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ORIGINAL

# An in-depth analysis of the benefits of musical therapies for people with dementia

## Un análisis en profundidad de los beneficios de las terapias musicales para las personas con demencia

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## ABSTRACT

To ascertain which actions, therapists, and participant characteristics had more potent and perceptible effects, a meta-analysis of illegal research on the impact of music rehabilitation on disorderly behaviors, nervousness levels, miserable emotions, with cognitive performance in dementia patients could be conducted. The research was initially a meta-analysis of all the randomized criminal trials uncovered in an investigation about over the last 15 years music therapy has been used with dementia patients. Music therapy's overall impact on outcome measures was assessed by a meta-analysis. The disruptive behaviors of dementia patients were relatively significantly reduced, and music therapy barely impacted cognitive performance. Additionally, it showed little effect on anxiety and depressive feelings. Several times every week, group music therapy is offered to help people with disruptive behaviors, stress, and depression emotions.

**Keywords:** Dementia; Meta-Analysis; Music Therapy; Disruptive Behaviors.

## RESUMEN

Para determinar qué acciones, terapeutas y características de los participantes tenían efectos más potentes y perceptibles, se pudo llevar a cabo un metaanálisis de investigaciones ilegales sobre el impacto de la rehabilitación musical en los comportamientos desordenados, los niveles de nerviosismo, las emociones miserables y el rendimiento cognitivo en pacientes con demencia. La investigación fue inicialmente un meta-análisis de todos los ensayos aleatorios criminales descubierto en una investigación sobre los últimos 15 años la musicoterapia se ha utilizado con pacientes con demencia. El impacto global de la musicoterapia en las medidas de resultado se evaluó mediante un metaanálisis. Los comportamientos perturbadores de los pacientes con demencia se redujeron de forma relativamente significativa, y la musicoterapia apenas influyó en el rendimiento cognitivo. Además, mostró escasos efectos sobre la ansiedad y los sentimientos depresivos. Varias veces por semana, se ofrece musicoterapia en grupo para ayudar a las personas con conductas disruptivas, estrés y emociones depresivas.

**Palabras clave:** Demencia; Meta-Análisis; Musicoterapia; Conductas Disruptivas.

## INTRODUCTION

Obstructive Music is a powerful tool for healing and enhancing mental, emotional, and physical Health, which is what musical therapy does. Anxiety, sadness, stress, and persistent pain are just a few ailments it couldtreat.[1] To facilitate recovery, musical therapy uses music to create a therapeutic atmosphere. This couldbe creating a music playlist customized to the person's requirements, employing music to promote meditation and relaxation, or even performing live music during therapy sessions.[2] Numerous advantages of musical therapy have been shown through research. For instance, it couldaid in lowering tension and anxiety, promoting relaxation, enhancing mood, and fostering social connection. Additionally, it couldbe utilized to assist people with physical disorders to enhance their movement and general functioning, such as Parkinson's disease or chronic pain.[3] Various locations couldprovide musical therapy, including hospitals, nursing homes, schools, and private clinics. The kind of music played, the length and frequency of treatment sessions, and the kinds of exercises performed couldall be altered to suit the requirements and tastes of the person.[4] Despite its apparent advantages, musical therapy has several drawbacks. One drawback is that, given the broad range of personal musical choices, it could not work for everyone. Additionally, some people couldnot be able to get musical therapy due to insurance coverage issues.[5] People's tension and anxiety have been demonstrated to decrease with musical therapy. People with anxiety problems couldfind it very helpful to relax and concentrate by listening to music or playing an instrument.[6] When utilized to lift one's spirits, music can arouse many emotions. People suffering from despair, loss, or trauma couldfind it helpful to express their feelings via music, which will help them feel better overall.[7] Unifying people via music is possible since it is a global language. The use of music therapy could assist individuals that couldhave trouble communicating vocally, connect and do it more successfully.[8] Cognitive abilities such as memory, attention, and executive functioning couldall be improved with music therapy. People with neurological disorders like dementia or severe brain damage couldfind this helpful.[9] Additionally, musical therapy couldhelp with coordination and motor abilities, two aspects of physical functioning.[10] Because it couldenhance mood, cognitive function, and general quality of life, musical treatments can benefit those with dementia.[11] Music therapists collaborate with people with dementia to design a playlist of songs unique to their tastes and requirements. The use of music couldelevate mood, calm agitation, and encourage social engagement.[12] Singing is used in singing therapy to enhance social interaction, language development, and cognitive function. Singing could benefit those with early-stage dementia since it can activate memories and emotions.[13] Rhythm and motion Music is used in treatment to enhance motor skills and encourage physical exercise. This could be particularly beneficial for dementia patients who have trouble moving and maintaining their balance.[14] Music is a common tool used in reminiscence therapy to jog memories and inspire people who have dementia to relate their life experiences. For those with mild to severe dementia who couldhave trouble verbally communicating, this couldbe quite helpful.[15] The whole research published up to this point was searched. Keywords like "music," "brain," "dementia," or "clinical trial" were utilized in the research.[16] To determine if music therapy positively affects dementia, the analysisexamined its impact on people with the disease.[17] Enhancing the standard of life, cognitive function, and psychological and psychosocial dementia symptoms were among the objectives of the research. The work aimed to investigate how various intervention strategies, including music, affect patients with Alzheimer's disease's cognitive and behavioral results. The investigation has applied active music therapy in the past ten years. To find these studies, sources were examined. These studies included AD dementia patients, were done in English, and gathered before and after intervention data on outcomes.[18] The article, which is a change of the closing remarks, delivered the analysis of "Music Selves and Societies" and provided a summary of the most recent developments in music and music therapy research and practice, with a focus on methods to incorporate music into everyday life and the treatment of people with dementia.[19] The article describes the medical treatment for people with dementia, which provides a conceptual structure of natural empirically supported treatment and is therefore used in music therapy.[20]

Objective of the research: Musical therapy is a potential therapeutic approach that couldenhance mental, emotional, and physical well-being. It has been shown to offer several advantages, including lowering anxiety and stress levels, boosting mood, and fostering social connections. Musical therapy can potentially be a potent tool for enhancing mental, emotional, and physical health by employing music to promote healing and well-being.

## METHOD

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standard was adhered to throughout this investigation, including Randomized Controlled Trial (RCT) meta-analyses.

### Databases

The benefits of musical therapies for people with dementia, data collection could involve a mixed-methods approach. Quantitative data can be gathered through standardized assessments of cognitive function (e.g.,

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Mental State Examination), behavioral tracking (e.g., agitation or mood scales), and quality of life questionnaires. Qualitative data can be collected through semi-structured interviews with caregivers and participants, and observations during music therapy sessions. Recording changes in emotional state, social engagement, and overall well-being will provide a comprehensive understanding of the impact of music therapy. Data collection should occur before, during, and after the intervention to assess progress.

**Research selection**

The meta-analysis could only include studies that meet the subsequent requirements. Studies followed the Cochrane Collaboration's guidelines for an RCT design in which subjects were accidentally allocated to one of two settings. The individuals were split into two categories, with one receiving exploratory music therapy and the other receiving standard treatment (i.e., no therapy or usual care). Research has examined both group and solitary music therapy. It was possible to calculate an impact magnitude using the available quantitative data. To assess the impact size, the measurement data of the research have to provide sufficient statistical values.

**Literature Search**

There were 1127 articles found in the literature search. Two hundred ninety-four publications were pertinent to the research based on the substance of their titles and abstracts. Among these, 279 publications were omitted from Table 1 because they contained systematic research, meta-analyses, or control groups (active treatment) and described quasi-experimental trials without providing quantitative data.Further analysis of the remaining 15 full-text publications was conducted, and those with duplicate research or inadequate data were disregarded. The meta-analysis was finally limited to 7 RCTs that fulfilled the inclusion criteria. The method for including analysis is exposed in a flow chart in figure 1.

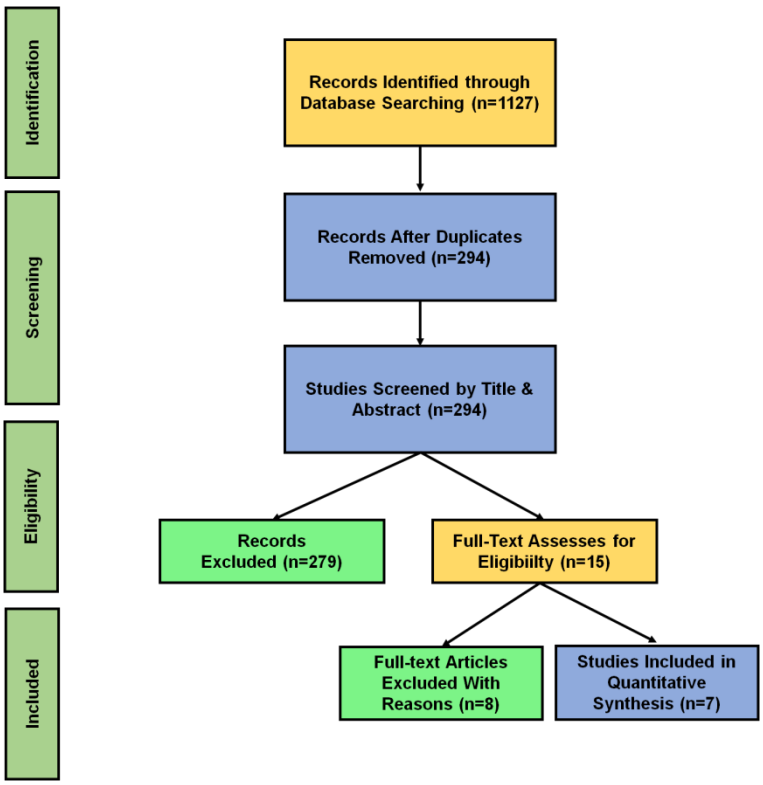


**Figure 1.** Prisma flow chart

**Characteristics of eligible studies**

Disruptive actions addressed in nine into ten researches were examined for the main result. Five investigations focused on fretfulness levels, depressed emotion, on cognitive performance were conducted for the secondary consequence. The participants' ages, on average, were between 65 and 87. The range of research quality ratings was 6 to 8.

**Outcome Measures**

This research learned from the research that the main benefits of successful music therapy were decreased disruptive behaviors, with secondary benefits including reduced anxiety and melancholy moods or enhanced cognitive performance in dementia patients. An assessment of depressed symptoms in senior citizens is done

using the GDS, a self-report questionnaire. It comprises a sequence of inquiries on motivation, energy, mood, and cognition. The GDS is often used to check for depression in older persons in research and therapeutic settings.

**Evaluation of procedural competence**

Four primary reasons for bias in RCTs could be identified by using the method developed by the Cochrane Collaboration to assess the possibility of biased: (1) assessment team and result blinding; (2) adequate sequential distribution; (3) assignment concealing; and (4) preliminary results. Studies are less likely to be biased if they include all relevant findings. Assessment of outcome blindness IS Whether or not the person evaluating the result is aware of the treatment allocation is discussed. An example of this would be a researcher monitoring blood pressure. Studies with sufficient result assessment blinding are less likely to be biased. The research record value standards of the Cochrane Collaboration served as the foundation for the instrument utilized to evaluate the quality of the research. This research assessed the participants, outcome measurements, statistical presentation, and research outcomes.

**Data Mining**

The raters separately retrieved data from each trial, ensuring an accurate analysis and avoiding subjectivity-related simple mistakes. When Cohen's kappa value is high (around 1), there is substantial agreement and consistency between the ratings of raters and registrants. If Cohen's kappa value is low (around 0), the raters' and registrants' evaluations are consistent, and they need more agreement. Positive inter-rater consistency was indicated by Cohen's kappa values greater than 065. The finding was ultimately determined by a third rater with expertise in a meta-analysis when the two raters couldn't agree. To learn more about the material left out of the published publications, this analysis got in touch by a numeral of the authors. Analysis on music therapy has shown that it is helpful in six domains, including psychological, emotional, physical, spiritual, cognitive, and social. The talents are enhanced and expanded upon via musical engagement in a therapeutic setting. Benefits of music therapy showed in figure 2.

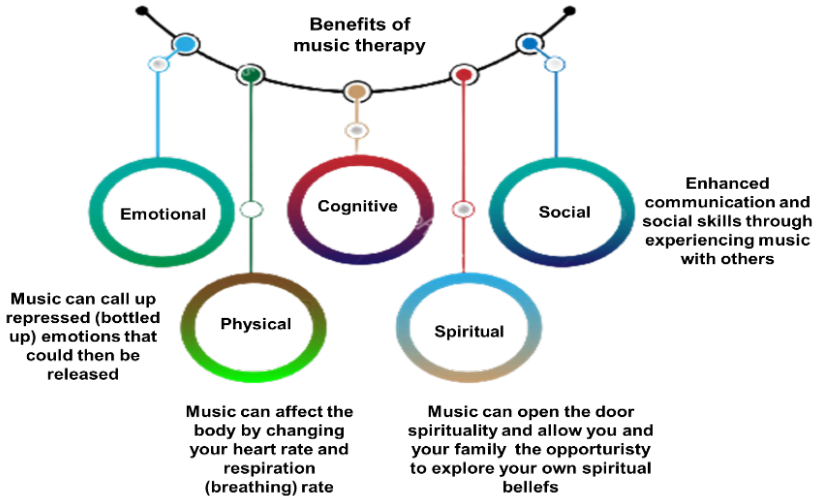


**Figure 2.** Benefits of music therapy

**Statistical Analysis**

*Effect size calculation*

Each variable's influence on an intervention's effectiveness is represented by its effect size. This meta-analysis was carried out with Comprehensive Meta-Analysis 2.0. Cohen's d was the standard by which the total effect magnitude was determined.

**Heterogeneity analysis**

The Q and x2 tests were used to cross-check the heterogeneity across studies. There was no evidence of heterogeneity across the analysis, when the p-value for the Q or x2 test exceeded were presented in equation (1). The percentage of variation in the cumulative impact attributable to research variability was estimated in this meta-analysis using the I2 value. I2 values of 0 % signify an absence of variation, 25 % indicate low deviation, and 50 % represent reasonable heterogeneity, and 75 % or more suggest excessive heterogeneity.

$$Q_t = \sum_{i=1}^{k} w_i(d_i - d_+)^2 \qquad (1)$$

**Additional analysis**

Several factors were looked at in a meta-analysis model for the research heterogeneity. In light of the meta-analysis findings, this analysis further studied the variables to identify potential causes for the heterogeneity and assess their influence on the outcomes. To determine the elements that led to more significant categories, results and evaluate the benefits of music therapy were analyzed. When QB was considerable in the among-grouping instance, this parameter could be a moderating factor that changed the impact's size. The music therapist's statement as a "fully interactive member of the team" allowed for assistance to care planning for "distress management" and also helped to create a wise of how patients had "developed/engaged over time," to which "the majority of patients seem to respond well. Figure 3 below compiles different responses.

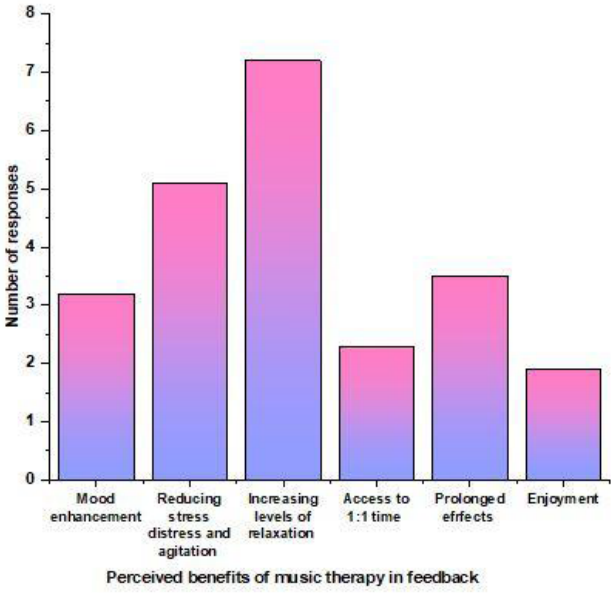


**Figure 3.** Perceived benefits of music therapy

## RESULTS

**Analysis of Sensitivity and publication bias**

After each research was firmly ruled out of the meta-analysis, tests were conducted to see how each researchinfluenced the overall effect size.[21] In this absence of journal bias, the scheme should resemble an equal funnel, with more extensive research clustered towards the top and smaller studies distributed more evenly at the bottom. Small studies with null or negative findings are absent at the bottom of the plot, which couldindicate publication bias.

**Total impact magnitude**

The disruptive behaviors, nervousness levels, depressive emotions, and cognitive performance of dementia patients were all examined in this research to see how music therapy affected them. Additionally, this research got the subgroup and met regression analyses on researchcharacteristic variables, looked into connections among their impact sizes, and determined distinctions between the results of each research's feature parameter at multiple levels. The findings showed that music therapy considerably reduced dementia-related symptoms, and the impact size of the nine trials was primary for disturbing behaviors. The total Hedges' g was 066, with a range of 118 to 018.[22]

**Heart rate**

While a foundation heart rate prior to a physical therapy session involving music therapy was consistently higher than the heart rate during and following the session, the starting point heart rate prior to a physical therapy session involving no music therapy was always less than the heart rate during and following the session.[23] After the 11th session, we saw a drop-in heart rate (figure 4a). To observed an increase in heart rate throughout the therapeutic process. Through the duration of the treatment without music therapy up to the ninth session, also increase in heart rate (figure 4b).

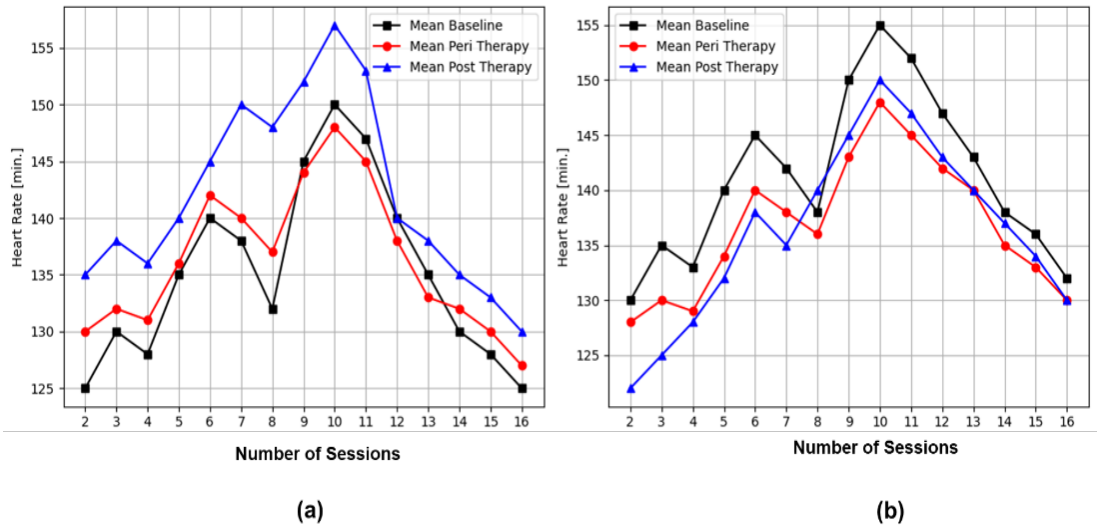


**Figure 4.** Heart rate with and without music therapy

**Respiratory rate**

The respiratory rate before the music therapy physical therapy session was generally more significant than during and after the session.[24] The respiratory rate also increased during treatment in the eighth session (figures 5a and b).

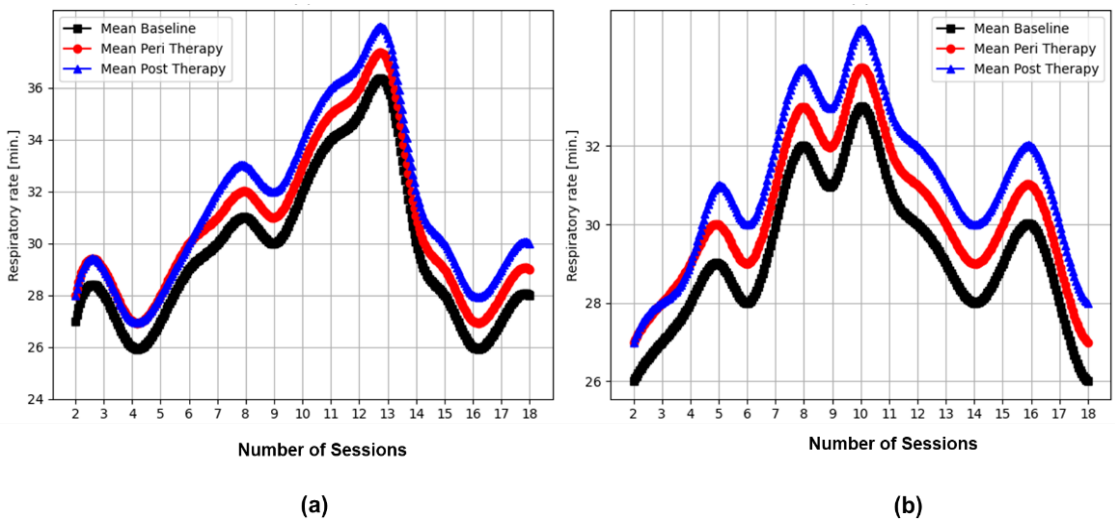


**Figure 5.** Respiratory rates with and without music therapy

## DISCUSSION

According to this meta-analysis, dementia patients couldbenefit from music therapy. One of the outcomes most often studied and upon which the effectiveness evaluation significantly hinged was disruptive conduct. According to this research, the effects of music therapy on social outcomes, nervousness, low moods, and disruptive behaviors were either high or reasonable. Overall, the findings indicated that participants' oppositional behavior, anxiety, and painful sensations were moderately high to moderately affected by music therapy. Patients who get music therapy could feel more self-assured and less stressed. Patients' memories couldbe recalled thanks to their chosen music, which enhances cognitive performance. The mental reaction of a patient couldbe periodically evaluated during personalized music therapy. Individual music therapy couldbe rapidly modified to meet people's needs when they get angry, upset, or unable to keep up. Individual music therapy couldmeet the demands of each dementia people uniquely, help them remember things, improve their cognitive performance, and arouse good feelings. The results couldhave been influenced and rendered harder to understand since both groups of patients contained those with mild dementia, as shown by the subgroup analysis. The connection between dementia severity and music therapy's effects is still not fully established. Overall, individuals with mild to moderate dementia who get music therapy couldunwind and feel appreciated, which helps to lift their spirits when they are down. Disruptive behaviors replace anxious and

depressed behaviors as dementia advances. The results demonstrated that music therapy is less successful at managing the complete disruptive behavioral process and offers patients who visit less often less stability.

## CONCLUSIONS

A stringent set of inclusion criteria were followed in this investigation. To investigate the effect size, this research carried out subgroup studies on particular variables related to the variations of impact sizes to each researchfeature variable at different levels. Music therapy produced a modest effect on nervousness and depressive emotions, a little effect on cognitive performance, and a fairly substantial impact on the disruptive behaviors of dementia patients. Over the last ten years, the practice of music therapy has advanced. Professional music therapist licenses and formal training in the field are now available in several nations. This researchwas to clarify the overall usefulness already established by pertinent research by merging the findings of prior studies, expanding the section size and numerical power of the existing data, and increasing the sample size. Individuals with poor cognitive functioning and disruptive behaviors should get tailored music therapy once per week. At the same time, people with high anxiety and depressive feelings should have it more often. Musical therapy couldaid dementia patients in maintaining their cognitive and physical functioning while also enhancing their general well-being by employing music to jog memories, uplift mood, and encourage social contact.

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## FINANCING

None.

## CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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