

Efficacy of Music Therapy in Cancer Patients Undergoing Radiation Therapy - A Scoping Review

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Abstract: Background: Cancer is an abnormal condition in which a group of cells disregard the physiological rules of the cell division and grow in an uncontrolled manner. It is one of the most significant and prevalent health issues that cause mortality. It is the second most common cause of death after ischemic heart disease that accounts for 13% of mortality rates in developed Nations. In cancer therapy, Radiation is a physical agent that destroys cancer cells. Ionizing radiation is the sort of radiation utilized in treatment. Radiation treatment (RT) is feared, especially by patients with recently discovered malignancies. According to research, using music as a healthcare intervention can benefit patients by decreasing the amount of pain they experience, encouraging relaxation and regular breathing, lowering anxiety and tension, and elevating mood. Aim: Music Therapy in health care is to manage symptoms, enhance quality of life, support physical and/or psychosocial function and to promote well-being. Objective: To explore if music therapy has positive effect on managing the symptoms related to radiation therapy. Methodology: Design: The design of this study is Scoping review. The study includes PubMed, Google Scholar and Science Direct, according to PRISMA guidelines the search keywords used were MT, cancer patients, and radiation therapy which is written in English and published between May 2017 to February 2024 non-interventional articles such as cross-sectional studies or duplicate studies were also excluded. The study made for inclusion and reviewed for outcome measures and selection which can be summarized according to a flowchart. Conclusion: Music therapy combined with other integrative therapies has shown positive effect in lower patients' anxiety, reducing depression and fatigue and improving quality of life. Therefore, more researches should be conducted in order to confirm the scientific quality of each MT intervention.

Keywords: Radiation therapy (RT), Music therapy (MT), Cancer

1. Introduction

Cancer is an abnormal condition in which a group of cells disregard the physiological rules of cell division and grow in an uncontrolled manner. ¹ It is one of the most significant and prevalent health issues that cause mortality. It is the second most common cause of death after ischemic heart disease that accounts for 13% of mortality rates in developed nations. ²

Radiation is a physical agent that destroys cancer cells. Ionizing radiation is the sort of radiation utilized in treatment. The word "ionizing" refers to the radiation's ability to electrically charge the particles in biological bodies upon impact. This process transfers energy from the rays to the body's cells as they pass through genetic modification, this energy can either directly destroy cancer cells or cause them to undergo apoptosis and cell death. The process causing genetic changes in radiation-treated cells is that the damaged DNA is unable to copy, which prevents cell division and ultimately leads to cell death.¹ Radiation treatment can decrease the size of tumors, manage their growth, and increase their survival time. Radiation treatment has the unfavorable side effect of additionally damaging nearby normal cells that are not part of the primary tumor mass. However, advances in imaging technology, attempts to precisely target the cancer mass, as well as lack of effective repair mechanisms, reduce the overall harm caused by radiation. ¹ Radiation treatment (RT) is feared, especially by patients with recently discovered malignancies. ³ For the sufferer, as well as their friends and family, the psychological pain brought on by the diagnosis may be devastating. With reactions including denial of the diagnosis, fear of death, fear of reoccurrence, and concerns about one's body image, impact on sexuality, relationships, and lifestyle changes. Appropriate

psychosocial interventions are required from integrative cancer therapy, intensive counseling, and educational programs. Previous research on palliative care for advanced cancer patients demonstrated that psychosocial treatment (such as psychological, social, informational, communication, and spiritual support) which consists of a large proportion of patient requirements. Throughout the treatment patients deal with several adverse effects. In particular, long-term therapy and unceremonious side effects may cause mental and social problems, such as pain, anxiety, fatigue, sadness, depression, insomnia, and radiation-induced nausea and vomiting. ^{4,5} RT to the pelvic area may result in significant adverse consequences and difficulties in women. Women feel pain when the applicator is inserted, taken out, and handled throughout the brachytherapy treatment. Pain also has a detrimental psychological effect. Research has indicated a noteworthy correlation between anxiety before brachytherapy and pain experienced throughout treatment, as well as between anxiety and depression before brachytherapy.

In order to prevent psychiatric illnesses and improve the quality of life for women, it is crucial to eliminate the physical and psychosocial issues they face.¹⁰ Out of which anxiety is the first symptom seen in 50% of cases that can lead to chronic anxiety in 30% of patients.⁶ At least one-third of cancer patients who never had anxiety before experience anxiety after receiving radiation therapy, approximately 25% of patients miss out on their scheduled RT treatment because they are anxious.

A patient's quality of life is affected by anxiety which frequently coexists with depression, one of the most prevalent psychological illnesses, anxiety leads to other issues including fatigue, difficulties sleeping, eating disorders, an

elevated heart rate, and high blood pressure. Additionally, anxiety negatively impacts the continuation of treatment and its potential advantages since it produces unfavorable emotions.⁴ Anxiety is frequently manifested during RT simulation as a result of immobilization tactics such as face mask limitations and restricted movement, in addition to isolation in an unfavorable environment.¹¹

According to research, using music as a healthcare intervention can benefit patients by decreasing the amount of pain they experience, encouraging relaxation and regular breathing, lowering anxiety and tension, and elevating mood.⁹ From a physiological point of view, music therapy helps lower blood pressure, heart rate, and pain perception. The stimulation of neural circuits linked to the control of music perception is one theory for the processes causing these effects. stress reactions and the processing of emotions. Research has demonstrated that music therapy is a useful tool for lowering cancer patients' perceived levels of pain. Through the use of brain mechanisms involved in attention, music has the power to both lessen the perception of pain and diminish focus on it.¹⁰ Therefore, aim was our study to find out the effect of music therapy in health care are to manage symptoms, enhance quality of life, support physical and/or psychosocial function and to promote well-being.

2. Methodology

Study Design- The Design of this study is Scoping review.

Database and Search Strategy- The study includes PubMed, Google Scholar and Science Direct, according to

PRISMA guidelines the search keywords used were MT, cancer patients, and radiation therapy which is written in English and published between May 2017 to February 2024 non-interventional articles such as cross-sectional studies or duplicate studies were also excluded. The study made for inclusion and reviewed for outcome measures and selection which can be summarized according to a flowchart.

Selection Criteria

Inclusion Criteria

- 1) It includes involving cancer patients undergoing radiation.
- 2) Patients who were given music therapy as intervention.
- 3) The study which is published in Indexed Journal in last 5 years

Exclusion Criteria

- 1) The study or articles which is published more than last 5 years before more than 5 years.7700
- 2) Articles published in other languages.
- 3) Articles not reporting outcome measures.
- 4) Discussion /position papers or comments.
- 5) Poster presentation, abstracts or articles without enough information about the intervention.
- 6) Articles only reporting the development of technology. The search was not limited by study design or the date of publication.
- 7) Duplicate articles should be removed

3. Result

Author	Year	Topic	Objective	Sample size	Outcome measure	Conclusion
Filiz Unal toprak	2024	The Effect of Music on Anxiety, Pain Levels, and Physiological Parameters in Women Undergoing Brachytherapy: A Randomized Controlled Trial	his study was conducted to investigate the effect of music on anxiety, pain, and physiologic parameters in women undergoing brachytherapy	50	Hospital Anxiety and Depression Scale (HADS), Visual analog scale	It was determined that while the music did not alter physiological metrics or anxiety levels, it did have a favourable impact on managing depressive symptoms and making people feel less in pain during the brachytherapy procedure. The results of music therapy can differ from patient to patient because every patient is unique.
Lillie O'steen	2020	A Prospective Randomized Trial of the Influence of Music on Anxiety in Patients Starting Radiation Therapy for Cancer	The primary objective of this research was to assess how the participant's genre-based music selections affected their anxiety levels during the first RT treatment session.	100	State-Trait Anxiety Inventory (STAI) and Symptom Distress Thermometer (SDT)	According to this study, women undergoing radiation therapy for cancer frequently experience high levels of anxiety, and the use of music in this setting did not significantly lower anxiety.
Fengyun zhao	2023	Effect of Ward Noise Reduction Technology Combined with Music Therapy on Negative Emotions in Inpatients Undergoing Gastric Cancer Radiotherapy: A Retrospective Study	The aim of the study was to explore an effective noise control measure	108	The Shapiro-walk test method	Studies have demonstrated that combining music therapy with ward noise reduction technology is a dependable way to lessen patients' unpleasant feelings and enhance their quality of sleep while they receive radiation treatment for gastric cancer. Its use has some potential for patient benefit, making it valuable for clinical promotion.
Alferdo Raglio	2021	Conventional and Algorithmic Music Listening before	This study explores if listening to music affects individuals receiving	60	Cochran's Q test and McNemar test	When comparing listening to music versus not listening to music, the study's findings are unclear.

		Radiotherapy Treatment: A Randomized Controlled Pilot Study	radiation therapy's levels of stress and anxiety.			
Patrica zeppegno	2020	Psychotherapy with Music Intervention Improves Anxiety, Depression and the Redox Status in Breast Cancer Patients Undergoing Radiotherapy: A Randomized Controlled Clinical Trial	This study evaluated the impact of psychotherapy with music intervention (PMI) on redox status, inflammation, anxiety, and depression in patients with breast cancer receiving radiation therapy (RT).	60	STAI test	According to the study's conclusion, the results are in accordance with earlier research and recommendations indicating that music therapy may be useful in lowering anxiety and symptoms of depression in people with breast cancer.
Andrew Rossetti	(2017)	The Impact of Music Therapy on Anxiety in Cancer Patients Undergoing Simulation for Radiation Therapy	This study assesses how MT influences patients with recently diagnosed head and neck or breast cancer's anxiety and distress during simulation.	78	(STAI-S Anxiety) questionnaire and Symptom Distress Thermometer (SDT).	Based on the STAI-S questionnaire and SDT, MT considerably reduced patient anxiety and discomfort during the simulation procedure.
Huei-Fan Yang	2024	Impact of background music listening on anxiety in cancer patients undergoing initial radiation therapy: a randomized clinical trial	To assess the impact of music listening on anxiety symptoms in patients receiving first RT.	50	The Brief Symptom Rating Scale (BSRS-5), Distress Thermometer (DT), and Beck Anxiety Inventory (BAI-C)	Music listening intervention significantly reduced anxiety symptoms in cancer patients having initial radiation therapy (BSRS-5, DT, and BAI-C scores) after two weeks. Our study found that music listening can effectively reduce anxiety symptoms and improve the quality of life for cancer patients receiving radiation therapy.

4. Discussion

This scoping review aimed at finding if Music therapy is effective in managing symptoms related to radiation therapy such as pain, anxiety, fatigue, sadness, depression, insomnia, and radiation-induced nausea and vomiting in cancer patients undergoing radiation therapy. The articles were researched on search engines like Pubmed, Google Scholar, and Science Direct. Furthermore, the quality of articles was assessed by the PEDRO scale. Previous research has shown the use of music therapy alone or together with other interventions can help in reducing anxiety pre-radiation therapy treatment and post-radiation therapy treatment.

Filiz Unal Toprak et al. stated that one common and upsetting symptom that cancer patients experience is pain. Playing music can impact the autonomic nervous system to release endorphins, which is a non-invasive intervention, a crucial part in managing pain. Repeated assessments taken during intragroup evaluations in their study revealed considerable reductions in the patient's pain levels. This study demonstrated the beneficial effects of music on pain intensity and depression management for cancer patients undergoing brachytherapy. When applied in concert with a multidisciplinary healthcare team and tailored to the patient's preferences, music intervention can produce the best results.¹¹

One of the studies pointed out that ward noise affects the patient's clinical status and disrupts the sleep quality of cancer patients undergoing for radiation therapy. Patients develop severe psychological issues, unpleasant emotions like worry and depression, and resistance to treatment due to physical harm and fear. Using the special physiological and psychological effects of music, as well as the understanding of medicine, psychology, and the field of music therapy,

music therapy allows patients to experience a range of emotions and sensations. Music boasts a unique power to evoke feelings and elevate moods. Patients' symptoms of anxiety and depression can be lessened by the rhythm of music's effect on the brain, which can activate brain cells, improve neuron excitability, and encourage the release of biological chemicals. According to a study, music therapy has the potential to be an effective treatment tool for enhancing cognitive function. Noise may act as a trigger for disease changes by entering the brain region linked to stress, specifically the amygdala. Elevated noise levels have the potential to trigger the activation of the amygdala, a deep brain region that is essential for managing emotions and stress. Additionally, Music therapy can help patients sleep better by regulating their sympathetic and parasympathetic nervous systems, relaxing their body and mind, and successfully removing tension, worry, and other negative feelings. The study concluded that Combining music therapy with ward noise reduction technology is a dependable way to help patients receiving radiation treatment for stomach cancer feel less depressed and sleep better at night. Another prospective randomized trial was conducted to check the impact of music therapy on patients with high anxiety before going for radiation therapy. When starting RT for cancer, a significant portion of women reported feeling very anxious. In their study, they failed to explain that listening to music alone did not significantly reduce anxiety.¹⁴

Yang HF aims to evaluate the impact of background music on anxiety reduction among participants. Patients receiving their initial radiation. Research indicates that music can reduce anxiety and stress levels in the short term. Music's effects on participants are influenced by both the type of music utilized and the timing of the intervention, as well as their subjective preferences. Music listening therapies may be an effective non-pharmacological treatment to alleviate distress in cancer patients.¹⁸

Many complementary therapies combined with music therapy have shown good results in improving patients' quality of life, dealing with anxiety, and improving their quality of sleep. Even few researchers have shown good effects of music therapy on fatigue and stimulation in radiation therapy. In comparison, no researches show the benefits of MT in patients who experience radiation-induced nausea and vomiting.

5. Conclusion

Music therapy combined with other integrative therapies has shown positive effect in lowering patients' anxiety, reducing depression and fatigue and improving quality of life. Therefore, more researches should be conducted in order to confirm the scientific quality of each MT intervention.

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