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ORIGINAL RESEARCH

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## THE INFLUENCE OF SUNDANESE ZITHER (*KACAPI*) MUSIC THERAPY ON ANXIETY LEVELS IN PRE-CARDIAC CATHETERIZATION PATIENTS

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### Abstract

**Background:** Patients who will have cardiac catheterization mostly experience anxiety. Unresolved anxiety may have a harmful effect such as increasing frequency of heart, breathing and blood pressure as well as risks of complication. Music is considered effective in reducing anxiety.

**Objective:** This study aims to examine the effect of Sundanese zither (*kacapi*) music therapy on anxiety level in pre-cardiac catheterization patients.

**Methods:** This was a quasi-experimental study. Fifty-six respondents were selected using consecutive sampling technique, which 28 respondents assigned in the experiment group and control group. Anxiety was measured using Hamilton Anxiety rating Scale (HARS). Data were analyzed using Wilcoxon and Mann-Whitney test.

**Results:** The results showed an average decrease in anxiety value in the experiment group of 10.28, and in the control group of 3.25. Mann-Whitney test results obtained p value <0.001, which indicated that there was a significant difference of mean decrease between the experiment group and the control group.

**Conclusion:** This study proves that the intervention of Sundanese *kacapi* music significantly decreasing anxiety levels (p <0.001) in pre-cardiac catheterization patients. It is suggested that Sundanese *kacapi* music can be used as an alternative therapy in the independent nursing interventions.

**Keywords:** anxiety; music therapy; Sundanese, zither; *kacapi*; cardiac catheterization

### BACKGROUND

Cardiovascular disease is multifactorial disease. The most common type of cardiovascular disease is Coronary heart disease (CHD) as the leading cause of death in the next fifteen years. CHD is caused by atherosclerosis. The ways to identify and diagnose the presence of CHD are from non-invasive techniques, such as electrocardiography (EKG), to invasive examination, such as coronary arteriography (cardiac catheterization). Cardiac

catheterization is done to restore the flow to the blocked blood vessels, to open the stenotic heart valve (narrow) and to repair congenital damage. However, patients who will have cardiac catheterization mostly experience anxiety ([Bonow, Mann, Zipes, & Libby, 2011](#); [Mann, Zipes, & Peter Libby, 2014](#)).

Anxiety experienced by the patients is caused by lack of accompanying friend, delivery of the first procedure, lack of satisfactory

information and length of waiting time. If anxiety is not resolved, then it will have a harmful effect, such as extending cardiac catheterization time, increasing the risk of complications, increasing heart frequency, breathing and blood pressure ([Andri, 2007](#); [Safaria & Saputra, 2009](#)). Thus, anxiety management of this patient need to be performed.

Anxiety management can actually be done through pharmacological and non-pharmacological therapies. The proven and useful non-pharmacological management is an integrated therapy in the form of complementary and alternative therapies, especially in anxious management. Non-pharmacological management can make body more relaxed and make sleep better. This non-pharmacological therapy can be implemented by nurses independently, one of which is the intervention of music therapy, such as Sundanese zither (*kacapi*) music therapy ([Andri, 2007](#); [Mulidah & Triyanto, 2009](#); [Safaria & Saputra, 2009](#); [Weeks & Nilsson, 2011](#)). The use of Sundanese kacapi music as a therapy in cardiac catheterization patients can improve the meaning of transcultural nursing and values in the application of nursing care to patients so as to deepen the cultural values in society. Listening to Sundanese kacapi music in Central Java Indonesia can enhance the development of specific and universal culture-oriented nursing practices, so that the wider community recognizes and accepts the cultural diversity in Indonesia as well as to improve local wisdom ([Andri, 2007](#)).

Music therapy can increase emotional coping and positive affective status, gain psychological satisfaction, improve well-being during surgery, and have an effect on decreased blood pressure, pulse, breathing, heart frequency, decrease hormones. Music can lower the stimulus of the sympathetic nervous system. When the music is playing, the music in the form of sound waves is received by the earlobe and then will go into the external auditory canal and then the sound waves vibrate the tympanic membrane and continued to vibrate the hearing bones of

malleus, incus and stapes and proceed to the house snail or cochlea then received by the auditory nerve (the cochlear vestibule nerve) and will be received by the brain (temporal lobe) as a sound sensation. The sound produced by the music will stimulate the expenditure of endorphins that will affect the working mechanism of the limbic system in the amygdala in the emotional setting and mood of feeling. If the regulation of emotions by the amygdala can be well organized, then one can control the emotions well and feel no anxiety. Listening to music with slow rhythm will also reduce the release of catecholamines into the blood vessels, so the concentration of catecholamines in the plasma becomes low. It can also activate the sympathetic and cause the release of stress hormones that result in relaxing the body ([Weeks & Nilsson, 2011](#)).

There are several studies have been conducted in regards to the use of Sundanese kacapi music, such as Supriadi's research that examined the influence of Sundanese flute kacapi music in decreasing blood pressure in elderly in Yogyakarta ([Supriadi, Hutabarat, & Monica, 2015](#)). Some studies used different kind of music such as classical and Javanese music to reduce anxiety in pre-catheterization patients ([HATI, Wibowo, & FarK, 2010](#)). However, lack of studies examines the impact of Sundanese kacapi music in decreasing anxiety in pre-catheterization patients.

## METHODS

### *Study design*

This was a quasi-experimental study with pretest posttest control group design.

### *Sample*

Fifty-six respondents were selected using consecutive sampling technique, which 28 respondents assigned in the experiment group and control group. The inclusion criteria of the sample were: 1) Patients who would have cardiac catheterization, 2) Aged 40-65 years, 3) Willing to follow research and listen to Sunda kacapi music, 4) Already got explanation about pre -catheterization

procedures, 5) Never have other relaxation techniques such as deep breathing relaxation, reciting the Qur'an or any other techniques. The exclusion criteria were: 1) Patients who got antidepressant therapy, and 2) Patients who had hearing loss.

#### *Instrument*

Anxiety was measured using Hamilton Anxiety rating Scale (HARS) ([Sulistiyo et al., 2017](#); [Yazici, Demir, Tanriverdi, Karaagaoglu, & Yolac, 1998](#)), which was developed by Max Hamilton in 1959 with good validity and reliability. The scale consisted of 14 items with 5 levels of score (between 0-4). The anxiety level was classified based the number of scores summed. It refers to no anxiety if score <14, mild anxiety if score 14-20, moderate anxiety if score 21-27, and severe anxiety if score > 28. Anxiety was measured before and after given intervention.

#### *Intervention*

MP3 and headphones were used to listen the music and each patient had the same brand. The music was given for 15 minutes and between 1-2 hours before the patient performed cardiac catheterization by the researchers accompanied by nurses in the ward. Sundanese kacapi music is music in instrumental form and has low tones with strings and with minimal bass percussions. The music was given in a slow tempo with 128 kilobytes per second (kbps) and 70 decibel (Db). This music has been validated in Semarang Music Studio; with the type of song was the melody from Ayun Ambing song using pentatonic scales that consisted of five tones only. The patterns of the melody used octaves (jumping from low to high on the same note). Audio in the song of Ambun Ambing was 77dB (left) and 88 dB (right)

recorded with a stereo system. There were R and L mark to be easy for respondents to put on. The form of instrumental song using the tempo of 129.1 beats per minute means it has slow tempo with the overall tap of 731 with 128 kbps voice quality. The overall song Ayun Ambing did not use human voice, but using only the sound of Sundanese kacapi instruments ([Supriadi et al., 2015](#)). This musical intervention was given only to the experiment group, while control group was only given a standard therapy from the hospital. During therapy, the researchers and nurses assure there would be no interruption.

#### *Data analysis*

The data analysis of this research consisted of univariate and bivariate analysis. Univariate analysis was used to describe mean and median of the data. While bivariate analysis consisted of Wilcoxon and Mann-Whitney test to examine the effect of Sundanese Kacapi Music on anxiety levels, and compare the effect between the experiment and control group.

## RESULTS

Table 1 shows that the mean of anxiety level in the experiment group during pretest was 32 and decreased to 18.46 during posttest. Wilcoxon test obtained value <0.001, which indicated that there was significant difference in anxiety level between pretest and posttest. Similar with the control group, there was a significant decrease in the mean of anxiety level between pretest (28) and posttest (26.42) with p-value <0.001. However, the experiment group shows the greater decrease in anxiety level compared to the control group.

**Table 1** Comparison of anxiety level before and after intervention between the experiment and control group using Wilcoxon test

Anxiety		Mean ± SD or Median (min-max)	P value
Experiment group	Pretest	31(15-48)	P < 0.001
	Posttest	18.46 ± 7.99	
Control group	Pretest	28 (13-43)	P < 0.001
	Posttest	26.42 ± 7.67	

**Table 2** Mean difference between pretest and posttest in the experiment and control group using Mann-Whitney

Group	Mean $\pm$ SD or Median (min-max)	P value
Experiment	10.28 $\pm$ 4.96	P < 0.001
Control	2.50 (0-9)	

Table 2 shows that the mean difference of anxiety level between pretest and posttest in the experiment group was 10.28, while mean difference of anxiety level in the control group was 2.50. Mann-Whitney value obtained p-value <0.001 which indicated that there was a significant difference in the mean level of anxiety. It could be said that Sundanese Kacapi music therapy was effective in reducing anxiety levels compared to the intervention in control group.

## DISCUSSION

Findings of this study indicated that as many as 56 respondents experienced different anxiety at the time of pretest. The experiment group was categorized in severe anxiety level, which the mean of anxiety score was  $28.75 \pm 11.20$ ; while the control group was also categorized in severe anxiety level, which the mean of anxiety score was  $29.67 \pm 6.62$ .

Several risk factors may also increase anxiety in preoperative patients, such as length of stay, smoking history, mild psychiatric disorders and negative perceptions of preoperative procedures ([Andri, 2007](#); [Safaria & Saputra, 2009](#)). Therefore, before undergoing surgery, the patient should have an explanation regarding the operation. The effects of anxiety include prolonged cardiac catheterization, increased risk of complications, and worsening heart conditions. Anxiety in this study includes feeling tense, pounding, depressed in the chest, muscle tension, insomnia, and frequent urination ([Taylor-Piliae & Chair, 2002](#)). Anxiety experienced by patients ranging from moderate to severe anxiety. Cardiac catheterization patients basically have anxiety with mild, moderate, severe anxiety levels in both the experiment group and the control group. Actually, to overcome the problem of anxiety in addition to being given

complementary therapy is also from the individual himself as well the coping strategy, whether the individual ultimately accepts by himself or is given a health education.

Previous study explains that women and men do not differ in their preoperative anxiety ([Karanci & Dirik, 2003](#)). It is explained that the anxiety of patients in a special unit such as in the heart unit may be different, due to concerns about his condition and a concern to the professionalism of care ([Castillo, Aitken, & Cooke, 2013](#)). Findings of this study showed that there was difference in anxiety value in the experiment and control group before and after intervention ( $p < 0.001$ ), which means that after the intervention of the Sundanese kacapi music there was an anxiety change in the experiment group, while in the control group after the standard action of the hospital was implemented, the anxiety of the respondents also changed significantly.

However, the results of this study also showed that there were differences in anxiety values between the experiment group and the control group ( $p < 0.001$ ) with an average change of  $3.25 \pm 2.86$  in the control group and  $10.28 \pm 4.96$  in the experiment group with the difference in the anxiety value between the two groups reaching 7.03. Anxiety reduction in this study was greater than that of previous study, in which the combination of music and emotional coping given for 30 minutes in cardiac catheterization patients was able to reduce anxiety. In addition, the study also showed a decrease in anxiety greater than that of another study which music was administered for 20 minutes in a preoperative patient.

The result of this study shows that there was a difference between the experiment group and the control group, but the change of respondent's anxiety value in the experiment

group was bigger than the control group, which is similar to the previous research ([Ghetti, 2013](#)). In the experiment group there were 28 respondents experiencing decreased anxiety. This indicates that anxiety-relieving efforts using Sundanese kacapi music provide a better effect for the patient, in which both the experiment group and the control group were still given a comfortable environment and treatment process based on the standard of the hospital.

On the other hand, of 28 respondents in the control group, there were 7 respondents who did not experience decreased anxiety, and 11 patients experienced decreased anxiety. The decrease in anxiety occurring in the control group may be due to the presence of other complementary interventions such as in-patient respiratory relaxation performed by the respondent or guided by the nurse, or other relaxations provided such as family support and caring from nurses, then the patients will eventually accept that they will have cardiac catheterization. Although some of these factors may also be experienced by the experiment group. However, the results of statistical tests indicated that the experiment group and the control group have the same or homogeneous data variance that can be ascertained that the decrease in anxiety occurring in the experiment group was due to the influence of the intervention of the Sundanese kacapi music.

As quoted by Susan from Halm and Novaes that the patient's anxiety experience is not only due to the physiological disorder that occurs, but also because of the perceived threat associated with threats from the treatment room environment ([Frazier et al., 2002](#)). The condition is corroborated by systematic review results, which concluded that music is effective in reducing anxiety in patients in hospital, but cannot reduce anxiety during invasive or unpleasant procedures ([Evans, 2002](#)). And the other studies explain that the effect of music on anxiety is not distinguished by gender and also has no impact on age. All patients are expected to focus on listening to music so as to benefit from the music therapy

provided ([Ottaviani, Jean-Luc, Thomas, & Pascal, 2012](#)).

According to Kolcaba's theory, the rhythm, sound, and harmony of music create comfort, when the patient listens to music, the patient can feel relaxed ([Green & Setyowati, 2004](#)). This is explained by a neurophysiologic mechanism. Music that is played to patients who are experiencing preoperative anxiety has stimulated the limbic system, which will stimulate phenylethylamine expenditure. The substance may affect the patient's mood ([Ebnesahidi & Mohseni, 2008](#)). The results of this study indicated that Sundanese kacapi music was proven to effectively reduce the anxiety of patients. Like the mechanism of pain relief, the lilting and peculiar rhythms of the Sundanese kacapi music can provide a feeling of calm and relaxation because the music can affect the workings of the sympathetic and parasympathetic nervous system ([American Music Therapy Association, 2010](#); [Frazier et al., 2002](#); [Setyawan, Susilaningsih, & Emaliyawati, 2013](#)).

Previous research has suggested that Sundanese kacapi music can affect brain waves through FFR mechanisms that are believed to be healthy for 5%-10% of nerve cells ([Cooke, Chaboyer, & Hiratos, 2005](#); [Price & Wilson, 2005](#)). The Sundanese kacapi music given in this study was for 15 minutes. Study shows that musical interventions given for at least 15-20 minutes can induce relaxation ([Chlan, 2009](#); [Cutshall et al., 2011](#)). The music is proven to have sedative effects on patients who listen so that the anxiety of patients decreased.

## CONCLUSION

There was a significant difference in anxiety levels between the experiment and control group. Sundanese kacapi music therapy was effective in reducing anxiety level in pre-catheterization patients. It is suggested that Sundanese kacapi music can be used as an alternative therapy in the independent nursing interventions.



## Declaration of Conflicting Interest

None declared.

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## Author Contribution

All authors contributed equally in this study.

## References

- American Music Therapy Association. (2010). *Music therapy and music-based interventions in the treatment and management of pain: Selected references and key findings*. United States: American Music Therapy Association.
- Andri, Y. D. (2007). Teori kecemasan berdasarkan psikoanalisis klasik dan berbagai mekanisme pertahanan terhadap kecemasan [Anxiety theory based on classic psychoanalysis and other coping mechanism toward anxiety]. *Majalah Kedokteran Indonesia*, 57(7), 233-238.
- Bonow, R. O., Mann, D. L., Zipes, D. P., & Libby, P. (2011). *Braunwald's heart disease e-book: A textbook of cardiovascular medicine*. Philadelphia: Elsevier Health Sciences.
- Castillo, M. I., Aitken, L. M., & Cooke, M. L. (2013). Study protocol: intensive care anxiety and emotional recovery (Icare)—a prospective study. *Australian Critical Care*, 26(3), 142-147.
- Chlan, L. (2009). A review of the evidence for music intervention to manage anxiety in critically ill patients receiving mechanical ventilatory support. *Archives of Psychiatric Nursing*, 23(2), 177-179.
- Cooke, M., Chaboyer, W., & Hiratos, M. A. (2005). Music and its effect on anxiety in short waiting periods: A critical appraisal. *Journal of Clinical Nursing*, 14(2), 145-155.
- Cutshall, S. M., Anderson, P. G., Prinsen, S. K., Wentworth, L. J., Brekke, K. M., Li, Z., . . . Bauer, B. A. (2011). Effect of the combination of music and nature sounds on pain and anxiety in cardiac surgical patients: A randomized study. *Alternative Therapies in Health and Medicine*, 17(4), 16.
- Ebneshahidi, A., & Mohseni, M. (2008). The effect of patient-selected music on early postoperative pain, anxiety, and hemodynamic profile in cesarean section surgery. *Journal of Alternative and Complementary Medicine*, 14(7), 827-831.
- Evans, D. (2002). The effectiveness of music as an intervention for hospital patients: a systematic review. *Journal of Advanced Nursing*, 37(1), 8-18.
- Frazier, S. K., Moser, D. K., Riegel, B., McKinley, S., Blakely, W., Kim, K. A., & Garvin, B. J. (2002). Critical care nurses' assessment of patients' anxiety: reliance on physiological and behavioral parameters. *American Journal of Critical Care*, 11(1), 57-64.
- Ghetti, C. M. (2013). Effect of music therapy with emotional-approach coping on preprocedural anxiety in cardiac catheterization: A randomized controlled trial. *Journal of Music Therapy*, 50(2), 93-122.
- Green, W., & Setyowati, H. (2004). *Alternative therapy*. Yogyakarta: Yayasan Surviva Paski.
- Hati, F. N. A. N., Wibowo, S., & FarK, P. (2010). Pengaruh musik klasik dan musik Jawa terhadap fungsi kognitif pada penderita stroke iskemik akut [Effect of classic and Java music therapy on cognitive function in patients with acute ischemic stroke]. Yogyakarta: Universitas Gadjah Mada.
- Karanci, A., & Dirik, G. (2003). Predictors of pre-and postoperative anxiety in emergency surgery patients. *Journal of Psychosomatic Research*, 55(4), 363-369.
- Mann, D. L., Zipes, D. P., & Peter Libby, M. (2014). *Braunwald's heart disease: A textbook of cardiovascular medicine* (10<sup>th</sup> ed.). Philadelphia: Saunders.
- Mulidah, S., & Triyanto, E. (2009). Upaya pengendalian respon emosional pasien hipertensi dengan terapi musik dominan frekuensi sedang [Effort to control emotional response in hypertensive patients using music therapy with medium frequency]. *Jurnal Keperawatan Soedirman*, 4(1), 41-45.
- Ottaviani, S., Jean-Luc, B., Thomas, B., & Pascal, R. (2012). Effect of music on anxiety and pain during joint lavage for knee osteoarthritis. *Clinical Rheumatology*, 31(3), 531-534.
- Price, S. A., & Wilson, L. M. (2005). *Patofisiologi konsep klinis proses-proses penyakit [Pathophysiology of clinical concept of disease processes]*. Jakarta: EGC.
- Safaria, T., & Saputra, N. E. (2009). *Manajemen emosi: Sebuah panduan cerdas bagaimana mengelola emosi positif dalam hidup anda [Emotional management: A smart guideline to manage positive emotion in your life]*. Jakarta: Bumi Aksara.
- Setyawan, D., Susilaningsih, F. S., & Emaliyawati, E. (2013). Intervensi terapi musik relaksasi dan suara alam (nature sound) terhadap tingkat nyeri dan kecemasan pasien (literature review) [Relaxed music therapy and nature sound on pain and anxiety of patients (review literature)]. *Jurnal Ilmu Keperawatan dan Kebidanan*, 1(8).
- Sulistiyo, Y., Santoso, B., Shobirun, S., Hadisaputro, S., Latifah, L., & Endang Pujiastuti, R. S. (2017). Effect of psychoeducation on anxiety in patients with coronary heart disease. *Belitung Nursing Journal*, 3(6), 743-749.
- Supriadi, D., Hutabarat, E., & Monica, V. (2015). Pengaruh terapi musik tradisional Kecapi Suling Sunda terhadap tekanan darah pada lansia dengan hipertensi [Effect of traditional music therapy Kecapi Suling Sunda on blood

- pressure in elderly with hypertension]. *Jurnal Skolastik Keperawatan*, 1(2), 29-35.
- Taylor-Piliae, R. E., & Chair, S.-Y. (2002). The effect of nursing interventions utilizing music therapy or sensory information on Chinese patients' anxiety prior to cardiac catheterization: A pilot study. *European Journal of Cardiovascular Nursing*, 1(3), 203-211.
- Weeks, B. P., & Nilsson, U. (2011). Music interventions in patients during coronary angiographic procedures: A randomized controlled study of the effect on patients' anxiety and well-being. *European Journal of Cardiovascular Nursing*, 10(2), 88-93.
- Yazici, M. K., Demir, B., Tanriverdi, N., Karaagaoglu, E., & Yolac, P. (1998). Hamilton anxiety rating scale: interrater reliability and validity study. *Turkish Journal of Psychiatry*, 9(2), 114-117.

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