



## Effectiveness of Music Therapy Against Decreased Pain Levels Post-Heart Surgery: Scoping Review

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### ABSTRACT

Heart disease is one of the major health problems worldwide, with common terms defined as coronary heart disease (CHD), peripheral artery disease, rheumatic heart disease, congenital heart disease, and venous thromboembolism, thus globally heart disease accounts for 31% of deaths. The increase in the incidence of heart disease in adults aged less than 20 years was overall 48% (121.5 million). The surgical procedure will certainly be associated with the patient's sensation of the pain felt. Inadequate pain management may delay postoperative recovery. Music therapy is defined as the use of music in clinical interventions that aim to fulfil physical, emotional, social, and cognitive needs. This study was aimed to conduct a review of the current novelty of the effectiveness of music therapy against decreased pain levels post-heart surgery. The literature search method uses the PubMed, EBSCO, ProQuest, and Science Direct databases. The total search result was 1,289 articles, five articles met the criteria for inclusion in the author's review. The conclusion of the review of the five articles that the administration of music therapy has a significant influence on the decrease in pain intensity, taking into account the focus on parts such as the length of music therapy action given for 30 minutes and the choice of music favoured by the patient, thus giving maximum effect during recovery.

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## Efektifitas Terapi Musik Terhadap Penurunan Tingkat Nyeri Pasca Operasi Jantung: Scoping Review

### ABSTRAK

Penyakit jantung merupakan salah satu masalah kesehatan utama diseluruh dunia, dengan istilah umum yang didefinisikan sebagai penyakit jantung koroner (PJK), penyakit arteri perifer, penyakit jantung rematik, penyakit jantung kongenital dan tromboemboli vena, sehingga secara global penyakit jantung menyumbang 31% kematian. Peningkatan kejadian penyakit jantung pada orang dewasa dengan usia  $\geq 20$  tahun adalah secara keseluruhan 48% (121,5 juta). Prosedur bedah yang dilakukan tentunya akan dikaitkan dengan sensasi pasien terhadap nyeri yang dirasakan. Manajemen nyeri yang tidak memadai dapat menunda pemulihan pasca operasi. Terapi musik didefinisikan sebagai penggunaan musik dalam intervensi klinis yang bertujuan sebagai upaya pemenuhan berupa kebutuhan fisik, emosional, sosial, dan kognitif). Tujuan penelitian adalah untuk melakukan tinjauan kebaruan saat ini tentang efektivitas terapi musik terhadap penurunan tingkat nyeri pasca operasi jantung. Metode pencarian literatur menggunakan database PubMed, EBSCO, ProQuest dan Science Direct. Hasil total pencarian sebanyak 1.289 artikel, terdapat lima artikel yang memenuhi kriteria inklusi dalam ulasan penulis. Kesimpulan ulasan dari kelima artikel bahwa pemberian terapi musik memiliki pengaruh yang signifikan dalam penurunan intensitas nyeri, dengan

#### Kata kunci:

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memperhatikan fokus pada bagian seperti lamanya tindakan terapi musik yang diberikan selama 30 menit dan pilihan musik yang disukai oleh pasien, sehingga memberikan efek maksimal selama pemulihan.

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## INTRODUCTION

Heart disease is one of the major health problems worldwide, with common terms defined as coronary heart disease (CHD), peripheral artery disease, rheumatic heart disease, congenital heart disease, and venous thromboembolism, thus globally heart disease accounts for 31% of deaths (WHO, 2016). Increased incidence of heart disease in adults aged  $\geq 20$  years was 48% (121.5 million). The United States in 2016 recorded a total of 2.744.248 deaths from heart disease (Benjamin et al., 2019). Many patients undergo surgical procedures as a treatment effort (Weiser et al., 2015). The surgical procedure will certainly be associated with the patient's sensation of the pain felt. Pain occurs after reduced or loss of effects of anesthesia and the greatest intensity of pain usually appears on the first and second day of postoperative surgery (Sier et al., 2020).

Postoperative pain is caused by damage to tissues or organs (incision), and pain can also be caused by the intensity or extent of the wound after surgery (Mazzeffi & Khelemsky, 2011). There is even a linkage of pain triggered by smooth muscle contractions due to compression and tension in visceral structures as well as inflammatory lesions (Wilder-smith, 2008). Postoperative pain is a major factor that can worsen the general condition of the patient so that it will have an effect on the systemic in the form of respiratory disorders, cardiovascular system, stimulation of the sympathetic nervous system, impaired muscle mobility, to inhibit the physical fitness of the patient (Mazzeffi & Khelemsky, 2011).

Inadequate pain management may delay postoperative recovery, according to Kolettas et al. (2015), note that nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids are often used to reduce pain, but they produce negative side effects such as nausea, vomiting, drowsiness to respiratory stress. Then according to the Garimella & Cellini, (2013), explains that the purpose of pain management is to reduce or relieve pain and discomfort by minimizing side effects. Therefore, a multimodal approach is also needed, such as non-pharmacological therapy to support and reduce the impact of drug side effects. The Agency for Healthcare Research and Quality (2013), provide non-pharmacological recommendations for pain management, namely music therapy.

Music therapy is defined as the use of music in clinical interventions aimed at fulfilling physical, emotional, social, and cognitive needs (American Music Therapy Association, 2021). Previous research has examined the effectiveness of music therapy which suggests that music can reduce postoperative pain (Liu & Petrini, 2015). Then another study explained music therapy can reduce the intensity of pain and anxiety postoperative period as well as this therapy is recommended as an addition in nursing action as a method of painkillers (Man et al., 2015). Other research in line explains that music therapy is an effective, safe, and easy to use therapy even most patients enjoy listening to music and proven to reduce levels of postoperative stress and pain hormones (Zengin et al., 2013).

However, the three studies did not discuss specifics about how long music therapy was administered to what type of music was used for patients. Thus, based on the explanation above the author is interested in conducting a review of the current novelty of the effectiveness of music therapy against decreased pain levels post-heart surgery.

## METHOD

The method used in this writing using scoping review, which is combining summary, explanation, and interpretation of quantitative and qualitative studies, is different from the systematic review where this type of scoping review requires identification of all literature regardless of the design of the research. Along with the increased knowledge of researchers in scoping reviews allows researchers to define search terms, where the main focus in this writing is to provide a general picture of the research evidence that has been conducted on the effectiveness of music therapy against decreased levels of postoperative heart pain (Arksey et al., 2007).

Searches are conducted by searching for relevant literature through PubMed, EBSCO, ProQuest, and Science Direct using keywords 'Cardiac Surgery', 'Open Heart Surgery', 'Heart Surgery', 'Mitral Valve Replacement', 'Coronary Artery Bypass', 'Coronary Artery Bypass Graft', 'Postoperative' and 'Post op'.

The inclusion criteria in this writing review will consider studies covering adult patients over the age of 18, literature published from 2010 to 2020 to multiply the search for sources of literature where articles are used in English, and with this type of intervention research. The article to be taken is the original article (original research) so that the data can be presented in full and facilitate the assessment of the research. The criteria of patients in the article are post-coronary heart surgery, heart failure (congestive), and mitral valve replacement in hospitals. The criteria of the article excluded are studies with pediatric patients only.

After finding the appropriate article the author performs the analysis by reading the title and abstract first in determining the article that fits the inclusion criteria. Then the author reads the article in its entirety.

## RESULTS

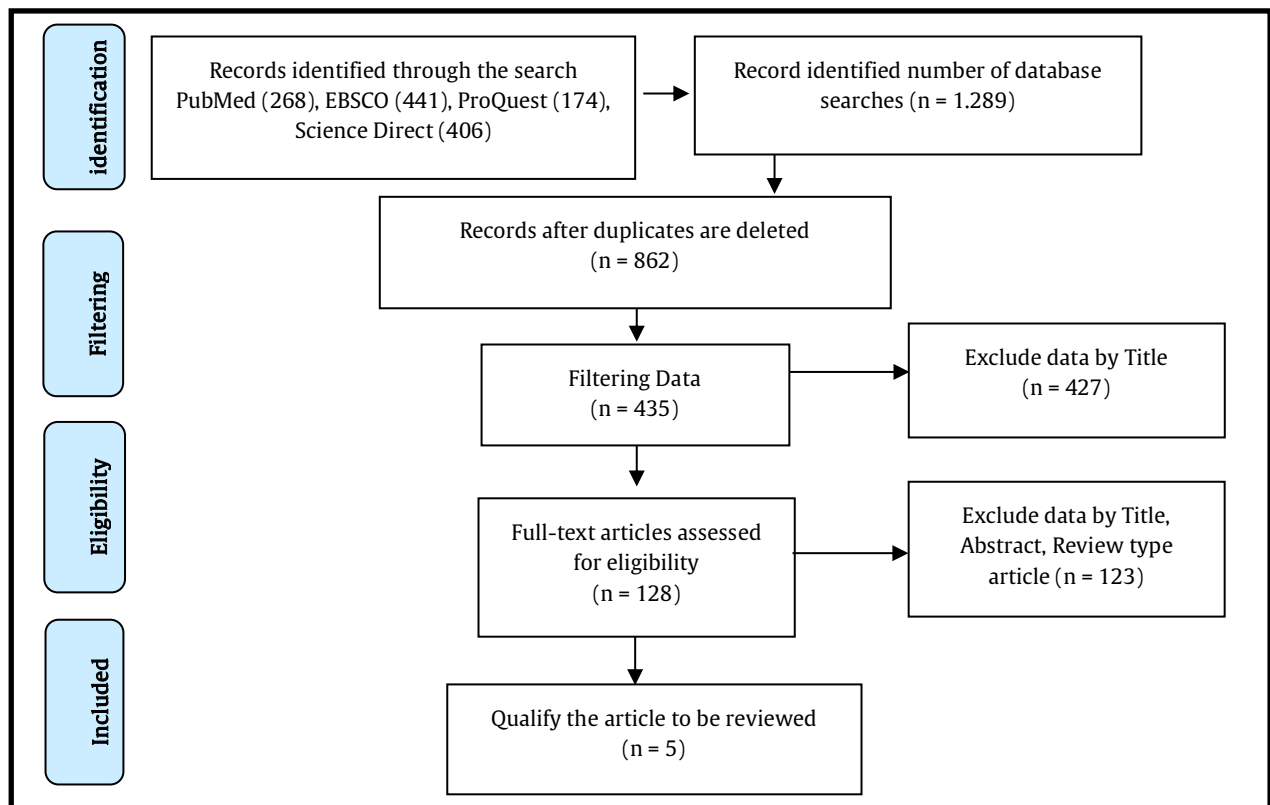
Strategy in article search by identifying 1,289 articles from 4 databases with details of PubMed 268 articles EBSCO 441, ProQuest 174 and Science Direct 406 articles. Based on the title rating and a full review of 5 articles that meet the inclusion criteria based on the results of the analysis. The five articles discuss providing music therapy to decrease the pain felt by patients post-heart surgery. The articles are written by Ozer & Arslan, tahun 2013, Ajorpaz et al., tahun 2014, Dai et al., tahun 2020, Lin et al., tahun 2020 dan Zhang et al., tahun 2020. Each article comes from Turkey, Iran, and China.

Based on 5 articles reviewed by the authors of music therapy can affect decreasing the intensity of pain in patients post heart surgery. The pain was reduced in postoperative open-heart patients who were given interventions in the form of music therapy compared to groups not given interventions, with the average score before musical intervention was given (2.13) then after the musical intervention was given an average score decreased to (1.20) (Ozer & Arslan, 2013). Music therapy has a positive effect in lowering the intensity of postoperative pain, so it can be used as a complement in non-invasive painkillers, and to reward patients for keeping asking for preferred music preference options (Ajorpaz et al., 2014). The use of music therapy is feasible for use in clinical applications where patients undergoing coronary artery bypass grafting

experience a significant decrease in pain levels (Dai et al., 2020).

Music therapy given to patients with mechanical valve replacement of the heart decreases the intensity of perceived pain (Lin et al., 2020). Decreased pain intensity also had an effect on the treatment of music therapy with pre-test values ( $6.48 \pm 1.68$ ) and post-test values ( $4.31 \pm 1.76$ ) (Zhang et al., 2020).

The results of the study Dai et al. (2020), also explained that the length of time music therapy should also be considered, with the administration of intervention within 30 minutes shows significant and effective results against the reduction of pain felt by patients on a moderate scale, therefore the study needs to be considered against the treatment of patients, especially those focused on postoperative heart.



\* Prisma FlowChart

No	Research Year	Title	Purpose	Research Design, population and instrument	Result
1	(Ozer & Arslan, 2013)	Effect of Music on Postoperative Pain and Physiologic Parameters of Patients after Open Heart Surgery	To find out the effects of listening to the music of your own choice and the presence of self-reports of pain intensity and physiological parameters in patients who have undergone open-heart surgery	Research Design: Quasi-Experimental The population and samples in the study were patients who were $\geq 18$ years old and spoke Turkish Instruments: using 3 study approaches, namely demographic variables, physiological parameters, and unidimensional verbal pain intensity scale	The results showed that pain decreased after open-heart surgery in patients who had listened to music (mean=1.20) compared to those who had not listened to music (mean=2.13) Again, SpO2 increased significantly within the band, but there were no differences in other physiological parameters between the groups or in each group. Although it shows only minor effects, these findings support the use of music in combination with pharmacological treatments to stabilize the patient's vital signs

					after heart surgery.
2	(Ajorpaz et al., 2014)	Effect of Music on Postoperative Pain in Patients Under Open Heart Surgery	To find out the effect of music on postoperative pain in patients undergoing open-heart surgery.	<p>Research Design: Quasi-Experimental</p> <p>The population in the study was 60 patients undergoing open-heart surgery referred to the ICU, with an age range of 18-60 years.</p> <p>Instruments: Data collection consists of two parts; the first part is demographic characteristics (age, gender, marital status, type of surgery, level of education) and the second is VAS. Where a zero score indicates no pain and a score of 10 indicates the most experienced pain level.</p>	The study findings showed positive effects of music to reduce postoperative pain, respectively for the experimental and control group; and the difference is insignificant ( $P = 0.21$ ). After each intervention for the experimental and control group; and the difference is significant ( $P = 0.04$ ). Thus, music can be used as a complementary and non-invasive method of relieving postoperative pain. Music, as an intervention nurse, is a non-invasive and safe therapy for the promotional health of patients.
3	(Dai et al., 2020)	The effect of music therapy on pain, anxiety and depression in patients after coronary artery bypass grafting	To see the application of music therapy to patients after transplanting coronary artery bypass and evaluate its effect on the patient's increased postoperative pain, anxiety, and depression.	<p>Research Design: Retrospective</p> <p>Population: 99 patients undergoing coronary artery bypass grafts from January 2017 to January 2019 were collected and divided into 3 groups.</p> <p>Instruments: This study uses Numerical Rating Scale (NRS), Self-Rating Depression Scale (SDS) dan Self-Rating Anxiety Scale (SAS).</p>	Music therapy as a non-invasive treatment method is very safe, simple, and economical to apply and can effectively reduce pain, with mean values before intervention ( $7.3 \pm 1.9$ ) and after intervention, the mean value becomes ( $4.2 \pm 2.1$ ) with patients undergoing coronary artery bypass grafts.
4	(Lin et al., 2020)	Effect of Music Therapy on the Chronic Pain and Midterm Quality of Life of Patients after Mechanical Valve Replacement	To explore the medium-term management of patient pain after mechanical valve replacement	<p>Research Design: Survey Methods</p> <p>The population and samples in this study were 86 patients, of whom 45 underwent mitral valve replacement, 24 underwent aortic valve replacement, and 17 underwent double valve replacement.</p> <p>This research instrument uses Simplified McGill Pain Questionnaire dan 36-Item Short Form Survey (SF-36)</p>	Music therapy is safe and effective when used in the treatment of patients after mechanical valve replacement. Music therapy reduces patients' chronic pain and improves their quality of life to some extent. The mean score of the intervention and control group patients showed differences in vas (Visual analog Scale) assessment, intervention mean value ( $3.02 \pm 1.42$ ) while for the control score ( $3.09 \pm 1.67$ ).
5	(Zhang et al., 2020)	Music Therapy for Early Postoperative Pain, Anxiety, and Sleep in Patients after Mitral Valve Replacement	To investigate the effects of music therapy on initial postoperative management after mechanical MVR	<p>Research Design: Survey Methods</p> <p>The population and sample in this study were a total of 222 patients undergoing mechanical MVR divided into two groups: a band and a control group. Patients in the band received 30 minutes of music therapy daily, while patients in the control group had a 30-minute shade.</p> <p>This research instrument uses a visual analog scale (VAS) used to evaluate the degree of pain, and a Self-Rating Anxiety Scale (SAS) is used for it evaluating early postoperative anxiety levels. Sleep duration of the patient and using the Verran and Snyder-Halpern Sleep Scales (VSH) to evaluate the patient's sleep quality.</p>	Music therapy can be safely and effectively included in the initial postoperative treatment of patients undergoing MVR, as it can reduce pain with mean preintervention values ( $6.48 \pm 1.68$ ) and postintervention ( $4.31 \pm 1.76$ ).

## DISCUSSION

Based on the above reviews, music therapy is very influential in decreasing the intensity of pain in post-cardiac surgery patients. The provision of music therapy has the main focus that must be considered, namely the time or duration of the administration of music therapy and the selection of music that the patient likes.

### Music Therapy by Time of Administration

Music increases the release of endorphins in the body and creates a mechanism of action of music on the environment, music also directs one's attention to a more pleasant emotional state thereby triggering feelings of mental relaxation. (Krout, 2007). According to research conducted by Nilsson (2008), explains that in the stage of use of music therapy is recommended the duration of listening to music should be for 30 minutes to create effectiveness and harmony so that the mind experiences refreshment. Based on the studies conducted by Liu & Petrini (2015), explains that music therapy given for 30 minutes provides evidence of reduced pain in patients posts thoracic surgery. In line with the research conducted by Yaman & Karabulut (2019), explained that the results of this study support the beneficial effects of favored music on pain control after open-heart surgery while the patient is in the ICU. Because listening to music is a simple, inexpensive, and side-effect-free intervention that can be provided by MP3 players and headphones, it is recommended to use extensive music therapy in patients undergoing open-heart surgery to reduce postoperative pain.

### Music Therapy by Music Choice

Effective music therapy cannot use just any music. It also affects the choice of music that the patient likes, the appropriate song will form a harmony that makes the patient feel calm and comfortable while helping the patient's healing. Based on research conducted by Twiss et al. (2006), explained that the suitability of the music heard by the patient can stabilize the hemodynamic system in the body. According to Chan et al. (2006), explains that music that corresponds to the choice of regional songs, opera to pop, can reduce the activity of the sympathetic nervous system, increase the activity of the parasympathetic nervous system, stabilize breathing, blood pressure, and heart rate. In line with the research conducted by (Jasemi, 2016), explains that choosing the appropriate music and using the harmonic audio produced by the music can coordinate various vibrational activities of the human body. Pain can be forgotten due to concentration in music and can be overcome by the constant administration of music therapy.

## LIMITATION OF THE STUDY

In our scoping review, there may be a bias against published scientific studies being considered in the selection of literature. Additionally, set date and language restrictions may affect research reviews and may have excluded some topics. Other concerns include the simple quality of research studies, heterogeneity, and sample size.

## CONCLUSION AND RECOMMENDATION

Based on a review of the five articles, it can be concluded that music therapy is an effective therapy and can be used to reduce the pain intensity of post-heart surgery patients, by paying attention to the focus on the duration of the music therapy action given for 30 minutes so that the patient feels comfortable so that it reaches the subconscious focus. and being able to enjoy the music they listen to, then focus on the patient's preferred choice of music, such as pop, jazz, classical, to spiritual chants, so that the patient feels the harmony of the music with the desired mood. Almost any type of music can be used for music therapy. But we must know the effect each type of music has on the mind. Each note, melody, rhythm, harmony, timbre, form, and style of music will have a different effect on our mind and body. In music therapy, especially music composition is adapted to the problem or goal that we want to achieve.

Rigorous research is needed to prove accurate efficacy of music therapy with relevant biomarkers and, higher methodological quality and use a large sample size.

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## Conflict of Interest Statement

The authors report there is no conflict of interest. The authors themselves will be responsible for the content and writing of the paper.

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