# Music Therapy and Music Medicine for Pain Management in Cancer Patients: A Rapid Review

By

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# MUSIC THERAPY AND MUSIC MEDICINE FOR PAIN MANAGEMENT IN CANCER PATIENTS: A RAPID REVIEW

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## Abstract

Cancer is a complicated and challenging disease that affects millions of individuals globally. Pain is a frequent symptom experienced by cancer patients. Pain activates the sympathetic nervous system which can impair quality of life, and cause anxiety, depression, helplessness, despair, and a plea for death. The most recent advances in contemporary cancer care include a focus on integrated and holistic thinking. Music therapy and music medicine have emerged as viable complementary therapies to pain management in cancer patients. This rapid review synthesizes existing literature to evaluate the effectiveness of music-based interventions in alleviating pain among individuals undergoing cancer treatment. A total of eight articles met inclusion criteria and were included in this review. The findings suggest that music therapy and music medicine show potential in reducing pain intensity, enhancing coping mechanisms, and improving overall well-being in cancer patients.


*Keywords:* Music therapy, Music Medicine, Pain management, Cancer patients.

# Music Therapy and Music Medicine for Pain Management in Cancer Patients: A Rapid Review

## Chapter I

## Introduction

Cancers are a cluster of diseases characterized by the uncontrolled growth and spread of abnormal cells (National Cancer Institute, 2021). It is a remarkably complicated disease (Knox, 2010), and if left untreated, it can lead to death. In 2024, more than 2 million new cancer cases will be diagnosed in the U.S. only, and about 611,720 people are expected to die from cancer in the U.S. in 2024, or about 1,680 deaths per day (American Cancer Society, 2024). However, Over the past 25 years, there has been a significant rise in cancer survivorship due to advancements in diagnosis and treatment. Approximately 18% of cancer survivors will live for 20 years or more, and 70% of survivors will still be living five years or more after their diagnosis. It is projected that there will be more than 22 million cancer survivors by 2030 (Bhatia et al., 2022).

Cancer is recognized as encompassing multiple physical symptoms, as well as psychological and existential concerns, with pain cited frequently as the most critical (Paice & Ferrell, 2011). The prevalence of pain in cancer is up to 50% in those undergoing active treatment for malignancy, and up to 90% in those with advanced disease (Money & Garber, 2018). Cancer patients may experience pain as a result of the cancer itself (bone metastases, cancer infiltration of soft tissues, or nerve compression), or the effects associated with cancer treatment (Deng, 2019).

Pain management in cancer patients includes both pharmacologic and nonpharmacologic interventions. Opioids are the mainstay of analgesic therapy and can be used in combination with

non-opioids (e.g. paracetamol) or non-steroidal anti-inflammatory drugs (NSaIDs) as well as complementary medications (Ripamonti, 2012). Deng (2019) noted that opioids are necessary and appropriate for patients with advanced cancer and intractable pain. Side effects of these medications include lack of energy, drowsiness, constipation, nausea, and dyspepsia. Additionally, cancer survivors are at a higher risk for opioid abuse (Deng, 2019).

Non-pharmacologic interventions are an important part of a comprehensive pain management plan (PDQ® Supportive and Palliative Care Editorial Board, 2018). The aim of non-pharmacological interventions is to treat the affective, cognitive/psychological, behavioral, and socio-cultural dimensions of oncologic pain (Ruano, 2022). These nonpharmacological therapies include physical, cognitive-psychological, and behavioral approaches, both invasive and noninvasive, that can complement other treatments and improve the quality of cancer care patients receive (Ruano, 2022).

Music has been found to be effective in controlling cancer pain (Zimmerman et al. 1989; Beck, 1991). It is important to distinguish between music therapy and music medicine when reviewing the literature related to music's ability to alleviate cancer-related pain. Music Therapy is the clinical & evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program (American Music Therapy Association, 2005). Music therapists conduct an assessment and develop a treatment plan that may address the biopsychosocial needs, including pain, of individuals with cancer. Both receptive and active music experiences are used in treatment based on the patient's preferences and abilities. Receptive experiences engage the patient in listening to live or pre-recorded music to reduce stress or anxiety, distraction, or

decrease pain perception. Active music experiences engage the client in playing instruments, singing, creating music spontaneously, or composing. These methods are typically chosen for self-expression, emotional release, distraction, stress, anxiety or pain reduction, and social interaction (Bradt et al., 2021).

Music medicine is defined as having patients listen to prerecorded or live music, which is often managed by a medical professional other than a music therapist, such that the music plays the role of a medicine (Edwards et al., 2023). Importantly, unlike music therapy, music medicine does not require a therapeutic relationship with the patient (Edwards, 2023). In addition, music medicine refers to the use of music by medical personnel to reduce anxiety, pain, and autonomic creativity and improve the status and well-being of medical patients (Dileo, 2013). It attempts to improve physiological functions including heart rate and blood pressure. Unlike music therapy, music medicine programs often use pre-recorded music that is not personalized to individual preferences (Allen, 2013). Furthermore, there is no establishment of a therapeutic relationship or a structured process of assessment, treatment, and evaluation for music experiences (Dileo, 1999). Allen (2013) identified the typical interventionists in music and medicine settings as including music therapists, medical professionals, music practitioners, music thanatologists, and volunteer musicians.

Music therapists work extensively with diverse patients, addressing their physical, emotional, social, cognitive, and spiritual needs through assessment, treatment, and evaluation of music experiences. Allen (2013) identified that medical music practitioners focus on creating therapeutic environments, offering comfort and solace to medically ill or dying patients through music, emphasizing environmental aesthetics; music thanatologists specialize in providing end-

of-life comfort using harp and voice, attending to both physiological and emotional/spiritual needs. Additionally, music practitioners, whether volunteers or professionals, bring live or recorded music to healthcare facilities, aiming to provide therapeutic effects and comfort to patients. Volunteer musicians contribute their musical talents to enhance the hospital experience, performing in various settings such as lobbies, open areas, or during patient visits (Allen, 2013, pp.4-5).

In analyzing the studies that met the inclusive criteria, the author found that although many studies have explored the effectiveness of music interventions, there is a lack of standardized intervention protocols and professionally credentialed researchers. Krishnaswamy & Nair (2016) and Li et al. (2011) indicated the intervention used was music therapy, but they were used music medicine actually. The authors did not go into detail regarding the qualifications of the interventionists, and the music interventions used were all music listening. The American Music Therapy Association defines music therapy as the use of music to achieve specific therapeutic goals conducted by a certified professional who has completed an approved music therapy program (American Music Therapy Association, 2005). Optimizing the efficacy of music therapy and music medicine requires a thorough understanding of patient preferences for music genres, delivery modalities, and intervention frequency. These limitations of Krishnaswamy & Nair (2016) and others, along with the scarcity of studies incorporating music therapy and music medicine for pain management in cancer patients, indicate that this is a topic that requires additional investigation.

Music-based interventions, either alone or as an adjunctive therapy, can provide an option to reduce pain in cancer patients while allowing for the maintenance of baseline physical and

psychological functioning (Rennie et al., 2022). Exploring non-pharmacologic interventions like music therapy offers alternatives for pain management and symptom control. This rapid review can give healthcare professionals evidence-based insights into the efficacy of music therapies for cancer pain management by combining the available studies. It can help direct the creation of standardized protocols and clinical decision-making.

This rapid review aims to provide a succinct, yet thorough examination of the research published between the years of 2010-2022, to synthesize the evidence on the efficacy of music interventions in alleviating pain associated with cancer. The purpose of this rapid review is to elucidate the effectiveness of music therapy and music medicine for pain management in cancer patients and to make recommendations for clinical implementation based on the results.

# Chapter II

# Method

## Theoretical Framework

The intent of this rapid review is to review the research related to the use of music therapy methods and music medicine interventions for pain management in cancer patients. The epistemological foundation of this review is objectivism. Objectivism holds that we may come to know the truth about reality through repeated observations of it in highly controlled situations (Hiller, 2016, p.100). General objectivist music therapy research regards interventions as objects, concentrating on the inherent meaning uncovered via strategic observation, and frequently highlighting the influence of specific musical features or experiences on client health (Matney, 2019, p. 15). In the context of this rapid review, the aim is to collect and analyze existing studies in an impartial and unbiased manner to provide an objective and evidence-based overview of the topic. The theoretical foundation of this review is Post-positivism. Post-positivism maintains an ontological belief in the objective nature of reality but recognizes that undertaking to know objective reality will always be deficient due in part to the limitations of our human capacities (Hiller, 2016). In a rapid review, post-positivism allows for a systematic and unbiased synthesis of existing literature while acknowledging the limitations and potential biases in the process. By adopting these epistemological and theoretical stances, this rapid review aims to comprehensively explore the impact of music therapy on pain management in cancer patients and provide a deeper understanding of the subjective experiences associated with this therapeutic approach.

## Search strategy & Inclusion and Exclusion Criteria

Original research articles were identified by searching CINAHL, Medline, and PsycINFO

using the keywords “music therapy”, “pain management” and “cancer patients”. Peer-reviewed studies meeting the following inclusion criteria are included in this review:

1. Published between 2010 and 2022.
2. The articles were written in English.
3. Published in a peer-reviewed journal.
4. The articles used experimental designs.
5. Participants were patients with cancer who were experiencing pain.
6. The intervention applied in the article is music therapy or music medicine.

The exclusion criteria were as follows:

1. The articles were not written in English.
2. The articles were published before 2010.
3. These articles did not use an experimental design.
4. The experiment utilized interventions other than music therapy or music medicine.

**Screening Process**

First, duplicate articles were removed from the initial references list. Then, screen the articles retrieved from each database based on their titles and abstracts. A master list of articles meeting the inclusion criteria will be compiled for the researcher based on the review of titles and abstracts. Subsequently, the remaining articles will undergo full-text screening.

**Quality Assessment**

The Checklist to Evaluate a Report of Nonpharmacological Trial (CLEAR NPT) (Boutron et al., 2005) adapted by Yinger and Gooding (2015) was used to assess the quality of the eight studies included in this rapid review. The CLEAR NPT was developed to evaluate randomized controlled trials of nonpharmacological treatments, or NPTs (Boutron, 2005). A

research article by McKinney and Honig (2017) used this method of assessment as it was also a non-pharmacological randomized controlled trial. The adapted CLEAR-NPT checklist encounters 10 items: Allocation Sequences, Allocation Concealment, Detailed Intervention, Intervention had Appropriate Skill, Adherence, Blinding-Participants, Blinding-Interventionist, Blinding-Outcome Assessors, Follow-Up Schedule, and Intention to Treat. Score 1 point if the answer to an item was "yes"; score 0 points if the answer to an item was "no"; score 0.5 points if there was missing information in the study to rate the item. Each study was assessed for risk of bias as described by Yinger and Gooding (2015): studies that earned 1 point each for questions 1, 2, 6, 7, and 8 on the quality assessment checklist were considered to have a low risk of bias; studies that earned 1 point each for questions 1, 2, 8, and either 6 or 7 were considered to have a moderate risk of bias; studies that met four criteria or fewer were considered to have a high risk of bias. (See Table 1).

**Table 1**

*Quality Assessment Rating Items & Guidelines adapted from the CLEAR-NPT*

| |
|---|
| **1. Was the generation of allocation sequences adequate?** |
| *Give 1 point only if a suitable method was used to generate the sequence of randomization (i.e. simple randomization via table of random numbers or computer-generated random numbers).* |
| **2. Was the treatment allocation concealed?** |
| *Give 1 point only if participants and investigators enrolling participants could not foresee upcoming group assignments* |
| **3. Were the details of the intervention administered to each group made available?** |
| *Give 1 point only if all of the following information was described in the report or made available in some type of addendum: information about who selected music, type of music.* |

*music delivery method; intervention materials, intervention strategies*

**4. Was care providers' experience or skill in each arm appropriate?**

*Give 1 point if the intervention was delivered by an individual with training in music perception and clinical applications of music (e.g., a board-certified music therapist with appropriate education and experience).*

**5. Was participant adherence assessed quantitatively?**

*Give 1 point if the number of sessions attended was reported.*

**6. Were participants adequately blinded?**

*Give 1 point only if participants were unaware of their group assignment, or if blinding was not feasible due to research design. Rate sub-items only if no points were awarded for question 6.*

**6a. Were all other treatments and care the same in each randomized group?** OBJ

*Assign a score of 0.5 if other treatments and care were the same in each group.*

**6b. Were withdrawals and lost to follow-up the same in each randomized group?**

*Assign a score of 0.5 if number of withdrawals and lost to follow-up are similar.*

**7. Were care providers adequately blinded?**

*Give 1 point only if care providers were unaware of participants' group assignment, or if blinding was not feasible due to research design. Rate sub-items only if no points were awarded for question 7.*

**7a. Were all other treatments and care the same in each randomized group?**

*Assign a score of 0.5 if co-interventions were the same in each randomized group.*

**7b. Were withdrawals and lost to follow-up the same in each randomized group?**

*Assign a score of 0.5 if number of withdrawals and lost to follow-up are similar.*

**8. Were outcome assessors adequately blinded to assess primary outcomes?**

*Give 1 point for participant-reported outcomes in which the participant is the outcome*

*assessor; Give 0 point if blinding is not feasible and rate question 8a.*

**8a. If outcome assessors were not adequately blinded, were specific methods use to avoid ascertainment bias (systematic differences in outcome assessment).**

**9. Was the follow-up schedule the same in each group?**

*Assign a score of 1 if the planned schedule for follow-up is the same in each group.*

**10. Were the main outcomes analyzed according to the intention-to-treat principle?**

*Assign a score of 1.0 if all participants randomized were included in the analysis and kept in their original group; assign a score of 0 if all participants randomized were not included in the analysis or not kept in their original group.*

Note: Taken from Boutron et al., 2005

Robb et al. (2011) constructed the Reporting Guidelines for Music-Based Interventions for reporting on intervention transparency and specificity, which were used to evaluate the quality of music intervention reporting in each included study. Seven different components of music-based interventions were included in this checklist including intervention theory, intervention content, intervention delivery schedule, interventionist, treatment fidelity, setting, and unit of delivery. Transparent reporting of interventions while accounting for the diversity, complexity, and distinctiveness of music-based interventions (Robb et al., 2011). (See Table 2).

**Table 2**

*Music Intervention Reporting Guidelines*

| |
|---|
| **A: Intervention Theory** |
| Score 1 if the study provides a rationale for the music selected; specify how qualities and delivery of the music are expected to impact targeted outcomes. |
| **B: Intervention Content** |
| Provide precise details of the music intervention and, when applicable, descriptions of procedures for tailoring interventions to individual participants. |

**B.1: Person Selecting the Music**

Score 1 if the study specifies who selected the music: (1) pre-selected by investigator, (2) participant selected from limited set, (3) participant selected from own collection, or (4) tailored based on patient assessment.

**B.2: Music**

Score 1 if the study specifies when using published music, provide reference for sheet music or sound recording and when using improvised or original music, describe the music's overall structure (i.e., form, elements, instruments, etc.).

**B.3. Music Delivery Method (Live or Recorded)**

Score 1 if the study specifies when using live music, specify who delivered the music and the size of the performance group (e.g., interventionist only, interventionist and participant), and when using recorded music, specify placement of playback equipment and the use of headphones vs. speakers. Specify who determined/controlled volume (e.g., interventionist, participant. Specify decibel level of music delivered and/or use of volume controls to limit decibels.

**B.4: Intervention Materials**

Score 1 if the study specifies music and/or non-music materials.

**B.5: Intervention Strategies**

Score 1 if the study describes music-based intervention strategies under investigation (examples: music listening, songwriting, improvisation, lyric analysis, rhythmic auditory stimulation, etc.).

**C: Intervention Delivery Schedule**

Score 1 if the study reports number of sessions, session duration, and session frequency including practice sessions.

**D: Interventionist**

Score 1 if the study specifies interventionist qualifications and credentials, and how many interventionists deliver study conditions.

**E: Treatment Fidelity**

Score 1 if the study describes strategies used to ensure that treatment and/or control conditions were delivered as intended (e.g., interventionist training, manualized protocols, and intervention monitoring).

**F: Setting**

Score 1 if the study describes where the intervention was delivered; include location, privacy level, and ambient sound.

**G: Unit of Delivery**

Score 1 if the study specifies whether interventions were delivered to individuals or groups of individuals, including the size of the group.

Note: Taken from Robb et al. 2011

**Classification Process**

The seven articles included in this quick review use different music-based interventions including music therapy and music and medicine, and in this section the authors will describe the process of classification. Through definitions of music therapy of American Music Therapy Association (2006) and Bruscia (2014), music therapy must be delivered by credentialed professional who has completed an approved music therapy program utilizing all aspects of the music experience and the resulting relationship as a motivator for change to help clients optimize their health. A professional interventionist is essential and needs to use evidence-based music interventions. Bradt et al. (2015) and Colwell & Fiore (2020) provided interventionist credentials. Bradt et al. (2015) utilized four music therapy approaches included re-creative, improvisational, receptive, and compositional, Colwell & Fiore (2020) utilized two specific

music therapy interventions which were patient-selected singing with accompaniment and patient-created chant using the Orff process. The two studies (Bradt et al., 2015, Colwell & Fiore, 2020) were classified used music therapy as the intervention.

Music medicine refers to the use of music by medical practitioners in research and clinical practice (Dileo, 1999). The interventionists in music and medicine are medical professionals. And the therapeutic relationship is not established through music, the process of assessment, treatment planning, and evaluation is not mandatory. The music used is pre-recorded music that can be selected by the medical staff and according to the patient's preferences (Allen, 2013). Six studies (Burrai et al., 2014, Bradt et al., 2015, Huang et al., 2010, Koca & Aylaz, 2022, Krishnaswamy & Nair, 2016, Li et al., 2011) utilized music listening as the intervention, all provided by medical professionals.

# Chapter III

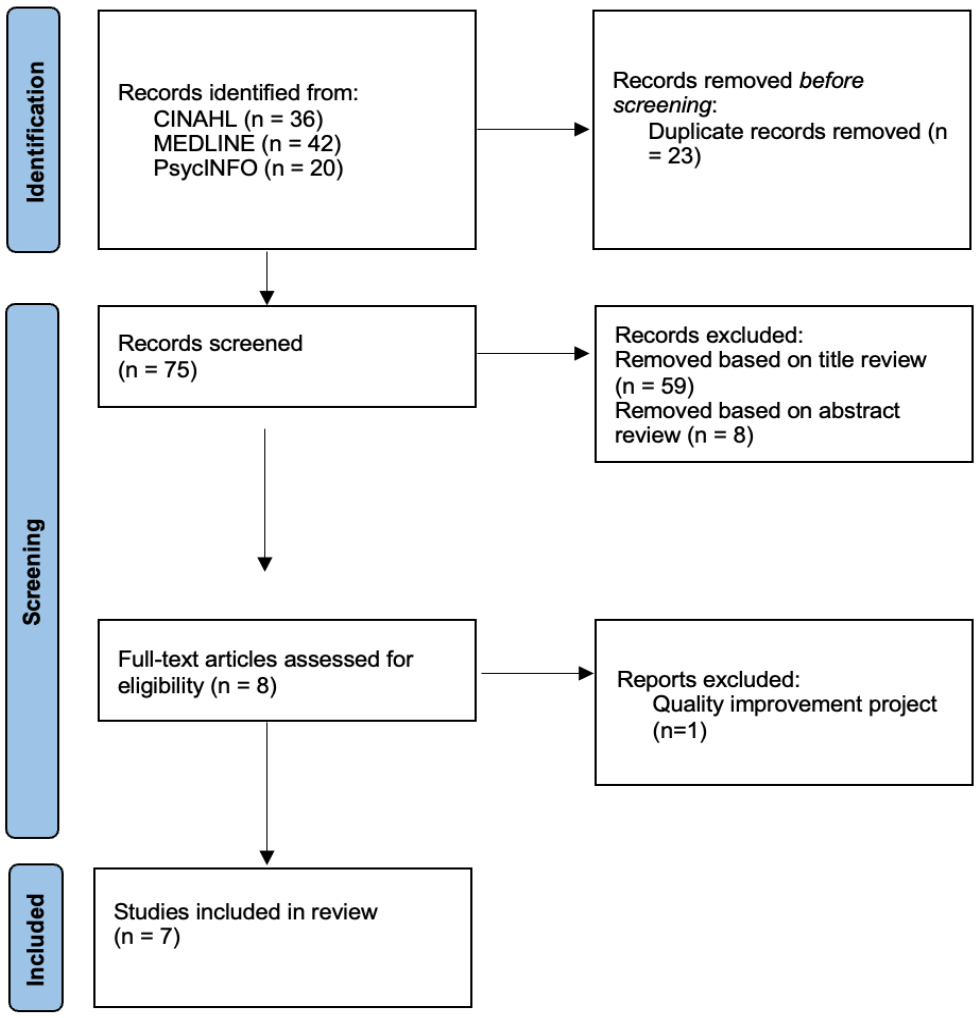
## Results

### Study Selection Results

A total of 98 articles were identified in the initial search. Twenty-three articles were duplicates and removed, leaving a total of 75 articles for the initial review. Each article was reviewed by myself and my thesis supervisor. Fifty-nine studies were removed based on title review, eight studies were removed after abstract review, and one studies was removed after full-text review. 7 remaining articles are included in this rapid review. (See Figure 1).

**Figure 1**

*Flow diagram of search strategy and article selection* (Page et al., 2021)



**Quality Assessment Results**

Seven articles that are included in this review were evaluated by using the adapted CLEAR-NPT Guidelines (Yinger & Gooding, 2015) and the Music Intervention Reporting Guidelines (Robb et al., 2011). These criteria for determining the risk of bias are similar to those used by Murphy (2017) and McKinney & Honig (2017), studies with a score of 5 and above were considered high-quality studies, studies with a score of less than 5 were considered to be at high risk.

**Table 3**

*Quality Assessment*

| Criteria | Burrai et al. (2014) | Bradt et al. (2015) | Colwell& Fiore (2020) | Huang et al. (2010) | Koca & Aylaz (2022) | Krishnaseamy & Nair (2016) | Li et al. (2011) |
|---|---|---|---|---|---|---|---|
| **Allocation Sequences** | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **Allocation Concealment** | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| **Detailed Intervention** | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **Intervention Had appropriate Skill** | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| **Adherence** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Blinding-Participants** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Blinding-Interventionist** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Blinding-Outcome Assessors** | 1 | 0 | 1 | 1 | 0 | 1 | 1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Follow-Up Schedule** | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **Intention to Treat** | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Total Score** | 10 | 8 | 8 | 7 | 8 | 5 | 8 |

The generation of allocation sequences was adequate in 6 (86%) of the studies, treatment allocation was concealed in 3 (43%) of the studies. Details of the interventions were adequate in 6 (86%) of the studies, and care providers' experience and skill were appropriate in 5 (71%) of the studies. Blinding participants and care providers were not feasible in any of the studies because of the nature of music interventions. The outcome assessors were adequately blinded to assess primary outcomes in 5 (71%) of the studies. All articles reported the number of sessions participants attended. Follow-up schedules were reported in 6 (86%) of the studies. The main outcomes were analyzed according to the intention-to-treat principle in 2 (29%) of the studies.

Seven studies included in this rapid review received an average quality score of 7.71 (range 5 to 10; mode = 8; median = 8). Seven studies had low to moderate risk of bias. Information regarding quality assessment and risk of bias is shown in Table 3.

**Intervention Reporting**

Seven studies were accessed by Music Intervention Reporting Guidelines (Robb et al., 2011). Seven studies reported intervention theory, the person selecting the music, music delivery method, the materials and strategies of the intervention, and the intervention delivery schedule. Only two studies (Colwell & Fiore, 2020; Koca & Aylaz, 2022) provided the description of the music. With the exception of three studies (Burrai et al., 2014; Bradt et al., 2015; Colwell & Fiore, 2020), none of the studies provided interventionist credentials. Five studies (Bradt et al., 2015; Colwell &Fiore, 2020; Koca & Aylaz, 2022; Krishnaseamy & Nair, 2016; Li et al., 2011)

reported a lack of setting information including location, privacy level, and ambient sound. Four studies (Burrai et al., 2014; Bradt et al., 2015; Colwell & Fiore, 2020; Huang et al., 2010) reported the unit of delivery.

**Table 4**

*Music Intervention Reporting Guidelines*

| Criteria | Burrai et al. (2014) | Bradt et al. (2015) | Colwell& Fiore (2020) | Huang et al. (2010) | Koca& Aylaz (2022) | Krishnaseamy & Nair (2016) | Li et al. (2011) |
|---|---|---|---|---|---|---|---|
| **Intervention Theory** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Person Selecting the Music** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Music** | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| **Music Delivery Method** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Intervention Materials** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Intervention Strategies** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Intervention Delivery Schedule** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Interventionist** | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| **Treatment Fidelity** | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Setting** | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| **Unit of** | 1 | 1 | 1 | 1 | 0 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Delivery** | | | | | | | |
| **Total Score** | 10 | 9 | 10 | 9 | 8 | 7 | 7 |

Seven articles met all inclusion criteria. The following information was extracted from each article and can be found in Table 5: authors, publication date, setting, age, gender, race/ethnicity, and diagnosis. Table 6 includes classification (music therapy [MT] or music medicine [MM]), music-based intervention, outcomes measured, and results.

**Demographics**

Participants in these seven studies ranged in age from 18 to 88. The number of participants in the reviewed studies ranged from 14 to 126. The number of all participants in these seven studies is 433. All seven reviewed studies reported participants' gender with a total of 70% (n = 305) identifying as female, and 30% (n = 128) identifying as male. Only in one study (Li et al., 2011) were all female participants. Participants' race/ethnicity was not reported in 4 studies. Five studies reported participants' cancer diagnoses in detail. Demographic information is shown in Table 5.

**Table 5**

*Demographic Information*

| Author / Year | Setting | # of Participants | Participant Age Range | Participant Gender | Participant Race/Ethnicity | Participant Diagnosis |
|---|---|---|---|---|---|---|
| **Burrai et al. (2014)** | Inpatient oncology unit | 52 | 64.5±12.7 | F=43<br>M=9 | Not Specified | Metastatic cancer=45<br>Nonmetastatic cancer=7 |
| **Bradt et al. (2015)** | Inpatient and outpatient oncology unit | 31 | 32-88 | F=21<br>M=10 | Black=23<br>Caucasian=6<br>Asian=1<br>Other=1 | Breast=6<br>Gastrointestinal=3<br>Head and neck=3<br>Hematologic=7<br>Lung=4<br>Other=5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Colwell & Fiore (2020)** | Outpatient oncology | 45 | 30-81 | F=38<br>M=7 | Not Specified | Cancer |
| **Huang et al. (2010)** | Oncology, palliative care, respiratory and gastrointestinal units | 126 | 18-85 | F=38<br>M=88 | Asian | Head and neck=51<br>Gastrointestinal=25<br>Hematological=16<br>Genitourinary=15<br>Lung=7<br>Bone=1<br>Other=11 |
| **Koca & Aylaz (2022)** | Outpatient chemotherapy unit | 45 | 19-83 | F=37<br>M=8 | Not Specified | Breast=21<br>Blood=6<br>Lung/laryngeal=6<br>Colorectal=3<br>Bladder/prostate=3<br>Bone/soft tissue=3<br>Brain=3 |
| **Krishnaswamy & Nair (2016)** | Department of Pain and Palliative Medicine | 14 | Not specified | F=8<br>M=6 | Not specified | Cancer |
| **Li et al. (2011)** | Surgical Department of Oncology Center | 120 | 25-65 | F=120<br>M=0 | Asian | Breast Cancer |

**Music-Based Interventions**

Two studies (Bradt et al., 2015; Colwell & Fiore, 2020) used music therapy interventions and six studies (Burrai et al., 2014; Bradt et al., 2015; Huang et al., 2010; Koca & Aylaz, 2022;

Krishnaswamy & Nair, 2016; Li et al., 2011) used music medicine interventions. Music listening was utilized in six studies (86%). Table 6 demonstrates the study's classification, intervention, outcomes measures and results.

**Table 6**

*Music-Based Interventions*

| Study | Classification | Intervention | Outcomes Measures | Results |
|---|---|---|---|---|
| **Burrai et al. (2014)** | Music and Medicine | Music listening: The participants listened to 5 or 6 pieces played with the saxophone for about 30 minutes. | Visual Analog Scale (VAS) for mood and pain level<br>Systolic blood pressure, diastolic blood pressure, and pulse rate measured by Omron HEM-705CP Automatic Digital Blood Pressure Monitor<br>Glycemia measured by Precision Xceed Pro Blood Glucose<br>Oxygen saturation measured by Nonin 9550 Onyx II 9550 fingertip pulse oximeter | Significant reduction of oxygen saturation and mood level.<br>The pain level showed a statistically significant difference only within music group.<br>There were no statistically significant differences between groups for pain level. |
| **Bradt et al. (2015)** | Music Therapy/Music and Medicine | Music Therapy: Re-creative: sing and/or play an instrument along to a familiar song<br>Improvisational: co- | Mood, anxiety, relaxation, and pain by means of visual analogue and numeric | Not statistically significant, but positively improved anxiety, mood, relaxation and pain. |

| | | | | |
|---|---|---|---|---|
| | | created instrumental or vocal improvisation.<br>Receptive: music-guided breathing exercises<br>Compositional: Song writing<br>Music Medicine: Music listening | rating scales.<br>Exit interview | 77.4 % of participants expressed a preference for music therapy sessions. |
| **Colwell & Fiore (2020)** | Music Therapy | Patient-selected singing with accompaniment (traditional)<br>Patient- created chant using the Orff process (novel) | Distress outcomes measured were: pain and fatigue using a 0–10 numerical rating scale, the State-Trait Anxiety Inventory (state form), and the Profile of Mood States 2 Short Form (for mood and fatigue). | Pain decreased for all conditions with no significant difference. Patient-selected singing condition showed the greatest decrease pain. |
| **Huang et al. (2010)** | Music and Medicine | Music listening | Sensation and distress of pain were rated on 100 mm VAS. | Significantly less post test pain in the music versus the control group. |
| **Koca & Aylaz (2022)** | Music and Medicine | Music listening | VAS<br>STAI | Significantly decrease of pain and anxiety levels in the experimental group. |
| **Krishnaswamy & Nair (2016)** | Music and Medicine | Music listening | NRS<br>Hamilton anxiety rating scale (HAM-A) | Statistically significant reduction in the postintervention pain scores in the test group compared to the control group |
| **Li et al. (2011)** | Music and Medicine | Music listening | Short-Form of McGill Pain Questionnaire | Significant reduction in pain level in the intervention group |

| | | |
|---|---|---|
| | (SF-MPQ)<br>Pain Rating Index (PRI-total)<br>VAS<br>Present Pain Intensity (PPI) | compared with the control group. |

**Synthesis of Research Results**

The seven included studies were published in English and were conducted in the following five countries: Italy (n=1; 12.5%), USA (n=3; 37.5%), Turkey (n=1; 12.5%), India (n=1; 12.5%) and China (n=2; 12.5%).

Four studies (Koca & Aylaz, 2022; Burrai et al., 2014; Li et al., 2011; Huang et al., 2010) are randomized controlled trials. Bradt et al. (2014) is a mixed method study. Krishnaswamy & Nair (2016) is a non-randomized two group pre-/pos- test design. Colwell & Fiore (2011) is a non-randomized three group pre-/post- test design.

Results from seven studies showed positive effects in pain levels in the intervention groups compared to control groups (Burrai et al., 2014; Bradt et al., 2015; Colwell & Fiore, 2020; Huang et al., 2010; Koca & Aylaz, 2022; Krishnaseamy & Nair, 2016; Li et al., 2011).

Burrai et al. (2014) reported that the pain level showed a statistically significant difference ($P$=0.001) in the posttest for experimental group for visual analog scale for pain (VASP), and there were no statistically significant differences between groups.

Bradt et al. (2015) found that music therapy and music medicine sessions were both beneficial in reducing anxiety as indicated by mood, relaxation, and pain. The qualitative results indicated a decrease in anxiety and pain perception, with negative values indicating greater favorable changes in music medicine. The mean difference data for pain was -0.2±1.4, negative values indicate more beneficial change in music therapy sessions.

Colwell & Fiore (2020) reported participants in the patient-selected singing condition had a much greater decrease in pain than participants in the standard care and patient-created chant, even though pain decreased across all 3 groups.

Huang et al. (2010) reported 42% of participants in the music group reported a 50% reduction in pain, compared to just 8% in the control group. Additionally, no negative impacts from the music were reported.

Results from Koca & Aylaz (2022) indicated a statistically significant decrease in mean VAS Pain Scale post-test scores for patients in the experimental group compared to pre-test, approaching a moderate effect. Patients in the control group had only a negligible decrease in mean scores from pre-test.

Krishnaswamy & Nair (2016) reported that there was a statistically significant decrease in the pain scores of the patients in the study group after the intervention. There were no statistically significant differences between pre and post pain scores in the control group. Further, they noted the difference in post-intervention pain scores (P=0.034) between the study group (music) and control group (talking) was statistically significant.

Li et al. (2011) reported that significant improvements in pain measurement indices were observed in both intervention and control groups throughout the intervention period, with the intervention group showing consistently better outcomes compared to the control group, as evidenced by Pain Rating Index (PRI-total) score, Visual Analogue Scale (VAS) score and Present Pain Intensity (PPI) score.

One study (Colwell & Fiore, 2020) met the criteria for music therapy, five (Burrai et al., 2014; Huang et al., 2010; Koca & Aylaz, 2022; Krishnaseamy & Nair, 2016; Li et al., 2011;

Schandert et al., 2021) met the criteria for music medicine, and one study (Bradt et al., 2015) compared the effect of music therapy and music medicine on cancer-related pain.

**Music therapy**

Music therapy sessions were provided by a board-certified music therapist in the study conducted by Bradt et al. (2015). Re-creative, improvisation, receptive, and compositional music therapy methods were used in this study based on patient preference for stress management, mood modulation, pain management, and psychological support. Similar to Bradt et al. (2015), Colwell & Fiore (2020) invited participants to select songs from a pre-determined list. The music therapist provided the accompaniment and participants were given the option to sing/play along using tone chimes. Participants were also invited to create an Orff chant creating lyrics based on their cancer experiences. Different musical elements were added, including a bordun, body percussion, melodic improvisation, and rhythmic ostinato. Participants played instruments such as xylophones and percussion, guided by the therapist. Caregivers could also join in, adding parts as desired. The therapist provided support on the djembe drum as needed.

**Music Medicine**

Music listening was utilized in six other studies (Burrai et al., 2014; Bradt et al., 2015; Huang et al., 2010; Koca & Aylaz, 2022; Krishnaseamy & Nair, 2016; Li et al., 2011). Five studies used recorded music played to the participants for listening, with one study incorporating live music.

Burrai et al. (2014) invited participants to choose 5 or 6 pieces of music of different styles and genres and then listened to the saxophone for approximately 30 minutes. The holistic nurse played the saxophone at the bedside of patients in the music group, and all music interventions took place in a designated room.

Bradt et al. (2015) created personalized playlists based on participants' music preferences. The music therapist gave the participant the iPod at the beginning of each session to ensure that they were able to operate it and then left the room. Music medicine sessions lasted 30-45 minutes, during which time participants did not engage in other activities.

Huang et al. (2020) also investigated the efficacy of curated playlists to reduce pain perception. Participants were given the option to select from four audiotapes (Taiwanese folk songs, Buddhist music, Harp music and Paino music). Participants were initially invited to listen to a short introduction audio before choosing the style of music they thought would help them relax and loosen their attention. The participants listened to music through headphones, and the majority selected Taiwanese music (71%), with Taiwanese folk songs being the most popular (43%), followed by Buddhist music (28%), and other participants (29%) chose Western music. The experimental intervention employed the chosen music, and following the break, the control group listened to the same music.

Koca & Aylaz (2022) asked participants to select their preferred music genre from the following list: three traditional Turkish music and other-type music (New Age, Natural, and Classical. Participants in the experimental group were allowed to the recorded genre they preferred among these six music genres. Control patients did not receive any investigator intervention.

The music selected by Krishnaswamy & Nair (2016) was traditional Indian instrumental music and modern contemporary tunes. The experimental group listened to the music for 20 minutes via a headphone-connected MP3 player, with all participants hearing the same pieces of music. The individuals in the control group spent the 20-minute period talking to them.

Li et al. (2011) provided patients in the intervention group with the names of 202 music titles and introductions to four genres of music from a music media library stored on an MP3 player. Patients in the intervention group were instructed to select the music they favored, control the volume, and listen to it through headphones connected to an MP3 player. Total intervention time included hospitalization after radical mastectomy (mean=13.6 ± 2.0 days) and two cycles of chemotherapy (mean=18.9 ± 7.1 days each). Patients were instructed to listen to music twice a day (30 minutes each time), once in the morning (6 a.m.-8 p.m.) and once in the evening (9 p.m.-11 p.m.). During the postoperative hospitalization, if patients missed music listening sessions, researchers encouraged them to adhere. Once patients were discharged from the hospital, the researchers followed up by phone. Control patients were not blinded to music therapy in the intervention group and participated in four tests (one at baseline and three after randomization to the group).

# Chapter IV

# Discussion

## Summary of the Findings

The seven studies included in this rapid review reveal that investigations into the implementation of music therapy and music medicine with pain management in cancer patients are still in an exploratory phase. The results of seven studies indicated that music therapy and music medicine have applications in reducing pain and improving other symptoms such as anxiety, mood, relaxation, distress in cancer patients.

Five studies reported that music-based interventions had positive effects on the improvement of pain in cancer patients. Results of Huang et al. (2009) showed that there were no significant differences in the intensity of worst or least pain between groups. Li et al. (2010) reported that there were no significant differences ($P$>0.05) between groups. Colwell & Fiore (2020) showed that there were no significant differences found among conditions. Results of Burrai et al. (2014) showed that there were no statistically significant differences between groups for pain level ($P$=0.136), the pain level showed a statistically significant difference at posttest for visual analog scale for pain (VASP) ($P$=0.001). Bradt et al. (2015) showed that positive effects in improving pain, but there was no statistically significant difference between the conditions for these outcomes.

The results of three studies showed that statistically significant in pain. Krishnaswamy & Nair (2016) showed statistically significant reductions in study group ($P$=0.003) as well as the study group and control group ($P$=0.034). Koca & Aylaz (2022) indicated that the scores of state and trait anxiety inventory (STAI) and visual analogue scale (VAS) of experimental groups decreased showed a statistically significant decrease.

There was lack of reporting of music, interventionist, setting, unit of delivery may have the effect of influencing the final outcomes. Only 2 studies (Colwell & Fiore, 2020; Koca & Aylaz, 2022) provided the description of the music. And only 5 studies (Burrai et al., 2014; Bradt et al., 2015; Colwell & Fiore, 2020, Koca & Aylaz, 2022) provided interventionist credentials. Only 2 studies provided the setting information. 4 studies reported the unit of delivery. Researchers often describe music interventions without providing a clear theoretical basis or mechanism of action. This leads to difficulties in interpreting results and making comparisons across studies. For example, music listening interventions may affect multiple dimensions of pain, but the lack of clear theoretical concepts may lead to differences in interpretation of results (Robb et al., 2011).

Music listening was utilized in six studies. Burrai et al. (2014) used live saxophone music, the other five studies (Bradt et al., 2015; Huang et al., 2010; Koca & Aylaz, 2022; Krishnaswamy & Nair, 2016; Li et al., 2011) used pre-record music. There are no studies that show the impact of live and recorded music on outcomes. Re-creative, creative, improvisational, receptive, and compositional music therapy methods were utilized by Bradt et al. (2015) and Colwell & Fiore (2020). It is important to highlight here that the results of Bradt et al. (2015) showed that the majority of participants expressed a preference for music therapy services for future treatments.

The Visual Analog Scale (VAS) is the most frequently utilized pain measurement tool to measure the intensity of pain on a scale of 0 to 10, with 0 being described as "no pain" and 10 as "the worst possible pain". VAS is defined as a line of fixed length (Critical Path Institute's Electronic Clinical Outcome Assessment (eCOA) Consortium, 2022). Numeric rating scale

(NRS) has also been used in these included studies. NRS consists of numbers that represent an ordered continuum of certain attributes. Outcomes regarding pain were derived from participants' self-reports, so how the music-based intervention affected participants' pain ratings was influenced by subjective perceptions. While the results of the six studies showed no statistically significant reductions in pain levels, all of the data showed reductions in pain levels for participants who received the music-based interventions.

In response to the choice of music, three studies (Huang et al., 2010; Koca & Aylaz, 2022; Krishnaswamy & Nair, 2016) chose culturally relevant songs associated with the researcher's countries. In six studies that used music medicine interventions, the music was either music chosen directly (Huang et al., 2009, Li et al., 2011, Burrai et al., 2014, Krishnaswamy & Nair, 2016, Koca & Aylaz, 2022) by the interventionist or based on participants' preferences (Bradt et al., 2015). Cultural background and autobiographical memories may uniquely influence music perception and cognition, it is vital to personalize music therapy because music preferences are unique (Rajendran, 2022). Garza-Villarreal et al. (2017) recommends considering patient's choice of music over the therapist's preferences. Good et al. (2000) reviewed findings from five pain studies to demonstrate cultural differences in preference for music. The results indicated that there are significant differences in preference for music for therapeutic purposes. The elements that shape an individual's musical preferences may be the patient's cultural identity, social interactions, popular media, cultural trends, and psychological dispositions (Rajendran, 2022; Rentfrow et al., 2011).

**Limitations**

One salient limitation of this rapid review is that the keywords "music therapy," "pain management," and "cancer patients" were used when searching for studies initially without the

inclusion of "music medicine." However, the title of this rapid review encompassed music therapy and music medicine. The reason for this was that during the author's screening process, an insufficient number of studies used music therapy as the intervention, while music medicine was utilized in most included studies. In the meantime, the author did not have enough time to add the keyword of “music medicine” to the database to do a new search and screening process. Also, the inclusion criteria only included studies published in English, which resulted in an incomplete list of studies included in this rapid review. This may influence the bias of the results by leading to an insufficient number of studies ultimately included in this rapid review and incomprehensiveness of the effectiveness of music medicine for pain management in cancer patients. Although four of seven included studies were randomized controlled trials, these studies suffer from small sample sizes making generalizability difficult. Poor standardization of interventions also suggests the possibility of insufficient evidence.

**Future Possibilities for Research**

For the future studies, the author suggests that larger randomized controlled trials using standardized intervention protocols are needed, and that researchers need to determine whether the intervention is classified as music therapy or music medicine and provide evidence of the credentials of the appropriate intervention implementers. Additionally, examining the mechanisms by which music-based interventions affect the reduction of pain perception and psychosocial well-being in cancer patients will contribute to a better understanding of the therapeutic potential of music therapy and music medicine in this area. Finally, investigating the cultural and environmental elements that impact the implementation and efficacy of music interventions in various regions is crucial for fostering equal access to supportive cancer care services.

Bradt et al. (2021) suggested that future research should explore patient characteristics as moderators of the therapeutic effects of music therapy interventions versus listening to prerecorded music. Music can also cause harm, and since music also represents a multifaceted experience, the relationship between music and harm is complex and may include a number of factors based on the context, the deliverer, the music, and the receiver (Silverman et al., 2022). Bradt et al. (2015) have shown that both listening to prerecorded music and music therapy can benefit cancer patients by improving symptom management and providing psychosocial support. Because music evokes strong emotional responses in patients that may require psychotherapeutic support, it is recommended that even when listening to prerecorded music is offered, a certified music therapist should be available to assess the patient and provide psychotherapeutic support in conjunction with the music intervention.

Dose-response should be explored in future research, which is frequency and duration of music therapy and music medicine interventions. Six studies reported that sessions were 20-45 minutes in length, but there is no explanation as to why and how this length and frequency can lead to positive improvements in pain management for cancer patients. Explaining the mechanisms involved could allow for an in-depth exploration of whether the frequency and duration of a session affects the final outcomes and provide standards and information for future research.

Furthermore, all seven studies were short-term studies and did not bring evidence against what kind of impact music therapy and music medicine would have on pain management for cancer patients if they were to receive music therapy and music medicine over a long period of time. It is suggested that future research in this area could have a longer timeline of studies to

bring about long-term pain management for cancer patients.

## Conclusion

This rapid review included seven studies that met the inclusion criteria to analyze and evaluate the effectiveness of music therapy and music medicine in reducing pain in cancer patients. The findings of the review suggest that music therapy and music medicine interventions can be a beneficial non-pharmacological addition to traditional pain management strategies for cancer patients. Key findings of the study include a significant reduction in pain levels in the intervention group compared to the control group, although most of the data was not statistically significant. Additionally, the included studies noted improvements in anxiety, mood, relaxation, and distress. However more randomized controlled studies with larger samples and longer periods of time are still needed to strengthen the evidence. Furthermore, inadequate investigator qualification and intervention standardization may influence results. Standardizing interventions, increasing sample sizes, controlling for variables as well as exploring the underlying mechanisms that produce treatment effects, and investigating the cultural and environmental factors that influence their implementation, a music therapist should also be available when listening to pre-recorded music is offered are recommended in future studies.

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