their physical and psychological conditions ([Morton & Fontaine, 2008](#)). Thus, nurses in intensive unit are required to provide patient comfort, and Hariring Kabayan Instrumental music therapy can be used as an intensive therapy medium.

Hariring Kabayan music therapy has a moderate effect size of 0.484, which is better than previous study, which only have effect size of 0.12 ([Cutshall et al., 2011](#)). The resulting strength of the effect indicates that "known music" is capable of giving better effect, which is in accordance to Morton, et al ([2008](#)) stated that ICU patients choose music that is familiar to them for therapeutic use. So, it can be concluded that Hariring Kabayan Instrumental therapy is suitable for therapy for the people of West Java because it has a very familiar musical composition for the people in that province.

The strength of the resulting effects also indicates that the nurse's sensitivity to culture in nursing care is important to provide a curing environment and avoid cultural shock if the nurse does not understand the patient's background. This is in accordance with the statement of the theory which states that cultural sensitivity in creating a curing environment for intensive patients is very important in nursing interventions because the response and individual values may vary in culture ([Morton & Fontaine, 2008](#)).

Sundanese flute in Hariring Kabayan instrument is one of the local wisdoms of Sundanese culture. In the theory of transcultural nursing, local music is the application of the symbolic environment that is part of the "environment" in the Leininger theory paradigm. All respondents in this study are Sunda tribe and happy with Sundanese music. After done the Hariring Kabayan therapy, most of the respondents stated more relaxed and comfortable. The study of the potential use of local wisdom in reducing specific pain of AMI disease has not been done, but in other diseases in the other studies indicated that socio-cultural power through traditional music is able to provide the effectiveness on the decrease of pain significantly ([Oktavia, Gandamiharja, & Akbar, 2013](#); [Somoyani, Armini, & Erawati, 2013](#)).

The results of this study when compared with previous research using a spiritual approach on AMI patients showed that the effect of Hariring Kabayan music is not better than spiritual approach ([Sugiarto et al., 2015](#)). This is because spiritual therapy provides a relaxing effect and reaches the deeper areas of the patient, while Hariring Kabayan therapy only provides a relaxing effect only. Nevertheless, both studies show that the holistic aspect of the patient's approach is able to contribute more to the decrease in pain of AMI patients after 24 hours of admission to ICU compared with nursing only focused on the physical aspect alone.

From the above discussion, the use of the cultural aspect of creating a "curing environment" for patients with intensive care has been shown to be effective in reducing the pain of AMI patients after 24 hours of CICU admission, as evidenced by the results of paired and unpaired group analysis, thereby Hariring Kabayan therapy is effective in reducing pain and leads to a positive effect on patient comfort and healing.

### **Effect of Hariring Kabayan instrumental music therapy on anxiety**

Findings of this study showed that there was a significant effect of Hariring Kabayan music therapy in reducing anxiety in AMI patients after 24 hours of CICU admission. The effectiveness of this study is different from the effectiveness of the pain variables. Pain is literally related to anxiety ([Ji, Fu, Ruppert, & Neugebauer, 2007](#)), but Morton ([2008](#)) mentions that pain is not the only cause of anxiety; other causes of anxiety for AMI patients are the fear of death, sense of isolation, the threat of helplessness and the threat of loss of function and self-esteem. Thus, the results of this study may be influenced by many other factors besides pain in the form of threats that disturb the patient psychologically.

During interviews, several patients revealed that their hearts were no longer intact so they were worried about a repeated attack which is more severe and takes their lives. Other concerns were about the survival of their abandoned family members. Concerns of respondents as described above are common for heart patients ([Moser et al., 2010](#)). Study indicated that poor management of anxiety can lead to depression and more dangerous ([Roest, Zuidersma, & de Jonge, 2012](#)). This proves that someone who has been suffered from AMI will continue to get anxiety even depression. Thus, the meaninglessness of the results of this study in reducing anxiety is often found that because anxiety is part of the psychologically complicated heart patients, it is what inspired some researchers above to examine and find the best method to improve

quality of life by improving the psychological patient post-AMI ([Moser et al., 2007](#)).

Although the results of Hariring Kabayan music therapy were almost close to the significant ( $p = 0.053$ ) limit, but in this case, it is concluded that it has not been effective in reducing the anxiety of AMI patients. Problems during the research is that researchers have not been able to create a conducive environment for music therapy. Noise from the CICU environment such as the sounds of ventilator machines and the activities of health practitioners were most widely expressed by patients, which cannot be controlled due to the procedure of treatment. Efforts to minimize noise had been done with the use of headphones while listening to music, but the results had not been maximized. The meaninglessness of the anxiety score is also consistent with the systole, diastole and pulse scores that were also not significant, according to the Morton, et al ([2008](#)) statement, based on a study of 2,500 respondents, it was concluded that there are 5 main indicators of anxiety: blood pressure, pulse, agitation, anxiety and patient statements. This suggests that systole, diastole and pulse are closely related to anxiety as a clinical indicator. While respiratory scores showing significant numbers were not included as a major indicator of anxiety.

Through the above description, although statistically the overall conclusions of the results of this study did not indicate a significant rate of decrease in anxiety, but Hariring Kabayan music therapy with a background of cultural aspects on the basis of paired groups gives a better effect than interventions that only focus on the physical aspect alone in decreasing anxiety of AMI patients.

### **CONCLUSION**

Hariring Kabayan music therapy is effective in reducing pain in AMI patients, but not effective in reducing anxiety. However, this therapy can be used as a complementary

therapy in reducing pain, especially for AMI patients in West Java. Further research is expected to modify a more conducive environment for music therapy.

#### Declaration of Conflicting Interest

None declared.

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#### Author Contribution

All authors contributed equally in this study.

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