

QUALITY IMPROVEMENT

Decreasing Pain Intensity in Adult Patients With Cancer Through Music Therapy: A Complementary Non-Pharmacological Approach

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Authors' disclosures of conflicts of interest are found at the end of this article.

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Abstract

Background: Adequate pain management continues to be an unmet need in patients with cancer. Pain is known to impact the quality of life. It is recommended that treatment plans include pharmacological and complementary non-pharmacological methods for managing pain. Music listening therapy is an evidence-based intervention used to manage acute and chronic pain in adult patients with cancer. **Methods:** This evidence-based practice project applied the use of music therapy in adult patients with cancer experiencing moderate to severe pain despite current pharmacological treatment in a rural outpatient oncology clinic. Pre- and post-intervention pain scores were assessed using a numeric rating scale, and results were analyzed using a Wilcoxon signed-rank test. **Results:** The results showed 83% of participants reported a reduction in pain intensity by at least one pain level after using music listening therapy. Additionally, 100% of participants expressed a willingness to continue music listening therapy at home as a self-guided technique to reduce pain severity. **Conclusion:** The role of the advanced practice provider must include comprehensive pain management and pain monitoring to assess its impact on patient quality of life. Patients are more willing to perform complementary interventions that have minimal barriers to physical, economic, and environmental factors, particularly in rural settings where the lack of additional health resources is significant. Music listening therapy may be conducted in any environment with known positive impacts on acute and chronic pain. Therefore, music listening therapy is a viable non-pharmacological complementary intervention that should be included in the education provided to our patients in their fight against cancer.

Pain is a common symptom in patients with cancer, with a prevalence of 20% to 50% (National Center for Complementary and Integrative Health, 2022). Approximately 80% of adult patients with advanced-stage cancer suffer from moderate to severe pain (National Center for Complementary and Integrative Health, 2022; Scarborough & Smith, 2018). Uncontrolled moderate to severe pain may interfere with physical and psychological functions, which correlate with decreased quality of life (QOL), increased rates of anxiety, and increased rates of depression (Lin et al., 2020). Improving a person's QOL is a national goal, and controlling pain directly contributes to this national goal (Office of Disease Prevention and Health Promotion, n.d.).

The management of pain is significant to both scholarly and clinical nursing, as it can be addressed and directly affected by nursing-led interventions (Yarbro et al., 2018). The advanced practice registered nurse (APRN) role includes comprehensive pain management due to the correlation between pain management and patients' QOL (Lin et al., 2020). To improve the QOL of patients with cancer, the National Comprehensive Cancer Network (NCCN) and the American Society of Clinical Oncology (ASCO) recommend using complementary non-pharmacological interventions for effective pain management (Zhi et al., 2021).

Music listening therapy is a form of passive music therapy that has been extensively applied as an evidence-based intervention in the management of both acute and chronic pain in patients with cancer (Deng, 2019; Garza-Villarreal et al., 2017; Hsu et al., 2022; Johnson & Elkins, 2020; Lu et al., 2021; Tang et al., 2021; Zeliadt et al., 2020). In addition, music listening therapy is a cost-effective intervention that is not limited to physical and environmental barriers, unlike many other integrative and complementary interventions (Deng, 2019). This is of particular importance in rural communities, where a lack of resources is prevalent and of particular importance to recognize and improve upon (Baltic et al., 2002; Leonard et al., 2021; Parchman et al., 2020).

This evidence-based practice (EBP) project addressed the need to decrease the pain severity reported in adult patients with cancer being treat-

ed at a rural outpatient oncology clinic. Numerous studies suggest that music listening therapy is an effective complementary therapy for pain across multiple clinical settings, including the outpatient clinic environment (Gallagher et al., 2018; Johnson & Elkins, 2020; Martin-Saavedra et al., 2018; Wang & Tian, 2021; Zhi et al., 2021). The purpose of this EBP project was to decrease pain intensity perceived in adults with cancer whose pain was not currently controlled using pharmacological interventions alone. The overarching aim was to provide a method for decreasing pain intensity in patients with cancer by using music listening therapy as a self-guided complementary intervention. Expanding the use of this self-guided intervention in rural communities could contribute to improved pain tolerance that can be performed in the home setting whenever needed to manage pain.

NURSING THEORY

This project utilized nursing theory to improve patient outcomes. Kolcaba's theory of comfort is a middle-range theory that supports using complementary measures to improve patients' physical condition (Kolcaba, 2003). The basis of comfort is to improve an unmet physical, spiritual, or emotional need that a person experiences in order to enhance satisfaction and overall QOL. The nursing theory supports a holistic approach to restoring function, and places comfort as a pivotal cornerstone in patient treatment and recovery.

The comfort theory has three main principles for providing comfort to patients: relief, ease, and transcendence. In the application of music listening therapy, relief is felt by utilizing music listening as a passive distraction technique to decrease pain perception via a decrease in nerve impulse and muscle tension. This decrease creates an analgesic effect that utilizes the gate control opioid receptor agonism response and neuromatrix psychosocial mechanism to achieve a psychomotor response and is evidenced by decreased pain intensity (Thakare et al., 2022). Ease is achieved when improved pain intensity decreases accompanying anxiety and fatigue. Lin et al. (2020) found that anxiety and fatigue are commonly associated with the effects of uncontrolled pain. Improvement in pain is associated with improvement in anxiety and fatigue (Li et

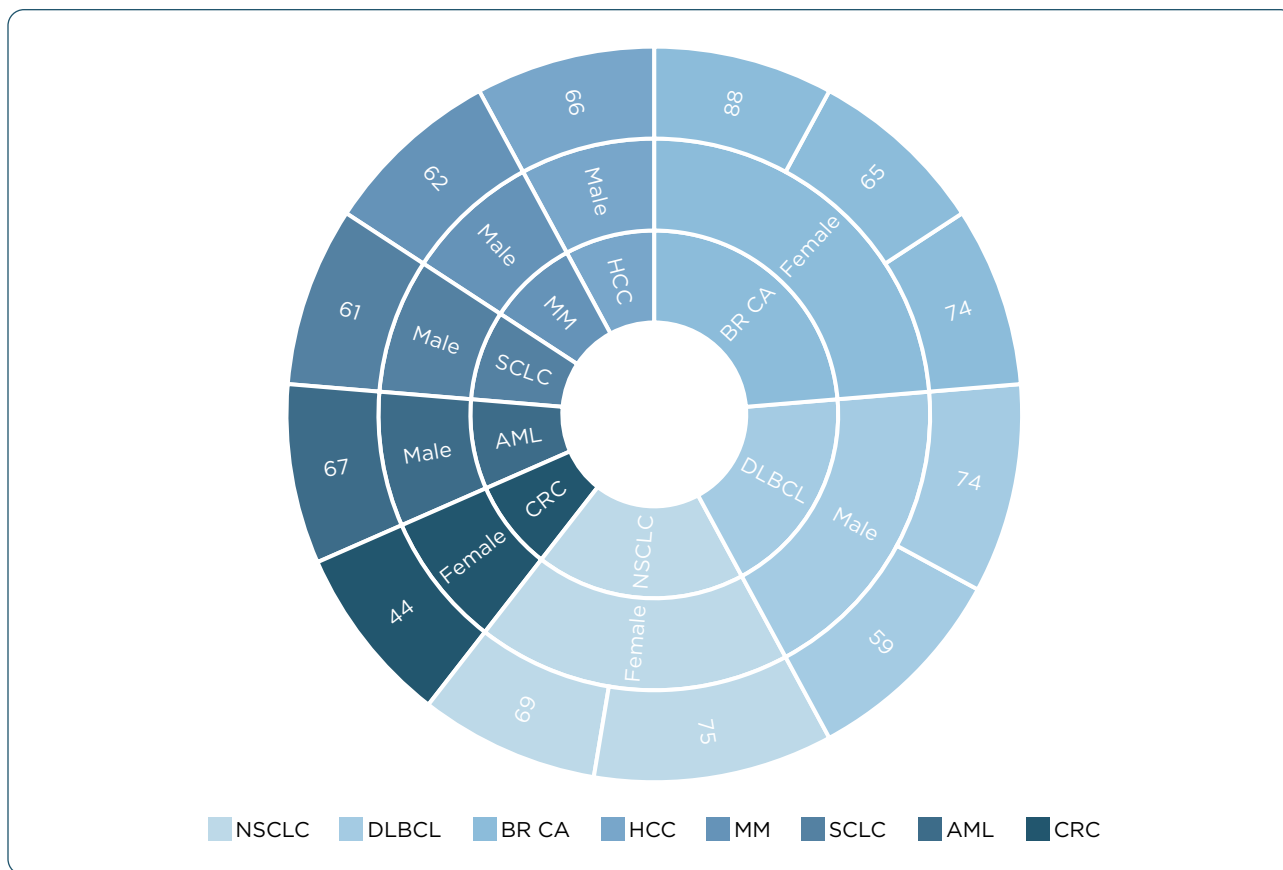


Figure 1. Participant demographic information. Ring 1: Diagnosis. Ring 2: Gender. Ring 3: Age. NSCLC = non-small cell lung cancer; DLBCL = diffuse large B-cell lymphoma; BR CA = breast cancer; HCC = hepatocellular carcinoma; MM = multiple myeloma; SCLC = small cell lung cancer; AML = acute myeloid leukemia; CRC = colorectal cancer.

al., 2021). Transcendence is achieved when there is the ability to overcome an obstacle and restore normal functions. In the use of music listening therapy, this transcendence is represented by the patient’s ability to move past the pain, evidenced by improved QOL and the ability to perform previous activities (Johnson et al., 2017).

Therefore, the holistic nursing approach can be used through music listening therapy to decrease pain intensity in patients with cancer, ultimately providing effective means for physical, emotional, and psychological comfort (Eriksson et al., 2018).

METHODS

Participants

Participants included adult patients with cancer at the outpatient hematology/oncology clinic with moderate to severe pain. Patients were ap-

proached about project participation if they reported a pain level of four or higher at initial assessment of pain during a scheduled clinic visit. Additional inclusion criteria included adults aged 18 years and older, cancer diagnosis, and English literacy. Exclusion criteria included hearing impairment, sensitivity to sound, and severe mental illness. The sample size was 12 participants who were recruited over a 12-week period. These participants represented a wide range of adults aged 44 to 88 years and included both males and females with solid and hematologic oncology diagnoses (Figure 1).

Setting

This project was conducted in a rural outpatient oncology clinic that operates as part of a larger cancer center network. Patients at this location included adults aged 18 and older with any oncologic

disease diagnosis and nonmalignant hematologic conditions. The appropriate management of pain is included in all treatment plans as part of managing oncologic disease. Staff involved in this project included the internal project staff connected to study design and implementation, external site staff obtaining the initial pain score from the patient, and the providers, including physicians and advanced practice providers (APPs), who assessed the patients.

Instrument

The numeric rating scale (NRS) was used to assess pain intensity (Alghadir et al., 2018). The NRS is an 11-point numeric scale, with 0 = no pain and 10 = worst pain imaginable. This instrument has demonstrated evidence of test-retest reliability (intra-class correlation coefficient = .95) and construct validity in several populations, including patients with cancer (Alghadir et al., 2018; McCaffery & Beebe, 1989; Wickham, 2017; Appendix A).

Intervention and Data Collection

For this intervention, existing clinical staff continued to perform pain assessments on patients at the beginning of each scheduled visit. Pain scores were collected along with vital signs by medical assistants prior to seeing the provider on the day

of the appointment. These were recorded into the electronic medical record (EMR) in real time. These existing pain scores were used to identify potentially eligible patients and were recorded as the pre-assessment scores. Those meeting inclusion criteria were approached after planned office visits for participation. Patients who agreed to participate in this project completed an Institutional Review Board–approved informed consent form.

Led by a board-certified APRN, project staff educated patients on how music listening therapy as a complementary non-pharmacological intervention works to improve cancer pain management (Yangöz & Özer, 2019). Furthermore, project staff educated patients on the importance of the participant identifying lyrical or non-lyrical music that resonated with them. Education was guided by evidence-based custom-designed materials (Appendix B). The same APRN also provided each participant with a 30-minute session of music listening therapy via a preloaded MP3 player based on personal preference (Howlin & Rooney, 2021). The APRN then reassessed patients' pain intensity immediately after completing the session. Additionally, each patient was asked to indicate their willingness to continue the music listening therapy at home in a self-guided manner to reduce pain (Figure 2).

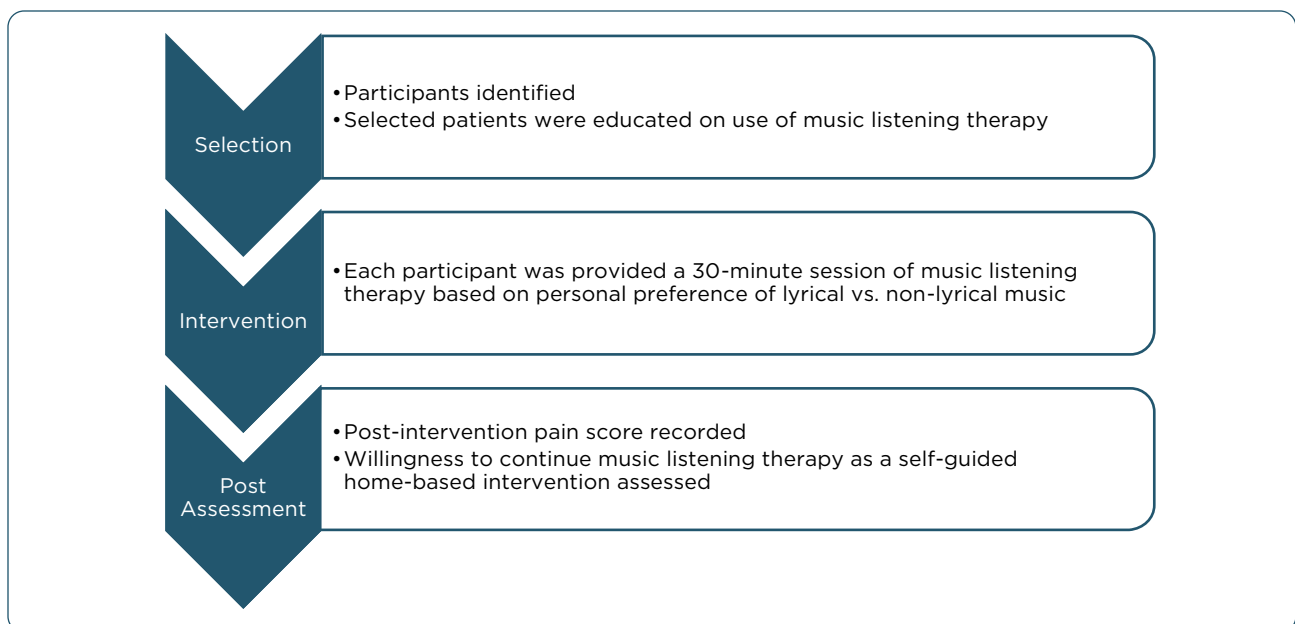


Figure 2. Participant selection, intervention, and data collection.

This project was conducted over 3 months. Data abstracted from the EMR included age, ethnicity, gender, race, diagnosis, NRS pain assessment scores, and pharmacological pain management treatment. In addition, the types of music selected and the patients' willingness to continue music listening therapy at home were collected. These data were recorded on a data capture form. Data were stored on a password-protected computer, only accessible to the Doctor of Nursing Practice project personnel. Each patient was assigned a participant identification number. The project APRN collected only the information pertinent to this project.

Data Analysis

Descriptive statistics were used to analyze demographic and clinical characteristics. A Wilcoxon signed-rank test was used to compare pain scores before and after the intervention to determine pain improvement after using music listening therapy. Data were then analyzed using the Statistical Package for Social Sciences (SPSS) version 28. The project goal for success was at least 30% of patients with a reported decrease in pain intensity based on previous study findings (Gallagher et al., 2018; Wang & Tian, 2021).

RESULTS

Out of 12 patients accrued over 3 months, 83% of participants reported a reduction in pain intensity by at least one pain level after using music listening therapy. Additionally, 100% of participants expressed a willingness to continue the intervention at home as a self-guided technique to reduce pain severity. The change in pain level was statistically significant ($p < .01$). These findings are clinically significant, as there was a considerable improvement in pain for patients without altering their existing treatment plan (Table 1, Figure 3).

DISCUSSION

Music listening therapy has been found to reduce pain intensity in patients with cancer (Howlin & Rooney, 2020; Park & Lee, 2021). It is a cost-effective intervention that may be combined with any treatment plan to assist in pain management. A reduction in pain intensity is strongly correlated with improved QOL, as evidenced in several studies that compared the overall patient-reported effects of pain (Lin et al., 2020). Advanced practice registered nurses are in a unique position to support the incorporation of complementary interventions such as music listening therapy into the plan of care for patients with cancer. Music listening therapy can be implemented in a large or small organization by incorporating it into standard operating procedures for pain management. This complementary non-pharmacological intervention is cost-effective, low-risk, and has few barriers, making it a viable option to substantially improve the severity of pain perceived by patients with cancer. Health-care professionals, including APPs, should consider incorporating music listening therapy in the management of cancer-related pain. Music listening therapy may reduce pain severity and anxiety, both of which are crucial for improving the overall QOL of patients (Gallagher et al., 2018).

Limitations

A limitation of this project was the small sample size. Recruitment was hindered by patients' health limitations, reluctance to try complementary interventions for pain, ability to stay for the intervention, and multiple natural disasters. Part of the screening included ensuring the correct patient population was selected for participation. This practice also cares for nonmalignant hematologic patients. An initial inclusion review was conducted on all patients to ensure only patients with a cancer diagnosis were approached by staff.

Table 1. Overall Response by Pain Level and Willingness to Continue Intervention at Home

Overall pain	<i>n</i>	Improvement by ≥ 1 pain level	Improvement by ≥ 2 pain levels	% meeting pain goal	Willing to continue at home
Moderate (4-6)	5	4	0	80%	100%
Severe (7-9)	5	5	0	100%	100%
High (10)	2	1	1	50%	100%

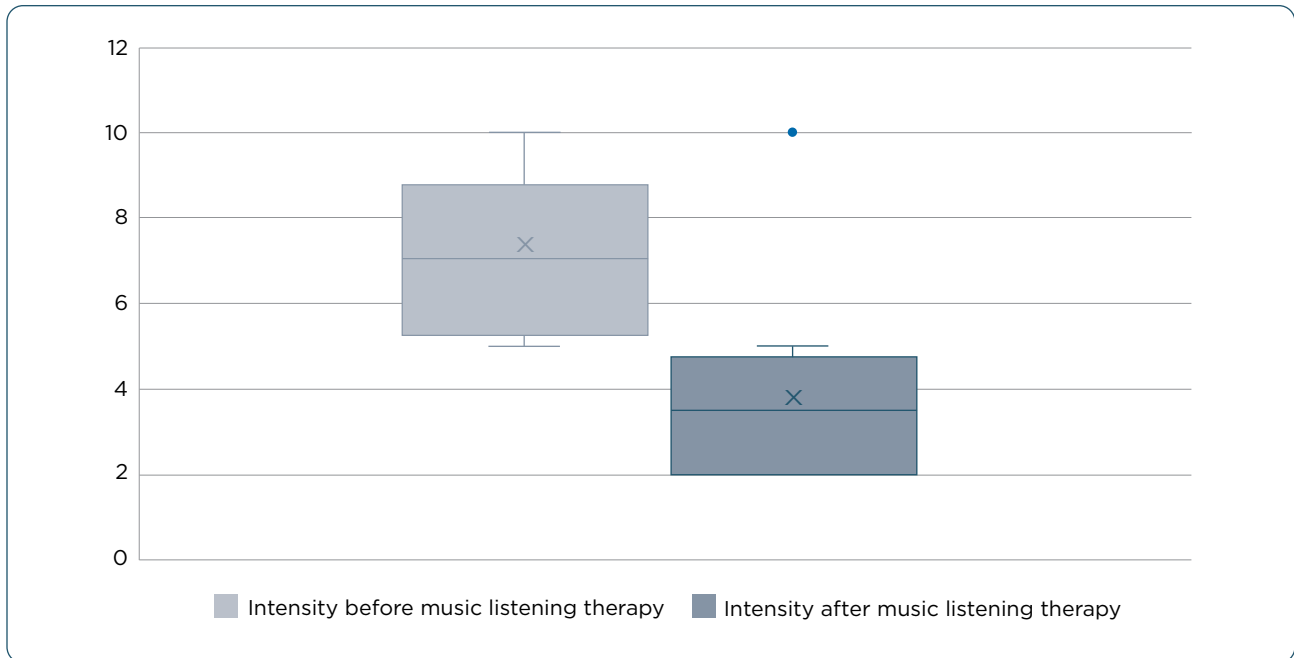


Figure 3. Pre- and post-intervention pain intensity scores.

It was also necessary to address the exclusion criteria previously outlined.

Despite this limitation, a strength of this project was the ease of delivering the intervention and applicability across all age groups of patients with cancer experiencing pain. The management of cancer requires patients to give up control of many of their routines. Patients are directed when and how often they can utilize pharmacological interventions, and they are often limited on the treatment options to manage their pain. Conversely, music listening therapy gives the patient a sense of control because they can choose the type of music and how often to use the intervention. Furthermore, this complementary non-pharmacological approach should not interfere with treatment plans.

Additionally, there is a consideration that an explanation of the intervention is necessary as part of patient education. It is not intended to create bias to the outcome any more than the education of any intervention, including pharmacological interventions, creates. The explanation does, however, help to motivate participants to try a new intervention to enhance the psychosocial mechanisms of music listening therapy (Thakare et al., 2022).

CONCLUSION

Rural communities continue to be affected by a lack of resources as well as socioeconomic disparities and barriers to obtaining medical care, including specialized pain management (Parchman, 2020). Patients with cancer need to have treatment plans that include both pharmacological and non-pharmacological interventions (Tick et al, 2018). Music listening therapy is a cost-effective intervention that is not limited to physical and environmental barriers, unlike many other integrative and complementary interventions (Deng, 2019). This project aimed to apply an important evidence-based complementary health intervention into practice to assist with uncontrolled pain. By focusing on the use of music listening therapy, the goal was to show improvement in the perceived severity of pain using an intervention that was cost-effective, low risk, and had ease of use in this population, as evidenced in previous studies (Deng, 2019). The intervention demonstrated clinical significance through a reduction in reported pain. Although the sample size for accrual was small, the results showed clinical significance in decreasing overall perceived severity of pain. Additionally, the willingness of all patients who participated to continue this intervention at home

with self-guided techniques adds significant value to the ease of use and perceived effectiveness.

Overall, the evidence supports the use of music listening therapy in patients with cancer. The results from the EBP project further provide evidence that implementing this intervention produced the intended result of decreased perception of pain in most patients enrolled. Based on the clinical significance found in the project, further application of this intervention in a larger group in rural settings may yield improved results for those willing to participate.

The severity of pain is directly correlated with QOL. Therefore, the perception of pain must be addressed as thoroughly as possible using multimodal methods, including music listening therapy as a complementary health intervention. Providers are ideally suited to introduce these interventions during treatment planning and management (Tick et al., 2022). As such, music listening therapy is a viable tool to reduce pain severity and improve the QOL of patients with cancer today and tomorrow. ●

Disclosure

The authors have no conflicts of interest to disclose.

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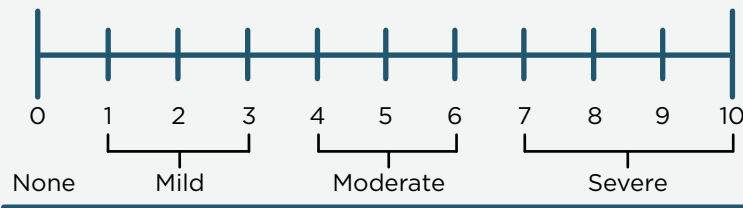
Appendix A. Instructions for Numeric Pain Rating Scale

General Information:

The patient was asked to complete three pain ratings, corresponding to current, best, and worst pain experienced over the past 24 hours. The average of the three ratings was used to represent the patient's level of pain over the previous 24 hours.

Patient Instructions:

"Please indicate the intensity of current, best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)."



Note. Adapted from McCaffery, M., & Beebe, A. (1989). Downloaded from www.rehabmeasures.org.

Appendix B. Music Listening Therapy to Improve Pain in Patients With Cancer: Educational Pamphlet

Music Listening Therapy to Improve Pain in Patients With Cancer

1 in 3 patients with cancer continue to report moderate to severe pain. Pain has a known negative impact on the quality of life of patients with cancer.

Complementary interventions, also called integrative interventions, are health interventions designed to work with current pharmacotherapy for pain control. Because there is a known need to improve pain in patients with cancer, the current NCCN guidelines support using complementary health interventions such as music listening therapy.

What Is Music Listening Therapy?

Music listening therapy is a receptive therapeutic intervention that works as a distraction. Music listening therapy utilizes distraction techniques to provide entertainment that can positively impact pain, anxiety, depression, shortness of breath, and mood.

Music Listening Therapy in Patients with Cancer

Evidence has shown that both cancer and non-cancer-related pain are responsive to music listening therapy.

Risks vs. Benefits

This is a cost-effective, low-risk intervention with few physical limitations to use except for profound hearing impairment.

Music Listening Therapy as a Complementary Intervention

Pain has been shown to have a direct relationship with increased anxiety, depression, and decreased physical function.

Music listening therapy has been shown to positively affect both the physical and psychological effects of pain. Since all these areas can have a negative impact on the quality of life, addressing unmet pain needs may improve the overall experience of patients with cancer.

The Intervention is Music Listening Therapy

It is designed to be taught in the office and continued at home as a self-guided intervention.

Selected music may be lyrical or nonlyrical based on preference.

This complementary intervention aims to provide you with an additional tool that can be used with your current care plan to reduce your pain.

How to Perform Music Listening Therapy

- It is important to select a series of music you connect with. This may be lyrical or nonlyrical.
 - » Evidence shows that the music you connect with by a positive memory, lyrics, or rhythm is more effective in assisting with distraction from pain.
- Use earbuds or headphones.
- Close your eyes if possible or wear a face mask to assist in a deeper connection.
- Place yourself in a position to listen to the music for at least 30 minutes.
- Focus on the music.
- Relax and enjoy the music.

Notes

Note. Information from Everdingen et al. (2016); Gallagher et al. (2018); Lin et al. (2020); Swarm et al. (2019); Tick et al. (2018); Thakare et al. (2022).