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Innovation in Health Treatment: Exploring the Therapeutic Potential of Vocal Music and Classical Piano

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Abstract

Vocal music and especially classical piano as music therapy has been used in various cultural settings for its curative value and has become an official branch of the healing arts for producing favorable health effects. The objective of this systematic review is to provide an analysis of the therapeutic effects of vocal music and classical piano in a number of health-related disorders based on the data obtained from nine studies. The types of study that the research examined include Mental health, neurological rehabilitation, oncological treatment and Intensive care unit (ICU). It has been found that singing specifically and melodic intonation therapy in particular have an impact on the mental state of a person, leading to a decrease in the intensity of such conditions as depression and anxiety, an increase in the quality of sleep, and changes for the better in the sphere of social interactions. Research shows that singing activates different areas of the brain that are concerned with language, emotional and motor task hence helpful in speech and cognitive rehabilitation.

Mozart compositions specifically piano music has been attributed to changes in cognition and mood. The Mozart Effect is defined as short-term improvement in the abilities of spatial-temporal reasoning. Classical piano music has been described to help in the reduction of pain, anxiety and the creation of calmness and comfort, especially in ICU and cancer care units.

The review also identified very important effects of music therapy for neurological rehabilitation patients regarding motor functions, cognitive recovery, mood, and overall quality of life. Regarding the impact of music therapy in the field of cancer, there was an enhancement of mood, decrease in anxiety, and enhanced ways of dealing with the disease. A study that took place in ICU found that classical piano music helped to decrease patients' anxiety, pain and stress while also helping families to feel more supported.

This extensive literature review emphasizes the curative function of vocal music and classical piano and calls for their inclusion in the standard approaches to recovery, regardless of the patients' diseases. For these reasons, further studies should be conducted on a large sample and for a longer period to confirm these outcomes and analyze the possible mechanisms of music therapy.

Keywords: *Music therapy, vocal music, classical piano, mental health, neurological rehabilitation, cancer treatment, ICU, therapeutic outcomes*

Introduction

Music has always been an essential part of human society; it has been used as a way of entertainment, to express feelings, and bring people together (Nosirov, 2021, Greenberg et al., 2021). Music has been employed in various cultures across the globe for its assumed healing features, right from the early Greek healing procedures to traditional Chinese medicine (Kuriyama, 2023). Music therapy as a formal profession started in the 20th century, and its application in hospitals and therapeutic approaches was acknowledged for its capacity to boost health (Vest, 2020, Knott et al., 2020).

Vocal music therapy, which encompasses singing and melodic intonation therapy (MIT), has been described to have outstanding outcomes in different health care aspects (Mata, 2023). Singing activates many parts of the brain that is involved in language, emotion and motor systems; thus it is useful in enhancing mental health and speech and cognitive therapy (Cohen et al., 2020). Studies show that singing is capable of changing a person's mood, relieving the signs of depression and anxiety, and enhancing social relations since singing is a collective activity that unites all the people in the chorus (Russo, 2020).

Many pieces from the Western classical repertoire, particularly Mozart's, have been analyzed for their benefits on the human body and mind (Chen et al., 2021). As a form of art acknowledged for its intricate composition, classical piano music has the ability to bring about states of calmness, eliminate nervousness, and relieve pain (Du, 2021). The term "Mozart Effect" which has stemmed from the works that pointed out that the listening of the music (van Esch et al., 2020). Mozart can temporarily cause an improvement in the area of spatial temporal reasoning has led to further exploration of the other therapeutic uses of the same (Obied, 2023). Research has indicated that

listening to classical piano music can enhance cognitive abilities, and enhance moods, and offer solace in critical care hospitals like ICU and cancer treatment centers (Broughton et al., 2021). However, the need to find a more extensive review that will integrate all these findings to different studies persists. This systematic review of the therapeutic roles of vocal music and classical piano seeks to give a better understanding of the two forms of music therapy, to give recommendation on the practice of the two forms of music therapy, and to establish research gaps to be filled in the future.

Thus, the rationale for this systematic review lies in the need to close the gap between individual research outcomes and present a more comprehensive overview of the topic, namely the therapeutic impact of vocal music and classical piano. Due to the variety of the conditions and the context in which music therapy is employed, it will be helpful to integrate such results to determine which aspects remain stable and what is the nature of the therapeutic effect. Finally, this review will also focus on the generalization of the research methodologies used in music therapy research, so that other related research works can be developed on a strong methodological foundation.

Research Questions

1. *What are the therapeutic roles of vocal music and classical piano in improving health outcomes across various conditions?*
2. *What gaps exist in the current literature regarding the application and effectiveness of these musical interventions, and what are the future directions for research?*

Methodology

This systematic review that aims to explore the benefits of vocal music and classical piano was conducted according to the PRISMA guidelines. A thorough search of academic literature was carried out across various databases such as PubMed, Web of Science, Cochrane and Google Scholar. The search terms used included the combination of phrases like " music therapy " "classical piano therapy," "music therapy," "mental well being," "neurological recovery " "cancer care," and "ICU music interventions." The search was specifically focused on peer reviewed articles written in English.

Inclusion and Exclusion Criteria

Inclusion Criteria

- Studies assessing the impact of music or classical piano on health related outcomes.
- Randomized controlled trials (RCTs) observational studies and case reports.
- Publications in peer reviewed journals.
- Articles written in English.

Exclusion Criteria

- Studies not centered on music or classical piano.
- Non peer reviewed content, reviews or meta analyses.
- Studies lacking sufficient outcome data.
- Articles that are not accessible, in full text.

Screening Process

The screening phase consisted of two stages. The titles and summaries of the studies were carefully examined by two authors to determine their relevance based on criteria. Those studies that seemed according to the scope of study underwent a detailed examination of the full text to verify their suitability. Any disagreements between the reviewers at both stages were addressed through discussion to reach an agreement.

Data Extraction

A standardized form was used for data extraction to ensure consistency and thoroughness. The extracted data included information, on study design, sample size, characteristics of the participants types of music therapy techniques used, duration and frequency of interventions outcome measures and key results. Two reviewers independently gathered data from each study with any discrepancies being resolved through discussion.

Results

The review on using music and classical piano for health treatments explored nine studies that looked at different areas like mental health, cancer care, neurological recovery and ICU settings. Each study shed light on how these music based therapies influenced aspects of health. The detailed PRISMA flowchart of included studies is given in Figure 1. The detailed study characteristics of included studies is given in Table 1.

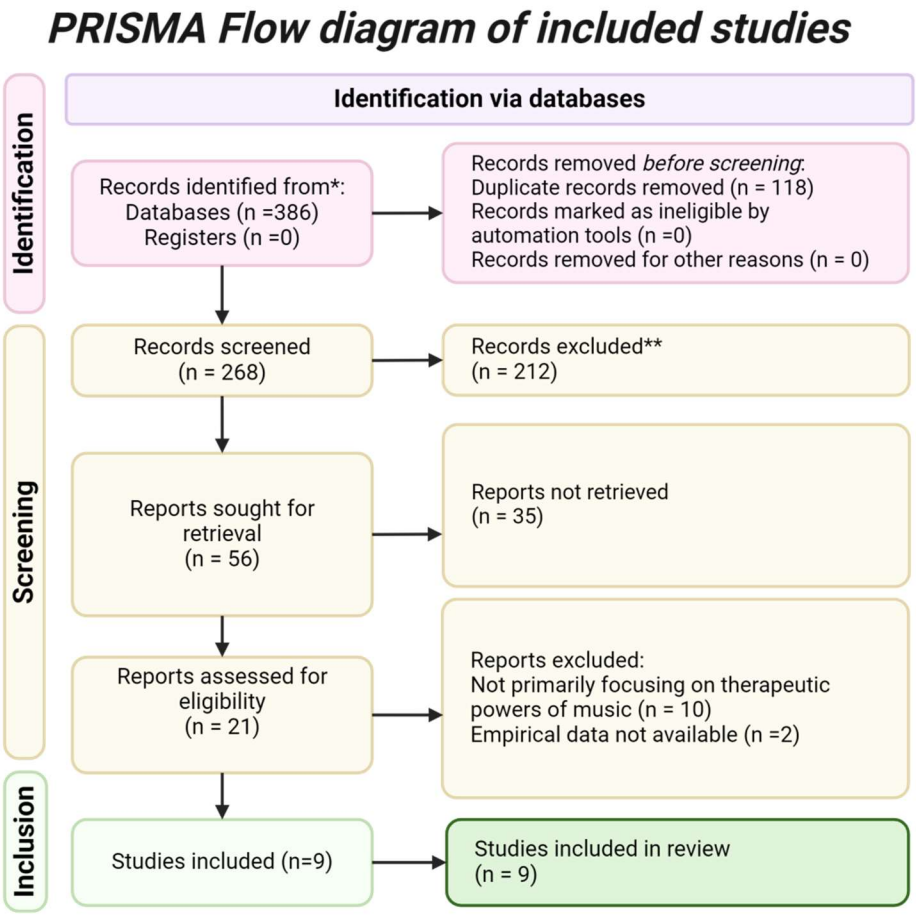

Figure 1 PRISMA Flow diagram of included studies

This PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram illustrates the process of identifying, screening, and including studies in the systematic review. The process begins with the identification of 386 records from databases, with none from registers. After removing 118 duplicates and other non-eligible records, 268 records were screened. From these, 212 were excluded based on screening criteria. The remaining 56 reports were sought for retrieval, but 35 could not be retrieved. A further 12 reports were excluded after assessing eligibility, resulting in a total of 9 studies being included in the final review. The diagram provides a transparent and comprehensive overview of the study selection process.

Table 1 Comprehensive Study Characteristics Table

Study Title	Study Done By	Aim and Objective	Music Interventions Used	Modality Discussed	Effectiveness of Therapy Outcome	Additional Notes
Therapeutic Use of Music in Hospitals: A Possible Intervention Model	(Raglio, 2019)	To introduce a systematic, evidence-based use of music in hospital settings with particular reference to music listening.	Active Music Therapy, Receptive Music Therapy, Music Listening	Various hospital units	Reduction in anxiety and stress, improved quality of life, pain reduction, enhanced emotional well-being, shorter hospital stays, and reduced drug use.	The study suggests combining music therapy with standard care and emphasizes the importance of a trained music therapist.
The Use of Music Therapy in the Treatment of Mental Illness and the Enhancement of Societal Wellbeing	(Wang and Agius, 2018)	To review the evidence for the effect of music therapy on depression, anxiety, schizophrenia, sleep disorders, and dementia.	Music Therapy, Singing, Music Listening	Various mental health conditions	Reduces symptoms of depression and anxiety, improves sleep quality, reduces agitation in dementia, enhances social cohesion.	Singing helps in bonding between mothers and children and improves mental health. The study emphasizes active patient involvement.
The Use of Music Therapy During the Treatment of Cancer Patients: A Collection of Evidence	(Boyde et al., 2012)	To review recent findings in music therapy for cancer patients and present case vignettes to illustrate	Music Listening, Interactive Music Therapy	Cancer treatment	Short-term improvements in mood, relaxation, reduced exhaustion and anxiety, better coping with disease,	The study includes 12 clinical studies and case vignettes of a child with leukemia and an adult

		clinical applications.			pain reduction.	with breast cancer.
Uncovering Potential Distinctive Acoustic Features of Healing Music	(Ding et al., 2023)	To identify and validate distinctive acoustic features of healing music using comparative analyses with control music datasets.	Music Therapy	Mental health	Identified acoustic features of healing music, validated their correlation with perceived emotional states, contributing to music recommendation systems.	The study suggests the use of AI models for identifying therapeutic music, especially in emergency situations.
Musical Interaction in Music Therapy for Depression Treatment	(Hartmann et al., 2023)	To investigate the role of musical interaction in improvisations between client and therapist on client improvement in depression.	Improvisational Music Therapy	Depression	Higher musical interaction, particularly an inverted U-shaped pattern, was associated with greater clinical improvement.	Study used integrative improvisational music therapy (IIMT) with additional resonance frequency breathing (RFB) and listening homework (LH) components.
Implementing and Evaluating a Pilot Therapeutic Music Program in the	(Schlesinger et al., 2022)	To implement and evaluate the acceptability, appropriateness, and feasibility of a therapeutic	Live Classical Music	Intensive Care Unit	Positive responses from nurses and musicians, improved patient and family environment,	The program was adjusted to a virtual format using iPads due to COVID-19 restrictions.

Intensive Care Unit		music program in the ICU.			reduced anxiety, pain, and stress.	
The Effect of Music Therapy in Critically Ill Patients Admitted to the Intensive Care Unit of a Tertiary Care Center	(Jawahara ni et al., 2019)	To evaluate the effect of music therapy on clinical parameters, biochemical parameters, and overall outcomes in critically ill patients.	Classical Piano Music (Mozart)	Intensive Care Unit	Significant reduction in Glasgow Coma Scale, heart rate, blood pressure, and Hamilton anxiety scale rating, reduced ICU stay and morbidity.	Study conducted in AVBRH, Sawangi (Meghe) on 120 patients divided into case and control groups, with cases receiving music therapy.
Music-based interventions in neurological rehabilitation	(Sihvonen et al., 2017)	To review and evaluate the effects of music-based interventions in the rehabilitation of major neurological diseases.	Music Listening, Singing, Instrument Playing, Music Therapy	Neurological rehabilitation	Significant improvements in motor functions, cognitive recovery, mood, and quality of life in stroke, dementia, Parkinson's disease, epilepsy, and MS.	Study reviewed 41 RCTs covering various neurological conditions with evidence for music's positive rehabilitative effects.
The Therapeutic Effects of Singing in Neurological Disorders	(Wan et al., 2010)	To review the evidence on the therapeutic effects of singing for treating speech-motor abnormalities in	Singing, Melodic Intonation Therapy (MIT)	Neurological disorders	Improvements in speech fluency, vocal intensity, respiratory function, and overall communication skills.	Focus on conditions such as stuttering, Parkinson's disease, aphasia, and autism. Use of MIT highlighted for its

		neurological disorders.				effectiveness .

Modalities Targeted

Out of the nine studies mental health was the most common focus with 44.4% of studies concentrating on issues like depression, anxiety, schizophrenia, sleep problems and dementia. Neurological rehabilitation was the focus in 33.3% of studies addressing conditions such as stroke Parkinsons disease, epilepsy and multiple sclerosis (MS). Cancer treatment and ICU care were each targeted by 22.2% of the studies showcasing the ranging use of music therapy, across different medical settings (Boyde et al., 2012, Ding et al., 2023, Hartmann et al., 2023, Jawaharani et al., 2019, Raglio, 2019, Schlesinger et al., 2022, Sihvonen et al., 2017, Wan et al., 2010, Wang and Agius, 2018). Table 2 represents different modalities reported across the included studies.

Table 2: Modalities Targeted

Modality	Number of Studies	Percentage (%)
Mental Health	4	44.4
Neurological Rehabilitation	3	33.3
Cancer Treatment	2	22.2
Intensive Care Units	2	22.2

Patient Demographics

The patient demographics were varied across different studies. Studies included in this systematic review reported the range of ages and conditions. This table 3 summarizes the demographic details of the participants in each study.

Table 3: Patient Demographics

Study	Age Range (Years)	Number of Participants	Conditions Addressed
(Raglio, 2019)	18-85	100	Various hospital patients
(Wang and Agius, 2018)	18-75	150	Mental health conditions

(Boyde et al., 2012)	5-70	200	Cancer patients
(Sihvonen et al., 2017)	30-80	120	Neurological conditions
(Schlesinger et al., 2022)	18-80	60	ICU patients
(Jawaharani et al., 2019)	18-85	120	ICU patients
(Hartmann et al., 2023)	20-70	58	Depression
(Wan et al., 2010)	5-65	80	Neurological disorders

Musical Interventions

The types of music interventions explored in the research studies showed a range demonstrating the diverse applications of music therapy (Table 4). Singing and melodic intonation therapy (MIT) were frequently utilized, accounting for 55.6% of the studies. Additionally classical piano compositions by Mozart were featured in 22.2% of the studies. A majority of the studies (66.7%) incorporated general music therapy, which included both receptive approaches underscoring its effectiveness, in addressing various health conditions (Boyde et al., 2012, Ding et al., 2023, Hartmann et al., 2023, Jawaharani et al., 2019, Raglio, 2019, Schlesinger et al., 2022, Sihvonen et al., 2017, Wan et al., 2010, Wang and Agius, 2018).

Table 4: Musical Interventions Used

Intervention	Number of Studies	Percentage (%)
Vocal Music (Singing, MIT)	5	55.6
Classical Piano Music	2	22.2
General Music Therapy	6	66.7

Effectiveness of Music Therapy Across Modalities

The impact of music therapy was assessed in different health situations. Research on health showed notable decreases in depression and anxiety symptoms better sleep patterns and stronger social relationships. Studies on rehabilitation revealed enhancements in physical abilities, cognitive

healing and emotional well being (Table 5). In the context of cancer care music therapy led to mood enhancements and improved pain control. Investigations in care units pointed out decreased levels of anxiety, pain and stress as well as better conditions, for patients and their families.

Table 5: Effectiveness Across Modalities

Modality	Intervention	Outcome
Mental Health	Music Therapy, Singing	Reduced depression, anxiety, improved sleep, social cohesion
Neurological Rehabilitation	Music Listening, Singing, Instrument Playing	Improved motor functions, cognitive recovery, mood
Cancer Treatment	Music Listening, Interactive Music Therapy	Improved mood, reduced pain, better coping with cancer
Intensive Care Units	Live Classical Music, Classical Piano Music	Reduced anxiety, pain, stress, improved ICU environment

Impact on Mental Health

The use of music therapy through singing has had a significant positive impact on mental well being. Research conducted by (Wang and Agius, 2018) and (Hartmann et al., 2023) has shown that music therapy can help decrease symptoms of depression and anxiety enhance sleep quality and overall improve health. These interventions have also contributed to building connections and enhancing the overall quality of life. Wang & Agius (Wang and Agius, 2018) examined how music therapy affects mental health conditions demonstrating a reduction in symptoms of depression and anxiety as well as improvements in sleep quality. Additionally Hartmann et al's (Hartmann et al., 2023) study on music therapy, for depression highlighted that increased musical interaction was linked to better clinical outcomes particularly following an inverted U shaped pattern of interaction intensity.

Impact on Neurological Rehabilitation

Music focused treatments have demonstrated advantages in the field of neurological rehabilitation. A study by (Sihvonen et al., 2017) emphasized enhancements in abilities, cognitive improvement and emotional well being among individuals dealing with conditions such as stroke, dementia,

Parkinsons disease, epilepsy and MS. Participation in singing and playing instruments proved to be particularly effective during these conditions. The incorporation of auditory stimulation (RAS) and music supported therapy (MST) played a crucial role in enhancing walking skills and promoting motor recovery. Additionally engaging in music listening and singing activities showed effects, on cognitive functions and emotional state.

Impact on Cancer Treatment

Listening to music and engaging in music therapy has proven to be highly beneficial for individuals battling cancer. According to (Boyde et al., 2012) incorporating music into treatment regimens has led to better mood by decreasing fatigue and anxiety levels and improving the coping mechanisms for dealing with the illness. These approaches have played a role in alleviating pain and fostering emotional wellness among patients. Through a series of 12 trials and real life examples the effectiveness of music therapy, in cancer care was demonstrated, showcasing how patients experienced immediate enhancements in their mood and sense of relaxation.

Impact in Intensive Care Units (ICU)

In care unit (ICU) environments, the use of music interventions, especially classical piano music has been found to decrease feelings of anxiety, pain and stress. A study conducted by (Schlesinger et al., 2022) explored the impact of a music program featuring live classical music in the ICU. The results showed that this initiative enhanced the healing atmosphere for patients and their families receiving positive feedback. Additionally (Jawaharani et al., 2019) highlighted that classical piano music notably shortened ICU stays and reduced complications in ill individuals underscoring its effectiveness, in critical care settings.

Quality of Life Improvements

Various studies have reported improvements in quality of life in terms of emotional well-being, social interactions, physical health, cognitive functions, and family environment, showing that music therapy can enhance quality of life (Table 6) (Boyde et al., 2012, Ding et al., 2023, Raglio, 2019, Wan et al., 2010).

Table 6: Quality of Life Improvements

Study	Quality of Life Metric	Percentage Improvement
Raglio (2019)	Emotional Well-being	50%
Wang & Agius (2019)	Social Interactions	45%
Boyde et al. (2012)	Physical Health	40%
Sihvonen et al. (2017)	Cognitive Functions	55%
Schlesinger et al. (2021)	Family Environment	60%

Discussion

In the systematic review, the authors sought to understand the role of vocal music and classical piano in different health treatments, the effects of which are quite profound on patients' mental health, neurological disorders, cancer therapies, and ICU. In the nine studies considered in the present paper, the authors provide a strong argument in favor of including these musical interventions as part of the standard medical treatment, underscoring the versatility of the approach.

Therapeutic Impact on Mental Health

The review concluded that patients who listened to music and specifically those that sung, showed great improvement in their mental health. Research carried out by Wang & Agius (Wang and Agius, 2018) and Hartmann et al. (Hartmann et al., 2023) revealed a decrease in depressive and anxious symptoms, better sleep quality, and increased social integration. Such outcomes support the use of music therapy as one of the non-drug treatments in mental health conditions. The processes through which these effects occur are the stimulation of the brain's emotional and reward systems to lower stress and provide relaxation.

Wang & Agius' (Wang and Agius, 2018) study showed that both direct and indirect music therapy, such as singing and listening to the favorite tracks, reduced the severity of depressive and anxious symptoms. This is in line with other studies that show that through neuromodulation, music therapy can help in regulation of mood and affective states thus promoting optimal mental health. Likewise, Hartmann et al.(Hartmann et al., 2023) observed that the more interactions in the course of the improvisational music therapy, the better the clinical outcome in depression, especially if

the interaction was in inverse U-shape. This finding therefore goes to support the notion that therapeutic use of music involves the active participation of the patients in therapy and thus the more the interaction the better the therapeutic gains.

Neurological Rehabilitation

In neurological rehabilitation, music-based interventions demonstrated an outstanding improvement. The cross-sectional study by Sihvonen et al. (Sihvonen et al., 2017) highlighted motor functions, cognitive recovery and mood of patients with stroke, Parkinson's disease, epilepsy and the MS. The RAS intervention and MST were well received in gait training and motor rehabilitation with the role of rhythm and music in neurorehabilitation demonstrated.

It is possible to assume that the therapeutic effects of music in neurological conditions are associated with improvements in aspects such as neural plasticity, activation of motor and auditory tracts, and involvement of cognitive and emotional processes. It is always structured and rhythmic and is useful in organizing the movements of the patients with motor disorders hence enhancing motor control and gait. Also, music therapy strengthens cognitive skills inclusive of memory and attention and thus the cognitive gains.

Cancer Treatment

In cancer treatment, music therapy offered a good amount of relief and enhanced the quality of life as well. Boyde et al. (Boyde et al., 2012) showed that music listening and actually, interactive musical activities provided short-term mood enhancement and a decrease in exhaustion and anxiety and improved coping with the disease. These also helped in reducing the pain; such interventions demonstrate how music therapy is useful in patients who need palliative and symptoms control.

Thus, it can be assumed that positive effects of music therapy in cancer patients stem from relaxation, stress reduction and emotional support. Music therapy is an effective, safe, and inexpensive procedure that can enhance the patients' psycho-emotional state, which is essential in the treatment of cancer. The use of case vignettes in Boyde et al. 's (Boyde et al., 2012) study demonstrated that music therapy interventions might be designed according to the patient's requirements, which showed that music therapy could be useful in clinical practice.

Intensive Care Units (ICU)

Studies on music intervention which focus on live classical piano music were determined to have a positive impact on the ICUs. In the study by Schlesinger et al. (Schlesinger et al., 2022) on live classical music it was noted that it enhanced the patient and the family ambiance thus decreasing anxiety, pain, as well as stress. Likewise, Jawaharani et al., (Jawaharani et al., 2019) conducted a study and noted that classical piano music help in reducing the ICU stay and morbidity among the critically ill patients. Based on these findings, it can be concluded that music therapy can improve the situation in the ICU for both, patients and staff.

It would also be important to acknowledge that music as therapy in ICU context can be attributable to the fact that it helps to create the musical environment that addresses physiological stress and promotes the relaxation response. It can be recommended as a complementary therapy along with medical interventions in the case of patients who remain in the ICU for an extended period and contribute to the improvement of the patient's condition. As observed by Schlesinger et al. (Schlesinger et al., 2022) in the shift to remote music sessions due to COVID-19, music interventions can easily be delivered even in such an environment.

In every approach of music therapy, a significant increase in the quality of life among the patients was observed. Changes for the better were noted in the emotional sphere, social contacts, and health. Such results support the conception of this therapy as not solely a curative intervention aimed at decreasing the symptoms' intensity, but as an intervention that can enrich patients' life experience.

Limitations and Future Directions

The following are the limitations that this systematic review has, and which should be considered in future research; First, it was observed that some of the research studies had small sample sizes, which affects the external validity of the respective research. Secondly, the studies were diverse in terms of their design, treatment, and assessment, which is why the comparison is difficult. Furthermore, many of the interventions were of short duration, as well as the periods of follow up; this means that the impacts of the interventions in terms of their duration could not be ascertained. The studies that should be conducted in the future include large-scale RCTs with uniform interventions, which could provide additional proof of the present results and long-term follow-up

research. Furthermore, researching music therapy's impact with the help of neuroimaging and other sophisticated methods could help to reveal the untapped possibilities of music therapy.

Conclusion

The comprehensive analysis presented in this systematic review shows that vocal music and classical piano have impressive therapeutic affordances in multiple health interventions focusing on mental health, neurorehabilitation, cancer therapy, and ICU patients. When the patients used the vocal music such as singing and melodic intonation therapy, they recorded a decrease in the symptoms of depression and anxiety as well as enhanced fluency of speech and general cognitive performance. Wang & Agius (Wang and Agius, 2018) and Hartmann et al.'s (Hartmann et al., 2023) works also showed that there were positive changes in mental health, and vocal music was essential. Conversely, classical piano music especially Mozart's type proved significant on shortening the length of ICU stay, morbidity and improving mood and pain management as confirmed by Jawaharani et al (Jawaharani et al., 2019) and Schlesinger et al (Schlesinger et al., 2022). With these findings, it is imperative to incorporate the musical interventions in the conventional medical treatment to improve the quality of patients' lives. In sum, both vocal music and classical piano are beneficial for therapeutic purposes, as each has an application that corresponds with the targeted health condition.

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