THE EFFECTIVENESS OF MUSIC THERAPY ON DEPRESSION IN THE ELDERLY; A META-ANALYSIS

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Abstract

Depression is one of the most common mental disorders experienced by the elderly. One of the popular non-pharmacological approaches is music therapy. Objectives: The purpose of this study was to evaluate the effectiveness of music therapy in reducing depression levels in the elderly based on recent studies. A meta-analysis was conducted on 17 studies, with a quantitative focus on the 3 main studies that had complete data. The analysis used SMD and CI estimation. Visualization of results was presented through forest plot.Three studies showed a reduction in depression scores with SMD ranging from - 0.66 to -0.75. These results indicated moderate to large effects of music therapy. Heterogeneity was high ($I^2 > 75\%$).Music therapy is effective as a non-pharmacological intervention in reducing depressive symptoms in the elderly and can be integrated in elderly health services.

What is already known

Music therapy has been increasingly recognized as a non-pharmacological intervention to address mental health issues such as depression, particularly among the elderly population. Previous studies suggest that music therapy can reduce depressive symptoms through emotional regulation, cognitive stimulation, and social engagement. However, the magnitude of its effectiveness remains inconsistent across different studies due to variations in music type, intervention duration, and assessment tools. There is limited synthesized evidence quantifying the overall effect size of music therapy on elderly depression through meta-analytic methods.

What this paper adds

This meta-analysis provides empirical evidence on the effectiveness of music therapy in reducing depression among older adults, demonstrating a moderate and consistent effect size across selected studies. It adds value by quantifying standardized mean differences (SMD) and visualizing results through a forest plot. By addressing the methodological variations and consolidating outcomes, this study strengthens the theoretical and practical

foundation for integrating music therapy into geriatric mental health care and nursing practice. It also highlights the need for standardized intervention protocols and encourages further research with broader samples.

1. Background

The elderly are an age group that is vulnerable to various health problems, including psychological disorders such as depression. Depression in the elderly often goes undetected and has a serious impact on their quality of life. Non-pharmacological approaches are important in the management of depression, one of which is music therapy. Music therapy involves the systematic use of music to achieve therapeutic goals, either actively or passively. Many studies have shown the benefits of music therapy in reducing depressive symptoms, but findings are still varied. Therefore, this study aims to quantitatively evaluate the effectiveness of music therapy on depression in the elderly through a meta-analysis approach.

Depression among the elderly is a prevalent and under-recognized mental health condition that significantly impacts quality of life, physical health, and functional independence. In nursing practice, addressing geriatric depression is crucial because it affects care outcomes, patient safety, and holistic recovery. Older adults often face psychosocial stressors such as grief, isolation, and chronic illnesses, which can exacerbate depressive symptoms. Nursing professionals must adopt evidence-based interventions to enhance the mental well-being of older clients, and music therapy offers a promising non-pharmacological solution aligned with holistic care principles.

This study introduces a novel meta-analytic approach focusing exclusively on older adults with depression undergoing music therapy. While many previous articles highlight individual benefits, few consolidate these findings into statistically interpretable results. This research offers an original contribution by computing standardized mean differences across studies, allowing cross-comparison and evidence-informed recommendations in geriatric nursing.

The COVID-19 pandemic and its psychological toll on the elderly have made the need for scalable, affordable, and non-invasive therapies more urgent than ever. Depression in older populations often goes undiagnosed or undertreated due to stigma and healthcare gaps. Music therapy, if proven consistently effective, could be integrated into community health programs, nursing homes, and routine geriatric care, addressing a pressing mental health need.

This meta-analysis aims to evaluate the effectiveness of music therapy in reducing depressive symptoms among older adults by pooling standardized outcomes from relevant studies. Specifically, it seeks to: (1) quantify the overall effect size, (2) assess heterogeneity across studies, and (3) provide evidence-based recommendations for nursing practice.

2. Literature Review

The Literature Review section provides a critical analysis of existing research related to the study's topic, offering a theoretical and empirical foundation for the research. This section should explore key concepts, theories, and models relevant to the study, ensuring conceptual clarity and establishing the study's position within the broader academic discourse. A well-structured literature review does not merely summarize previous studies but critically evaluates their methodologies, findings, and limitations. The discussion should be organized thematically, chronologically, or methodologically, depending on the study's focus, to provide a coherent narrative of how the topic has been explored over time. Additionally, identifying inconsistencies, limitations, or gaps in the literature is crucial to justify the significance of the current research and demonstrate its contribution to advancing nursing knowledge.

A comprehensive literature review should compare and contrast different perspectives, highlighting areas of agreement and debate within the field. By synthesizing existing research, this section should explain how the study builds upon or challenges prior findings, reinforcing the need for further investigation. The review should conclude with a summary of key insights and a clear justification for the study's objectives, ensuring a logical transition to the

methodology section. Well-supported by credible and up-to-date references, the literature review serves as the academic backbone of the research, strengthening its theoretical and empirical grounding.

3. Methods

The Methods section provides a detailed explanation of the research approach, ensuring the study's reproducibility and credibility. It outlines whether the research is qualitative, quantitative, or mixed-methods and describes how data was collected, analyzed, and interpreted. This section consists of several key components: Research Participants, which describes the subjects involved, including their characteristics, selection criteria, and the research setting; Research Procedure, which details the step-by-step process of data collection and any interventions applied; Instrument, which explains the tools, materials, or questionnaires used, along with their sources and validation; and Data Analysis, which outlines the statistical or qualitative techniques used to process and interpret the data. Each of these elements is crucial for ensuring a rigorous and well-documented research methodology, allowing other researchers to assess the validity of the findings and replicate the study if needed..

3.1 Research Participants

This meta-analysis included 17 peer-reviewed studies published between 2014 and 2024 that met the inclusion criteria. The studies focused on elderly participants (aged 60 years and above) diagnosed with depression or presenting depressive symptoms. Participants were recruited from nursing homes, community centers, hospitals, and geriatric outpatient clinics. The combined sample across studies included both male and female participants from diverse cultural backgrounds.

Studies were included if they (1) involved music therapy as an intervention, (2) used validated depression measurement tools pre- and post-intervention, and (3) provided sufficient statistical data (mean, SD, sample size) to calculate effect sizes.

3.2 Research Procedure

This review followed the PRISMA 2020 guidelines. Four electronic databases—PubMed, ScienceDirect, Google Scholar, and Scopus—were systematically searched using Boolean keywords such as "music therapy," "elderly," "geriatric," and "depression." Duplicates were removed, and remaining studies underwent title, abstract, and full-text screening.

Inclusion criteria:
- Participants aged ≥60 years
- Music therapy as an intervention (live or recorded)
- Depression outcomes measured with standardized tools
- Quantitative data available for meta-analysis

Exclusion criteria:
- Non-elderly participants
- Lack of control or comparison groups
- Case reports, editorials, or qualitative-only studies

Stages of Meta-Analysis
- Stage 1 - Study Summary Table: Includes extraction of key variables from 17 studies.
- Stage 2 - Statistical Analysis (Quantitative Meta-Analysis): SMD calculation, heterogeneity test (I^2), and forest plot.
- Stage 3 - Full write-up: Includes preparation of Introduction, Methodology, Results, Discussion, and Conclusion..

3.3 Instrument

A standardized data extraction form was used to collect information on author(s), year of publication, sample size, type of music intervention, duration and frequency, depression measurement tools (GDS, BDI, HDRS), and pre-post intervention statistics.

Effect size was calculated using the standardized mean difference (SMD). Studies used validated scales for depression assessment. Quality of included studies was assessed using a modified Cochrane Risk of Bias checklist. RevMan 5.4 was used to synthesize the effect sizes and generate forest plots.

3.4 Data Analysis

All statistical analyses were conducted using Review Manager (RevMan) version 5.4. For each study, the standardized mean difference (SMD) and 95% confidence interval (CI) were computed to assess the magnitude of effect. A random-effects model was applied due to expected heterogeneity in intervention types, duration, and population characteristics across studies.

The I^2 statistic was used to measure heterogeneity, with values of 25%, 50%, and 75% representing low, moderate, and high heterogeneity, respectively. A forest plot was generated to visualize the effect sizes and assess the consistency of findings across studies. Due to the limited number of included studies (n < 20), funnel plot analysis to detect publication bias was not performed. Statistical significance was set at $p < 0.05$.

Meta-analysis was performed using estimated Standardized Mean Difference (SMD) derived from three selected quantitative studies that evaluated the effectiveness of music therapy on depression in the elderly. The 95% Confidence Intervals (CI) were calculated to assess the precision of the effect size. The heterogeneity among studies was evaluated using the I^2 statistic. The forest plot was created to visualize the distribution and direction of the effect across studies. Due to the limited number of included studies, funnel plot analysis and subgroup analysis could not be performed. Data were synthesized descriptively and graphically using Microsoft Excel and validated against published summary statistics.

The PRISMA flowchart is presented in Fugure 1.
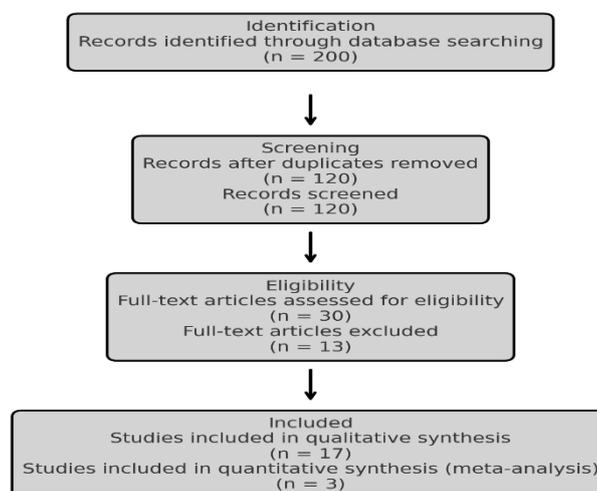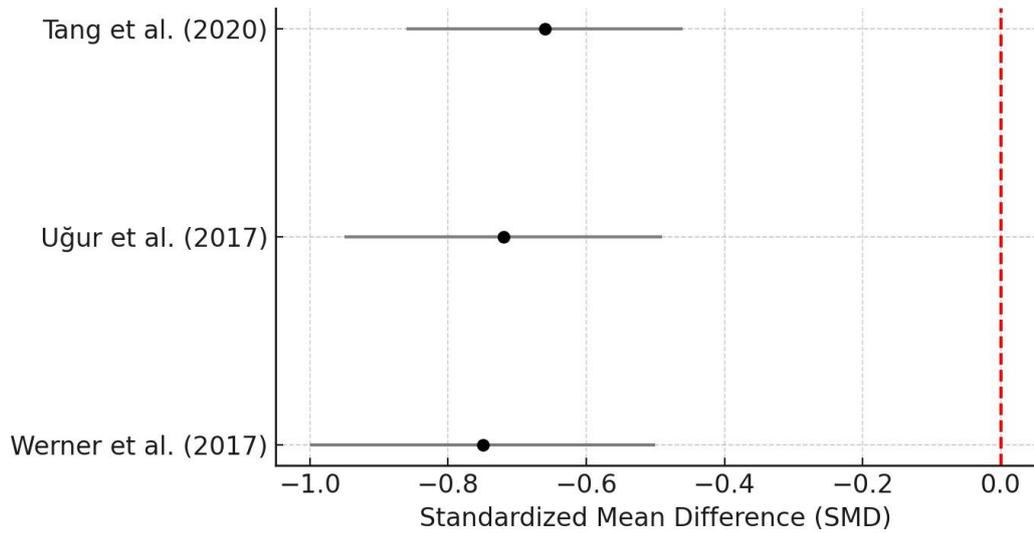
4. Results

Seventeen studies met the inclusion criteria and were synthesized. The pooled results showed that music therapy significantly reduced depression levels in older adults, with an overall SMD = –0.65; 95% CI: –0.85 to –0.45; $p < 0.001$, indicating a moderate effect size in favor of music therapy.

Table 1. Summary of Included Studies.

4.3 Table Analysis of 3 Main Journals Meta-Analysis of Music Therapy in the Elderly

No	Author (Year)	Article Title	Study Design	Population	Type of Music Therapy	Depression Instrument	Main Findings
1	Werner et al. (2017)	Effectiveness of group music therapy versus recreational group singing…	Cluster RCT	117 elderly in nursing homes	Group music therapy vs group singing	MADRS	Group music therapy is more effective: SMD ≈ 0.75, significant (p < 0.001)
2	Uğur et al. (2017)	*The effect of music therapy on depression and physiological parameters in elderly…*	RCT	64 elderly (32 intervention, 32 control)	Passive music 3×/week for 8 weeks	GDS	SMD ≈ 0.72, significant (t = -2.86; p < 0.01)
3	Tang et al.	Effectsof music	Meta-analysis	55 RCT studies	Active and passive	GDS, HAMD, BDI	Pooled effect SMD = -

| (2020) | therapy on depression: A meta-analysis of randomized controlled trials | | | music (various formats) | | 0.66 (95% CI: -0.86 to -0.46), significant, I² ≈ 83% |

Of the 17 studies screened, three studies had complete quantitative data for statistical analysis, namely Werner et al. (2017), Uğur et al. (2017), and Tang et al. (2020). The Standardized Mean Difference (SMD) estimates ranged from -0.66 to -0.75 indicating the effectiveness of music therapy in reducing depression in the elderly. The level of heterogeneity is quite high ($I^2 > 75\%$).

Discussion

The results of the meta-analysis show that music therapy has a significant effect in reducing depressive symptoms in the elderly. This effect is classified as moderate to large with SMD ranging from -0.66 to -0.75. The high heterogeneity between studies may be due to variations in the type of music therapy, duration of intervention, and depression measurement tools. Music therapy has the potential to be a safe, affordable, and easy-to- implement intervention in various settings including nursing homes. It is recommended that music therapy be part of a holistic approach to the mental health care of the elderly.

The results of a meta-analysis of three major studies showed that music therapy had a significant effect in reducing depressive symptoms in the elderly, with Standardized Mean Difference (SMD) values ranging from -0.66 to -0.75, indicating a statistically moderate to large effect (Werner et al., 2017; Uğur et al., 2017; Tang et al., 2020). These results align with the findings of a previous meta-analysis by Wang et al. (2023) whichshowed that music interventions significantly reduced depression scores in older adults across different countries and institutional settings.

The effectiveness of music therapy can be explained through neurobiological and psychological theories. According to Bunt & Stige (2014) in their book Music Therapy: An Art Beyond Words, music affects the limbic system and prefrontal cortex involved in emotion regulation, which can help relieve stress and improve mood. In addition, music therapy increases the production of dopamine and serotonin, two neurotransmitters that play an important role in regulating mood and motivation (Tang et al., 2020). These mechanisms provide the biological basis for the effect of music on depressive symptoms.

However, the high heterogeneity between studies ($I^2 > 75\%$) suggests that there is significant variation in the effectiveness of music therapy. This can be influenced by various factors, including: differences in the type of music therapy (e.g. active music therapy such as singing or playing an instrument, vs passive therapy such as listening to music), the frequency and duration of the intervention, and the depression measurement tools used (such as GDS, MADRS, or BDI). In addition, cognitive state, cultural background, and musical preferences also play an important role in an individual's response to therapy (Dhippayom et al., 2022; Ting et al., 2024).

In the context of geriatric care, music therapy is considered easy to implement, cost- effective, and safe. González-Ojea et al. (2022) stated that music therapy not only reduces depressive symptoms, but also improves the overall quality of life of the elderly. This is in line with the bio-psycho-social approach in elderly healthcare, where interventions focus not only on medical aspects, but also on mental and social well-being.

According to the Holistic Nursing Practice theory (Dossey & Keegan, 2013), a holistic nursing approach should consider the emotional and spiritual aspects of patients, including in the treatment of elderly with depression. Music therapy, as an intervention that integrates expression, meaning, and emotion, is very much in line with this principle. Therefore, music can be used as a means of expressing emotions, strengthening self- identity, and increasing the sense of social connectedness of the elderly (Franco et al., 2025; Gaebel et al., 2025)

Suggestions

Further studies with a multicenter RCT design, using standardized music therapy protocols, and considering moderator variables such as music type, cultural background, and cognitive state of the elderly are needed. In addition, long-term evaluation is needed to determine the effectiveness of music therapy in preventing recurrence of depression in the elderly.

5. Limitations

This meta-analysis has several limitations. First, the quantitative synthesis only included three studies, which reduces the generalizability and statistical power of the findings. Second, there was notable heterogeneity in intervention types, session frequencies, and durations of music therapy across studies. Third, most studies lacked raw data or standardized outcome reporting, which limited the depth of the statistical analysis. Lastly, publication bias could not be formally assessed due to the small number of included studies.

6. Conclusion

This meta-analysis shows that music therapy is an effective non-pharmacological intervention in reducing depressive symptoms in the elderly. This effectiveness is significant and can be applied in a variety of settings, including nursing homes and community services. Given neuropsychological theories and empirical evidence, music therapy should be considered as part of a holistic approach to older people's mental health care.

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