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## Review Article

# Music Therapy on Pain Management Among Post-Operative Patients: A Systematic Review

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### Abstract

**Aim:** This review aimed to identify and analyze the existing literature related to music therapy on pain management among post-operative patients.

**Methods:** This study utilizes a literature review approach, with research sources drawn from three databases: Proquest, Pubmed, and Google Scholar. Four suitable articles were found after screening the articles published between 2012 and 2022 in journals in English and Bahasa, with quasi-experimental research designs and True Experiments. "Post-operative Period" AND "Music Therapy" OR "Pain Management" OR "pain management" were the keywords used for literature searching.

**Result:** As many as four articles were found among the 1550 articles that met the criteria. This study showed that: (i) Recital prayer, such as shalawat and dzikr treatment, can be used in place of music therapy; (ii) Music picked by the participants was shown to considerably decrease the patient's pain following open surgery, biopsy, endoscopy, and wound dressing postoperatively.

**Conclusions:** This study indicated that music therapy or prayer therapy considerably reduced postoperative pain in post-operative patients, particularly when the music choice was picked by the participants. This study indicated that including music therapy in standard post-operative pain management may provide an effective technique for decreasing patients' pain severity for caregivers.

### Keywords :

**Music therapy, pain management, post-operative pain**

## INTRODUCTION

Pain is a pervasive and unavoidable experience that is also exceedingly intricate and elusive. It is frequently seen and reported differently by individuals depending on their experiences. Due to the subjective and ambiguous character of pain, it presents a significant difficulty for

healthcare providers to accurately identify and manage it efficiently. Following surgery, more than 80% of patients report immediate pain, and over 70% endure moderate, severe, or excruciating pain (1). Postoperative pain (POP) is the most common and significant patient care concern. More than 80% of individuals following surgery have acute POP, and most

all participants experience moderate to severe pain (1,2). Persistent pain after surgery can negatively affect both physiological and psychological functioning, such as hypoventilation, increased oxygen demands, delayed ambulation, and difficulty performing the Activities of Daily Living (ADL), which can lead to a chronic pain condition, disturbed sleep, anxiety, and patient dissatisfaction. (3).

Psychological elements play an important role in pain perception because mood influences pain perception and pain response (4). Non-pharmaceutical therapy should be considered when using conventional medicine to ease symptoms. A variety of pain management approaches, such as guided imagery, relaxation techniques, music interventions, back massage, pain management, and patient education, are categorized as post-operative pain relief strategies (5-9).

According to the American Music Therapy Association, therapeutic music delivery could be classified as either music medicine (MM) or music therapy (MT) (10). MM provides pre-recorded music to individuals via devices such as MP3s using headphones or speakers, which are provided by healthcare workers (11). MT credentialed music therapists, as opposed to MM, use a systematic process as a treatment, with the clients' active participation, to improve their health status (10).

According to Neuromatrix theory (12), music can alleviate distress by regulating endogenous opioid circulation, hence rising dopamine reward pathways in the central nervous system and thereby enhancing emotional development, motor abilities, and cognitive function (13-15). Additionally, music has been shown to affect biological activities such as emotions and distant memories, which affects how pain is perceived (16). Physiologically, listening to music stimulates the brain to generate endorphins, which have a comparable pain-relieving effect to morphine (12). Music has the potential to

impact the brain by stimulating an unconscious automatic response (16).

In addition, listening to music through a background sound system has been investigated as a noninvasive, safe, and cost-effective intervention in a number of surgical procedures (17-20). Consequently, listening to music before, during, and after surgery or biopsy treatments is beneficial at reducing pain and anxiety in a substantial majority of surgical patients (14,21,22). This has led to a situation where listening to music has beneficial effects in terms of decreasing pain and anxiety-related operations through the integration of more comfortable holistic care (23).

Previous researchers conducted a systematic review and meta-analysis of randomized controlled trials (RCTs) on post-operative recovery in adults but not a multiple intervention in a study. As the evidence for these therapies is inconsistent throughout the literature, we wanted to establish the appropriate therapy techniques for any procedure correlated with post-operative pain by reviewing all existing RCT trials on the effects of music on pain following operative procedure.

## REVIEW

### *Materials and Methods*

The systematic review is illustrated in Figure 1 by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (24,25). To summarize the review issue, the PICO (Participants, Intervention, Comparison, and Outcomes) framework was used. The study's participants are post-operative patients, with music therapy acting as an intervention and standard therapy as a comparison, with pain as the outcome.

### *Data Sources and Search Strategy*

From 2012 to January 2022, we conducted a comprehensive search of Proquest, PubMed, and other sources such

as Google Scholar to find all relevant English and Bahasa language RCTs and quasi-experimental papers on music therapy in post-operative patients. The following keywords were used to search: "Post-operative Period" AND "Music Therapy" OR "Pain Management" with filter: humans, 2012-2022, adults 19+. To locate the missing papers, we analyzed the reference lists of current research and relevant systematic reviews.

### *Study Selection Criteria*

The following PICOS-based criteria were used to determine which studies to include in this review: (i) population: adult patients, post-operative patients, and received post-operative music therapy; (ii) Intervention: studies in which patients received music therapy as an intervention, administered by a trained individual or team, including a nurse or music therapist, independent of the duration, frequency, or timing of the musical interventions. It consists of instrumental or other music played using post-operatively provided devices such as MP3 players with headphones, CDs, or speakers; (iii) Comparison: those in which patients in the control group received standard, ordinary, or typical care such as relaxation; (iv) Outcomes: pain; (v) Study design: until December 2020, full-text randomized controlled trials and quasi-experimental studies published in the English and Bahasa language.

Studies in which individuals who had a history of consumed central nervous system depressants showed chronic pain. The following papers were excluded: narrative reviews, meta-analyses, observational studies, protocols, ongoing clinical trials, and studies that we were unable to assess the data or did not include a control group.

## RESULTS

### *Result of the Search*

128 possibly relevant studies were found and tested for retrieval in total (Figure 1). 114 articles were eliminated

from this initial study group because they did not match the inclusion criteria. Five of the remaining twelve articles were eliminated due to unclear reports. Following that, seven articles were evaluated for eligibility. Following the review, three articles were removed since all the articles didn't describe pharmacological therapy use. Finally, four articles were included after a thorough study of the entire text.

### *Characteristics of Studies*

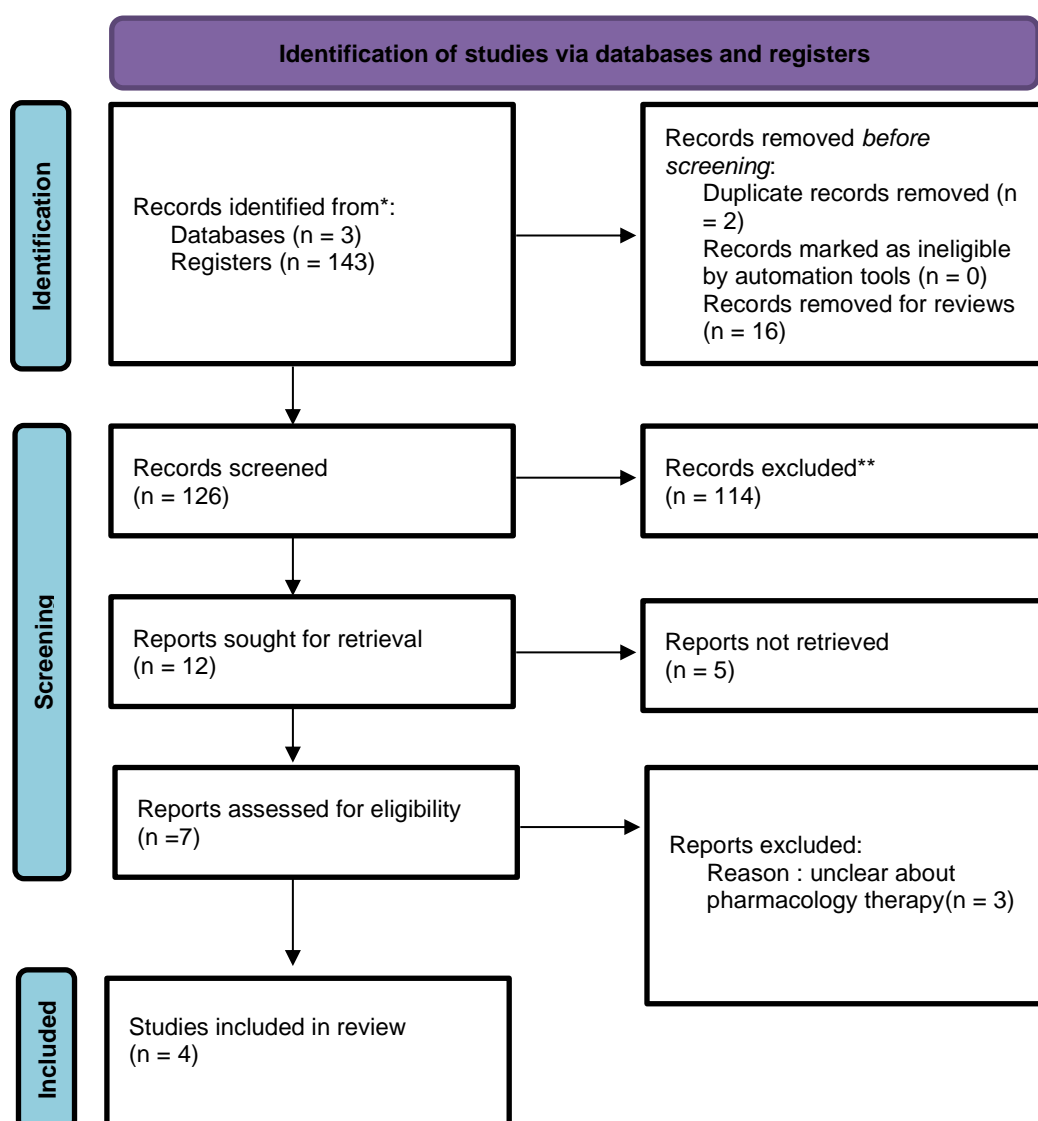
The characteristics of the included research are summarized in Table 1. These studies were published between 2018 and 2020. The studies in this review were done in Malaysia, Turkey, Hong Kong, and Brazil (26,27,28,29). The majority of participants (N=80, 31.74 percent) had endoscopic procedures, followed by appendectomy (N=72, 28.57 percent), dressing change from open tibial fracture surgery (N=70, 27.78 percent), and bone marrow aspiration for the first time (N=30, 11.90 percent). The music was performed live as well as pre-recorded. Preoperatively, intraoperatively, and postoperatively, the music intervention lasted between 30 minutes or as long as the surgical procedure took place. The pain was predominantly assessed using the Visual Analog Scale (VAS) and the Numerical Rating Scale (NRS).

### *Effect of Music Therapy on Pain*

There were no statistically significant differences in pain levels between Group MG and CG participants (26). In the recovery area, none of the patients in any of the three groups required further analgesics. No significant variations in post-operative analgesic requirements were seen between the three groups. The study discovered that PG participants experienced much less post-operative pain than the control group. The difference in mean pain scores experienced throughout the procedure between the intervention and control groups was statistically significant (p.05) (27).

In terms of pain, there were no statistically significant differences between the two groups. Regarding the need for further sedatives and analgesics, the music group requested fewer sedatives (15% vs 27.5%) and analgesics (17.5 percent vs 35%) than the control group, although this difference is not statistically significant (28). Post-operative pain was consistently present in both groups, ranging in intensity from mild

to severe. There was a statistically significant difference in pain scores between the groups (CG: 5.8 2.7 versus MG: 2.4 2.4;  $p < 0.001$ ), and a significant analgesic effect was observed following the nociceptive procedure, indicating that listening to music was effective in reducing the procedural pain associated with dressing change (29) (Table2).



\*Proquest, PubMed, and Google Scholar

\*\*based on inclusion criteria

Figure 1. The Preferred Reported Items for Systematic Review (PRISMA) Flow Diagram

Table 1. Characteristic of The Included Studies

Author, Year, Country, and Design	Participants Characteristics				Intervention		Outcome Assessed
	Sample Size	Mean Age (Mean±SD)	Gender (M/F)	Type of Surgery	Experimental Group	Control Group	
(26), 2018, Malaysia, Double-Blinded Clinical Trial	MG: 24 PG: 24 CG: 24	MG: 22.5 (med) PG: 26 (med) CG: 26 (med)	MG: 12/12 PG: 15/9 CG: 16/8	Appendectomy using a Lanz Incision under General Anaesthesia	MG: listening to music using headphones; PG: listening to continuous prayer recitations included Shalawat stiff and dzikir using headphones;  Duration: continuous while operating during surgery; timing-post-operative day 0	neither listened to prayer nor music	Pain: Numeric Rating Scale PONV: PONV 4 Grade Scale
(27), 2019, Turkey, Randomized Controlled Study	MG: 14 (2 drop out) CG: 16	MG: 57.64±16.07 CG: 50.12±15.33	MG: 8/6 CG: 13/3	Bone marrow aspiration and biopsy procedure for the first time	listening to classical Turkish music  Duration: continuous while operating during surgery; timing-post-operative day 0	No music intervention was employed in the group; standard treatment applied	Pain severity: Visual Analog Scale Anxiety: The State Anxiety Inventory (SAI)
(28), 2019, Hong Kong, Randomized controlled trial	MG:40 CG: 40	MG: 57.68±11.07 CG: 57.68±11.92	MG: 21/19 CG: 20/20	Endoscopic procedures	Listening to 15 Chinese popular songs repeatedly at 20 mins before and during the procedure using a headphone	No music intervention was employed in the group; standard treatment	Pain severity: Visual Analog Scale Anxiety: Chinese Version of the State-Trait

Author, Year,	Participants Characteristics			Intervention	Outcome		
(29), 2020, Brazil, Randomized, Controlled and Blinded Clinical Trial	MG: 35 CG: 35	MG: 30-39 years old (med) CG: 30-39 years old (med)	MG: 33/2 CG: 31/4	Immediate post-operative period of open diaphyseal tibial fracture surgery using spinal anesthesia	Listening to music for 30 mins before and during the dressing change procedure	applied  No music intervention was employed in the group; standard treatment applied	Inventory (STAI-C)  Pain: Numeric Rating Scale

MG: Music Group; CG: Control Group; PG: Prayer Group; PONV: Post-operative Nausea and Vomiting; MED: Median

## DISCUSSION

The purpose of this systematic review was to determine the impact of music on post-operative patients. Our detailed review of four trials including a total of 252 individuals and mostly analyzing pain severity revealed many major findings: (i) Recital prayer, such as shalawat and dzikir treatment, can be used in place of music therapy; (ii) Music chosen by the participants was shown to considerably decrease their pain following open surgery, biopsy, endoscopy, and wound dressing postoperatively. Music has been linked to both pain alleviation and emotional benefits (23). According to previous study, music can benefit patients in experiencing decreased pain intensity with an SMD of -0.77 (95 percent confidence interval -0.99 to -0.56) during the post-operative period (1).

Similar study on 50 post-surgical patients, in which patients were asked to recite prayer therapy afterward. They discovered that patients who recited prayer therapy had significantly lower mean pain levels than the control group (16). The optimal treatment technique on integrative medicine as providing patients with scientifically established medical treatments, compassion, and special attention to their spiritual and emotional needs. Integrating complementary medicine modalities such as spiritual beliefs, prayer treatment, and music therapy improves conventional medicine's outcome (22).

The objective of the second study was to determine the impact of classical Turkish music on pain and anxiety in patients undergoing bone marrow aspiration and biopsy (27). It was discovered that the intervention group experienced considerably less pain during the procedure than the control group ( $p < 0.05$ ). According to the literature, classical Turkish music decreases sedative and analgesic drug dose, anxiety, and pain perception, as well as acute procedure pain perception, hence accelerating the healing process (30,31,32).

The third study showed there was no significant difference in pain perception between the two groups (28). The reasoning for these results is that pain assessment was not completed immediately following colonoscopy, which could result in recollection bias. Numerous randomized controlled trials have demonstrated that music interventions reduce the need to use sedative and analgesic medications (33). Additionally, this study discovered that patients in the music group required less supplemental sedative and analgesic medicine during colonoscopy than patients in the control group, although a statistically significant difference was not observed. This could be because the sample size is too tiny or the procedure is too brief. Our findings indicated that there was no substantial effect on physiological markers, which is consistent with the findings of several research (34-36). This could be a result of individual variances in how they respond to music. The physiological benefits of music may be augmented by the participants' musical tastes and training (34,37,38). Thus, allowing patients to select their music is encouraged.

The majority of surgery have pain as the first and most common post-operative consequence in adults, with the initial post-operative dressing serving as an extra nociceptive stimulus (29,39). As a result, we sought to assess the analgesic effects of music during this surgery in conjunction with frequently prescribed pharmacological therapy. For the management of post-operative pain, a multimodal analgesic approach utilizing both pharmaceutical and nonpharmacological therapy is indicated (40). Thus, music may contribute to the alleviation of discomfort, anxiety, and acute pain, and may provide respite from these symptoms (41). In terms of music-induced analgesia, it is proposed that music can help to control pain by diverting, regulating mood, and alleviating tension (42). Additionally, music-induced emotions may be mediated via descending pain-modulatory pathways at the spinal cord



level (43). The music chosen for this study was chosen by the patient due to its capacity to elicit intense emotions and enjoyment in the listener (44). Previous research has indicated that self-selected music has a greater therapeutic effect on pain control when intervention groups get it (40,45, 46,47). Magnetic resonance neuroimaging revealed changes in activity in numerous areas of the nervous system, including limbic regions, between subjects who listened to their favorite music and those who did not listen to music after painful stimulation (44).

## CONCLUSION

The results of this systematic analysis indicated that music therapy or prayer therapy used in conjunction with music therapy considerably reduced post-operative pain in post-operative patients, particularly when the music was chosen by the participants. This implied that including music therapy in routine post-operative pain management could provide caregivers with an effective strategy for reducing patients' pain severity.

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