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The Effect of Music Instrument Kacapi Suling "Ayun Ambing" Towards Reducing Blood Pressure of Hypertension

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Abstract

Background: Hypertension is still the most common complaint in Indonesia. Apart from causing some discomfort, complications of hypertension are also considered to be life-threatening. One therapy that can be used to lower blood pressure is music therapy. Kacapi suling is one of the traditional Sundanese music that is popular among the Sundanese people with a frequency of 50–75 Hz, 121 Kilobytes per second (Kbps), 76 decibels with a slow tempo.

Objective: This study aims to find out the effect of kacapi suling instrument music therapy on blood pressure in hypertensive patients.

Methods: This study used a Pre-Experimental Design in the form of a One-Group Pretest-Posttest with 20 respondents with hypertension. Data collection tools in the form of a sphygmomanometer, a questionnaire containing the respondent's biodata, gadgets, loudspeakers, and stationery. Instrumental music is played once with a duration of approximately 5 minutes using a device connected to a loudspeaker. Before and after blood pressure measurements were taken. Data analysis in this study using Wilcoxon.

Results: The results showed that the average systolic pre-test score was 142.86 while the post-test average was 135.24 with a p-value = 0.001. The average post-test diastolic value was 87.62 and the average post-test score was 84.29 with a p-value = 0.122.

Conclusion: There is an effect of kacapi suling "Ayun Ambing: instrument music on decreasing systolic blood pressure in hypertensive patients but there is no effect on diastolic blood pressure.

Keywords: ayun ambing, hypertension, music therapy

Introduction

Hypertension is a health disorder experienced by humans all over the world. Hypertension is the greatest risk of mortality and morbidity in the cardiovascular system. If not treated properly, hypertension can lead to complications such as stroke, kidney failure, myocardial infarction, and death. Therefore hypertension must be detected early and treated properly. More than 77% of stroke patients, 69% of heart attack patients, and 74% of patients with congestive heart failure (CHF) suffer from high blood pressure >140/90 mmHg. This causes death in 45% of patients with heart problems and 51% of deaths in stroke patients.¹

The World Health Organization (WHO) states that currently there are 1.13 billion people worldwide with high blood pressure. Two-thirds of these people live in developing countries with lower-middle income.² Based on the 2018 Balitbangkes Riset Kesehatan Dasar (Riskesdas), data shows that hypertension is still the third-largest disease after stroke and tuberculosis in Indonesia with an incidence rate of 24% in men and 22.6% in women.³ According to the Jambi Provincial Health Office, the total data for hypertension sufferers in 2017 was 102,895 (12.63%), and the total hypertension sufferers in 2018 increased to become the second of the ten biggest diseases that occurred in Jambi city, which was 117,414 people (12.18 %) people with hypertension.⁴

A person who is sentenced to have high blood pressure is usually advised to take drugs such as amlodipine to keep blood pressure under control and avoid complications. In addition to these drugs, complementary therapies can be given to control blood pressure in hypertensive patients, such as drinking lots of water, exercising, regulating diet, breathing, and music as relaxation techniques.⁵ Several studies have described the benefits of complementary therapy in keeping blood pressure stable. Knowledge about this therapy needs to be learned by people with hypertension, so it can help prevent worsening or complications, one of which is music therapy, especially music with a slow rhythm.

Human life cannot be separated from rhythm. The pulse and heartbeat of humans also have a special rhythm. Physiologically, the right hemisphere of the brain shows work activity when music is played. The reaction shown by the brain depends on the type of music that affects it.⁶ The type of music with a fast rhythm, fast tempo, with high frequency gives a different effect compared to music with a soft rhythm and slow tempo. Music therapy is not only related to certain fields of science such as psychology but can also be used in the medical and nursing circles, one of which is for stress management, overcoming pain, as well as stimulating infant growth and development.⁶ Music by its nature is easily felt and accepted by various stages of human growth and development, from fetuses, infants, children to the elderly. In addition, various types of music that are influenced by culture and individual values are received differently by humans. Some like instrument music, lyrical music, traditional music, or modern music. Everyone gets their place in the hearts of the audience.

A person's taste for certain music will have various effects on the brain. In terms of lowering blood pressure, it is suspected that plasma catecholamine concentrations affect sympathetic adrenergic activation and ultimately lead to the release of stress hormones. Listening to music, especially slow rhythmic music will reduce the release of catecholamines into the blood vessels so that the concentration of catecholamines in plasma is low. This causes the body to relax, heart rate decreases and blood pressure drops. In this case, it can be concluded that music that is suitable to be applied as therapy is music that does not have a fast rhythm. Music with a fast rhythm will feel more heart-stimulating than slow music. The brain will feel more tired if you listen to fast rhythmic music continuously, especially if you listen to people with high blood pressure.

There are so many types of music that can be used as therapy for healing, such as classical music or traditional music, one of which is the traditional music of the flute harp. The flute harp is a Sundanese musical instrument that is found in almost every area in the

The Effect of Music Instrument Kacapi Suling "Ayun Ambing" Towards Reducing Blood Pressure of Hypertension

Sundanese region, consisting of the harp and flute, and is usually presented instrumentally which produces harmonious and beautiful tones. Often the flute harp is the main complement whose chants not only accompany Sundanese songs but also foreign songs.⁶ Instrumental music is the sounds produced by musical instruments, be it wind instruments, strings, or punches. Expressions produced through the human voice are called vocals, while expressions produced through musical instruments are called instrumentals.⁷ It is not difficult to adapt the musical instrument of the kacapi suling as a therapy, especially when it is applied to people from Tatar Sunda. A therapy that is adopted or culturally colored will be more emotionally relevant to people of identical cultures.

Dominant music therapy with moderate frequency (750–3000Hz) can be used as an alternative for controlling the emotional response of primary hypertension patients. This is indicated by the results of the statistical analysis of blood pressure between the treatment group and the control group using the t-test, which obtained t-count = -12.870 and p = 0.000. This shows that moderate frequency dominant music therapy is very significant for controlling blood pressure response in primary hypertensive patients.⁸ Another study revealed that there was a difference between the level of loneliness of the experimental group before and after being given angklung music therapy (with a significance level of 95%).⁶ It can be concluded that playing the angklung musical instrument in groups can improve the mood and ability to interact with the research subjects because the angklung musical instrument contains elements of comfort, fun, togetherness, and recreation when playing it. This also proves that beautiful music can have a good effect on the listener, giving happiness so that it is easily accepted and applied as a therapy.

The type of musical instrument used in this study is the kacapi suling with the title "Ayun Ambing" accompanied by the sound of a flute and a harpsichord. "Ayun Ambing" has a frequency of 50–75 Hz, 121 Kilobytes per second (Kbps), 76 decibels with a slow tempo.⁹ "Ayun Ambing" udder is commonly used by Sundanese people when putting the baby to sleep (known as a lullaby) or during the siraman event as a complement to the activity of releasing children in a marriage. Based on the results of preliminary research that was tried in the RW 01, Cibogor Tengah, Bogor, West Java, it was found that 62.2% of 184 respondents had hypertension. They stated that they were not familiar with music for hypertension therapy. People with high blood pressure are usually given blood pressure-lowering drugs such as amlodipine 5 milligrams and 10 milligrams, which are sometimes taken regularly but not a few are lazy to take medication so that blood pressure is unstable. Even though it is important to take medicine regularly according to a doctor's prescription.

This research describes systolic and diastolic blood pressure before and after the intervention and the effect of the musical instrument "Ayun Ambing" on reducing blood pressure in people with hypertension. Supporting related research is 1) The Effects of Sundanese Kacapi Suling "Ayun Ambing" Music Therapy to The Level of Anxiety on Chronic Renal Failure Patient Undergoing Hemodialysis. This research implies that Kacapi Suling Sunda music can be considered and applied as a complementary treatment to reduce anxiety in clients, especially ESRD undergoing hemodialysis.⁹; 2) *The Influence of Sundanese Zither (Kacapi) Music Therapy on Anxiety Levels in Pre-Cardiac Catheterization Patient* which describes the average decrease in anxiety scores in the experimental group of 10.28, and the control group of 3.25. The results of the Mann-Whitney test obtained a p-value <0.001, which indicates that there is a significant difference in mean reduction between the experimental group and the control group.¹⁰; 3) *The Effect of Traditional Sundanese Flute Music Therapy on Blood Pressure in the Elderly with Hypertension* which illustrates that there is a difference in systolic (p-value 0.0001) and diastolic (p-value 0.001) blood pressure before and after treatment with traditional Sundanese flute music.⁶; 4) Blood Pressure Reduction in Elderly Patients Using Music Medicine, this research shows that giving traditional music treatment in the form of Sundanese flute harp can lower blood pressure in elderly patients.¹¹; 5) Efforts to Control

The Effect of Music Instrument Kacapi Suling "Ayun Ambing" Towards Reducing Blood Pressure of Hypertension

the Emotional Response of Hypertensive Patients with Moderate Frequency Dominant Music Therapy which states that moderate frequency dominant music therapy with a frequency of 750–3000 Hz can control the emotional response (blood pressure, pulse, respiration, and temperature) of primary hypertension patients in a fairly short time ranging from 1–5 days. The choice of songs used in this music therapy is entirely the music that the patient likes.⁸ Based on these five studies, further, identification is needed whether the musical instrument of the Kacapi flute with the title ayun udder which has a frequency of 50–75 Hz, 121 Kilobytes per second (Kbps), 76 decibels with a slow tempo can lower blood pressure, both systolic and diastolic.

Method

This study used Pre-Experimental Designs in the form of One-Group Pretest-Posttest with 20 respondents with hypertension. Information gathering equipment in the form of a sphygmomanometer, observation paper, a questionnaire containing the respondent's biodata, gadgets, loudspeakers, and writing equipment. Respondents gathered together in a closed room somewhat not soundproof and asked to lie down safely. Before trying to treat the instrumental music of Kacapi flute ayun udder, first, try measuring blood pressure for elderly people with hypertension. The instrument is played for approximately 5 minutes using a device connected to a loudspeaker for one time of playback. After the music was played, the researcher double-checked the blood pressure. The musical instrument of the Kacapi flute ayun udder has a slow tempo that creates a calm and peaceful atmosphere and it is hoped that the effect can have a relaxing effect on the body. The position of taking information was tried in the hall of RW 01, Central Bogor Village, Tanah Sareal District, Bogor City. This research has tested the normality of the data using Shapiro Wilk, the results show that the data are not normally distributed. So then the analysis of bivariate data in this study using Wilcoxon.

Result

Tabel 1. Overview of Blood Pressure Before and After Music Intervention "Ayun Ambing" Instruments for Hypertension Patients (n=20)

Frekuensi	Pretest Sistolik	Pretest Diastolik	Posttest Sistolik	Pretest Diastolik
Mean	142.86	87.62	135.24	84.29
Median	140.00	90.00	130.00	80.00
Minimum	130	80	120	70
Maksimum	160	100	150	110

Based on table 2 above, the description of systolic and diastolic blood pressure before and after the musical intervention of the Kacapi flute ayun udder instrument was performed in patients with hypertension in RW 01 Bogor Tengah, Bogor City. The mean value of systolic blood pressure before the intervention was 142.86 mmHg and after the intervention was 135.24 mmHg. The minimum value before the intervention was 130 mmHg and after the intervention was 120 mmHg. The maximum value before the intervention was 160 mmHg and after the intervention was 150 mmHg. Meanwhile, the mean/average diastolic blood pressure before the intervention was 87.62 mmHg, and after the intervention was 84.29 mmHg. The minimum value before the intervention was 80 mmHg and after the intervention was 70 mmHg. The maximum value before intervention is 100 mmHg and after the intervention is 110 mmHg.

The Effect of Music Instrument Kacapi Suling "Ayun Ambing"
Towards Reducing Blood Pressure of Hypertension

Tabel 2. The Effect of "Ayun Ambing" Instrument Music on Lowering Blood Pressure in Hypertensive Patients (n=20)

Variabel	Mean	p-Value
Pre-test Systolic	142.86	0.001
Post-test Systolic	135.24	
Pre-test Diastolic	87.62	0.122
Post-test Diastolic	84.29	

Based on table 3 above, shows that the average systolic pre-test value is 142.86 while the post-test average is 135.24 with a p-value of 0.001 which means that there is an effect of music therapy on the swinging udder instrument on systolic blood pressure. The average post-test diastolic value is 87.62 and the average post-test value is 84.29 with a p-value = 0.122 which means that there is no effect on diastolic blood pressure.

Discussion

Based on the bivariate analysis, the results showed that there was an effect of a musical intervention on the musical instrument of the Kacapi flute ayun udder on the reduction of systolic blood pressure with a p-value = 0.001, this is in line with a study which said that there was a significant comparison between blood pressure before and after administration. instrumental music treatment for 7 consecutive days.¹² Other research says that there is an effect of traditional music treatment with a lute on blood pressure in the elderly with hypertension.⁶ The Sundanese Kacapi music intervention significantly reduced the level of anxiety ($p < 0.001$) in patients with pre-cardiac catheterization. So it is recommended that Sundanese Kacapi music can be used as alternative medicine in independent nursing interventions.¹⁰ It can be concluded that music has an influence as a therapy, both physical and psychological therapy. However, further research is needed to obtain the right SOP (standard operational procedure) and disseminate information about complementary therapies to the wider community. The more health workers and the public understand and can apply independently, the prevention of the worsening of a disease can be overcome early and the cost of treatment can be reduced as much as possible. Music can make you relaxed and safe to use. When music enters the ear, music will provide a stimulus to the hypothalamus so that it does not react strongly to the stressor it receives. The music then triggers the pituitary to release endorphins, a neurohormone that provides exciting sensations. Endorphins activate the parasympathetic system and ultimately lower blood pressure, pulse, and breathing, and have a relaxing effect on the body. Ultimately there is a message to the hypothalamus to reduce neuropeptide secretion and create a sense of well-being. Decreased neuropeptide secretion causes the release of catecholamines to decrease and blood pressure, heart rate, blood vessel resistance decreases, and relaxation.¹¹ By the evaluation at the end of the data collection session, it was found that respondents felt comfortable or relaxed after listening to the musical instrument "Ayun Ambing", some stated that they were carried away by the natural atmosphere of the rice fields with the cool air and green scenery that soothes and refreshes the eyes. Some respondents stated that they would fall asleep if the instrumental music was played a little longer.

Hypertension in the elderly is related to age, obesity, exercise habits, and personality type. Factors that influence hypertension are age, stress, obesity, and exercise habits. Personality type and stress are the most important factors.¹³ Research on levels of stress and anxiety with the incidence of hypertension shows the results of a significant p-value of $p = 0.000 < 0.05$, meaning that there is a very close relationship between anxiety and stress levels with the incidence of high blood pressure in the elderly.¹⁴ Actually stress does not directly cause high blood pressure, but when there is stress there is an increase in blood pressure again, which in turn causes hypertension. Several kinds of stress that can increase blood pressure are stress due to daily life, stress due to work demands, ethnic differences,

stress due to social interaction, and stress due to emotional stress. If any of these stress factors are combined, there will be a twofold increase in blood pressure.¹⁵ According to researchers, the music of the Kacapi flute ayun udder instrument with a slow frequency and medium tempo can provide a comfortable, calm, and relaxing effect so that it can be said that the music of the Kacapi flute ayun udder instrument affects the psychological and physiological aspects of people with hypertension. The udder swinging instrument music can help hypertensive sufferers to reduce stress levels and lower their blood pressure at the same time. In addition, the musical instrument of the Kacapi flute ayun udder is easily accessible via social media such as YouTube and can be played anytime and anywhere and does not require a large cost to get it. "Ayun Ambing" music with a frequency of 50–75 Hz, 121 Kilobytes per second (Kbps), 76 decibels of slow tempo is an effective choice of music to reduce hypertension because it can provide a special stimulus for human hearing. The combination of the Kacapi strings and the sound of the flute will intertwine beautifully and allow listeners to express their feelings and convey their imagined flavors. This chant will produce a feeling of peace and harmony in body and soul. The ayun udder song has a simple melody and is very popular among the Sundanese people. This is of great interest to patients and caregivers (especially when providing health care independently).⁹ "Ayun Ambing" brings a relaxing and peaceful effect, so it can lower blood pressure.⁹ Music with a frequency of 50–60 Hz which is listened to for 20–30 minutes for patients with primary hypertension can reduce systolic pressure and increase diastolic pressure.⁹ Other research states that there is a very significant effect of giving Sundanese flute Kacapi music "Ayun Ambing" as a therapy to reduce anxiety levels of chronic kidney disease patients undergoing hemodialysis.¹⁶ Physiologically, listening to music with a slow rhythm will reduce the release of catecholamines into the blood vessels, so that the concentration of catecholamines in the blood becomes low.¹⁷ This causes the body to relax, heart rate decreases and blood pressure drops.^{16,18} Based on the research explanation above, it can be concluded that slow tempo music, with simple melodies and the right frequency, can make the mind calmer, the body becomes more relaxed so that blood pressure drops. With a note, if this music therapy is done consistently and people with hypertension focus on the music. Physical and psychological conditioning before therapy is an important part of the success of music therapy. People who will be treated need to be advised to sit comfortably according to their choice and then asked to focus on listening to music. The room where therapy is carried out also needs to be conditioned to be quieter, not noisy, and not have other things that will interfere with therapy, for example, a room that smells bad. It is better if the room is conditioned to be a room that smells good so that the therapeutic effect will be better. As happened in one respondent who did not experience a decrease in the increase in blood pressure after therapy. Respondent stated that he was thinking about other things so he didn't focus on listening to the music.

Musical elements originating from the harp and flute have the potential to be therapeutic music because they cause a relaxing effect. Music therapy is one of the human efforts to improve physical and mental qualities with the help of sound stimulation consisting of melody, rhythm, and timbre harmonies with forms and styles that are organized in such a way as to create music that is beneficial for physical and mental health.¹⁹ Music itself has 3 important parts, namely beat, rhythm and harmony. Beat affects the body, rhythm affects the soul, and harmony affects the spirit.²⁰ Classical music is a type of music that has regular rhythms and notes.²¹ Based on this, this means that music therapy, one of which is the "Ayun Ambing" instrument, can improve physical and mental quality because of the stimulation of tones or sounds that are arranged in such a way that they contain the rhythm of the song and harmonization that is beneficial for physical and mental health. Analysis of sound through notation with a series of notes from Kacapi suling can provide harmony between music and listeners due to sound waves whose movement patterns propagate into the eardrum through the medium of air. Sound, including music,

can change the frequency that is not harmonious in humans back to normal vibrations called healthy in medical science. In the end, integrated health will be created in a person.²² Listening to the flute harp will stimulate the activity of the hypothalamus thereby inhibiting the release of the hormone corticotropin-releasing factor (CRF) and inhibiting the work of the adrenals to secrete the hormones cortisol, adrenaline, and noradrenaline.²²

The musical instrument of the Kacapi flute is a type of musical art originating from the West Java area which developed in the Cianjur area and its surroundings. This art consists of two musical instruments, namely the harp (kacapi; Sundanese) and the flute as the main musical instrument. This composition has pieces of instrumental music used in two different scales, namely Laras Pelog with light and melancholic mood character, and Laras Salendro or Sorog with a slower and more serious character.¹⁹ Kacapi Suling uses a notation that tends to be melancholic, melismatic so that this causes a seductive and musical effect that is sounded through the flute.¹⁹ For the Sundanese people, listening to the Kacapi flute is like bringing the natural feeling to another atmosphere such as rice fields, countryside, a comfortable atmosphere, so listening to it is more relaxing. Music therapy is an effective method used as an intervention method, but it still has limitations that were previously not considered, namely this music is still tied to the cultural background of the clients involved in it. His attachment to this culture makes music therapy need to pay attention to the details of the songs used in therapy by paying attention to the background of the client who will receive therapy.²³ This can be minimized because instrument music is music without lyrics, so it is hoped that it can minimize the attachment of music as therapy to culture from a language perspective. Thus, the musical instrument "Ayun Ambing" has the potential to be universally accepted by other people and nations.

The study showed that there was no effect on diastolic blood pressure (p-value = 0.122). A study stated that there was a significant mean difference between systolic blood pressure in the control and intervention groups (p-value 0.02) and there was no significant difference in mean diastolic blood pressure in the control and intervention groups (0.51) In other words, Sundanese gamelan music therapy can lower blood pressure, especially systolic blood pressure.²⁴ However, in this study, it was not explained how long the duration and frequency of giving the music intervention was. This is different from other studies which state that there is an effect of traditional Sundanese flute music therapy on decreasing systolic and diastolic blood pressure after traditional Sundanese flute music therapy is carried out in the elderly with hypertension at PSTW Budi Pertiwi Bandung in 2014.⁶ The intervention uses the musical instrument "Ayun Ambing" as therapy but the method is slightly different. In this study, each respondent was given music therapy for 5 consecutive days and blood pressure measurement data were taken, namely during the first day of pre-intervention and post-intervention on day 5. Respondents were given traditional Sundanese flute music therapy once a day for 15 days. minutes during the day at 12.00 WIB, during the half-life of HCT drug administration (t = 4 hours, drug administration at 08.00 WIB). Meanwhile, in this study, each respondent only played the musical instrument "Ayun Ambing" for approximately 5 minutes at the same time to all respondents, and measurements were carried out pre and post-intervention. Based on the analysis above, it can be concluded that other factors can cause a decrease in diastolic blood pressure, one of which can be the duration and frequency of music playback. The longer and more often instrument music is played, it can cause a decrease in blood pressure, both systolic and diastolic.

Conclusion

Based on the research, it was concluded that by giving the intervention for approximately 5 minutes, there was an effect of musical instrument of Kacapi flute ayun udder on decreasing systolic blood pressure (p-value = 0.001), but there was no effect on diastolic blood pressure in hypertensive patients (p-value = 0.122). The results of this study

The Effect of Music Instrument Kacapi Suling "Ayun Ambing" Towards Reducing Blood Pressure of Hypertension

provide a choice of cultural-based complementary therapy. Nurses can teach this therapy to hypertensive patients, so they can carry out health care independently at home. The musical therapy of the Kacapi flute instrument "Ayun Ambing" should be heard more often so that its effect is expected to be more felt. In future research, it is suggested to provide intervention musical instrument "Ayun Ambing" with a longer duration and frequency to patients with hypertension and in different age groups, conduct a comparative study of the effectiveness of the effect of instrumental music with a medium frequency of 750–3000 Hz with instrumental music with a low frequency of 50–75 Hz to lower blood pressure or the same title but in different ethnic or national populations.

Conflict of Interest Declaration

This research is free from conflicts of interest both personal and organizational.

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The Effect of Music Instrument Kacapi Suling "Ayun Ambing"
Towards Reducing Blood Pressure of Hypertension

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