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Improving Cognitive Function in Persons with Dementia Through Music Therapy

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Improving Cognitive Function in Persons with Dementia Through Music Therapy

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NURS 4500: Nursing Research and Thesis

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Abstract

People diagnosed with dementia experience cognitive alterations that cause overwhelming challenges and lead to distinctive life changes. Declining cognitive function noticeably experienced in dementia not only inflicts difficulty with achieving independent living but increases feelings of agitation and disturbs quality of life. Advanced medical care is widely available for managing mental conditions but may not always be effective in treating cognitive changes like memory loss and confusion. Because the stages of dementia vary from person to person, medical interventions are often patient centered to effectively focus on an individual's specific needs. With non-pharmacological methods, flexibility in adjusting to an individual's ability is possible and can be more suitable in the plan of care for persons with dementia. Music therapy is a common approach to improving an individual's social, psychological, and physical well-being, often illustrating beneficial impacts on enhancing cognitive abilities. This research thesis delves into the effects of music therapy, including a literature review of six studies focused on the music intervention and a research proposal on improving cognitive function through music therapy.

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Introduction

For older adults, their healthcare plans become catered to their specific physiologic changes common with aging, and for many, this means transitioning from the prioritization of critical medical interventions to comfort care. Lifestyle choices and health management for the older adult population tends to focus more on optimizing their capabilities and ensuring a simple aging-in-place journey. Non-pharmacological interventions are practiced by healthcare professionals as a safe, supportive method for alleviating patients from health complaints and can cultivate improved outcomes for older adults, especially those diagnosed with dementia.

Problem Statement

Among the chronic diseases frequently seen with this population, dementia is the most common condition affecting older adults across the world. Dementia is “a disorder that is characterized by a decline in cognition involving one or more cognitive domains” (DeKoshy et.al., 2019), including learning, memory, and executive function. Losing the ability to effectively communicate about personal needs and recall specific events in a day suddenly introduces unexpected obstacles that eventually become a part of daily life. Because the disease process gradually declines over time, people diagnosed with dementia slowly lose full control over living independently.

Using a non-pharmacological intervention, like music therapy, can help in refining different cognitive functions for older adults and act as additional support to medical interventions. Music therapy is described as the “clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program” (van der Steen, 2018, p. 6). Despite the absence of definitive treatment, healthcare teams should prioritize

maximizing daily living for persons with dementia which can be accomplished through music-based interventions. Listening to calming melodies, playing instruments, and singing along with their favorite songs can actively engage an individual's mind and contribute to improvements in dementia symptoms. Chu et al. (2014) confirmed previous research, stating that "music therapy effectively reduced depression and anxiety in elderly persons...and regular music therapy delays cognitive deterioration" (p. 2). Therapeutic methods are often advised to be practiced in caring for all patients, especially for older adults. Incorporating music therapy into standard treatment for dementia may not only assist with cognitive difficulties, but also enhance mood and quality of life. This paper explores the non-pharmacological intervention of music therapy and its effects on improving cognitive function in persons with dementia.

Literature Review

This literature review will explore the meaningful effects of music therapy on persons with dementia. Dementia is characterized by regressive cognitive signs and symptoms, like decreased ability to appropriately recall information and solve problems. The exploration of the following articles aims to answer the question: can music therapy improve the cognitive function in persons with dementia?

Search Strategy

The six articles were found through the Dominican University of California library databases, which were PubMed and Iceberg. Useful keywords for finding the articles included music therapy, music interventions, cognitive function, cognitive impairment, and dementia. Although articles focused on cognitive function are included, many research studies primarily focused on the impact on quality of life and psychological health in persons with dementia. The decision to critique studies on quality of life and psychological health broadened the evaluation

on the effects of music therapy and supplemented the significant findings for its impact on cognitive function.

For the literature review, the articles are divided into two categories: 1) Music Therapy as a Primary Intervention and 2) Music Therapy with Art and Movement. For more information on the following articles, a literature review table is located in Appendix A.

Music Therapy as a Primary Intervention

Music Therapy was the only intervention used for participants diagnosed with dementia in the following three articles. The studies were able to discover how implementing the treatment contributes to positive impacts on persons with dementia, specifically on quality of life and mood.

Cho (2018) conducted her study “to compare the short-term effects of music therapy-singing group with those of a music medicine-listening group and a control-TV group, on quality of life and effect of persons with dementia at a long-term care facility” (p. 1). The population of interest for this study were residents of a nursing facility with a documented diagnosis of dementia who were between 65 and 100 years old and were able to sit in a chair or wheelchair for one hour. The researchers created a randomized controlled trial with a pretest-posttest design that adopted three groups for a sample size of 52 participants. Each of the participants were randomly assigned to three intervention groups: music therapy-singing group, music medicine-listening group, and control-TV group. For each intervention group, the participants had 40-minute sessions twice a week for four consecutive weeks. By the end of the four weeks, only 37 participants completed the interventions and, as a result, only 35 participants’ data were eligible to be included in the analysis due to two participants withdrawing their involvement. To assess

the impact of each intervention, the researchers measured the outcomes with the *Quality of Life – Alzheimer’s Disease* (QOL-AD) and the *Positive and Negative Affect Schedule* (PANAS).

The data illustrated significant effects on the music therapy-singing group on their quality of life (QOL) while the other two groups revealed no significant improvements. Active singing produced therapeutic benefits, including “physical relaxation and social engagement... [as well as] deep breathing and increasing oxygenation,” which was believed to optimally improve QOL. Interacting with other residents in the group and the music therapist may have also contributed to the success in group singing, as it is “challenging due to cognitive decline and behavioral changes” (Cho, 2018, p. 9). Among the three interventions, the singing group was the only group to produce a significant change in total positive affect scores across the four weeks due to the neurological benefits and the release of endorphins, the hormones associated with pleasure. With this research study, music therapy with singing proves its ability to improve overall QOL for persons with dementia and demonstrates the importance of actively engaging this population in a residential setting. The success of singing for the participants strengthens the idea that music therapy produces lasting effects on different parts of the mind, from enhancing oxygenation to releasing positive hormones. For future research, it is recommended to improve the randomized controlled design and include a larger sample size to further analyze its effects.

Chu et al. (2014) were also interested in the effects of group music therapy and wanted “to determine the effectiveness of group music therapy for improving depression and delaying the deterioration of cognitive functions in elderly persons with dementia” (p. 209). The researchers completed a randomized, parallel-group design with a sample size of 104 participants. Inclusion criteria detailed persons at least 65 years and above with dementia living in one of the three nursing homes in Taiwan. After recruiting participants, the researchers

divided them into the experimental group and the control group. The experimental group received group music therapy for 30 minutes sessions twice a week for six weeks. The control group received their routine nursing home care for the same time period. To assess the data, the researchers used the *Cornell Scale for Depression in Dementia*, evaluated salivary cortisol as a biological marker in their study, and the *Mini Mental Status Exam* (MMSE).

The study developed significant findings following the six weeks, one of which was the significant change in depression levels between the music therapy and control groups from the baseline week to the posttest week, or after the 12th session. Similar to the previous study, the music therapy group gradually experienced positive shifts in their mood throughout the sessions which led to the success in improving overall depression levels. They also found that mild and moderate dementia symptoms were significantly improved after the intervention at baseline and at the end of the treatment, depicting positive changes in MMSE scores for mild and moderate dementia. Although the MMSE only tested for five cognitive functions, satisfactory scores in orientation, attention, memory, language, and visual-spatial skills were significant findings for determining the true effects of music therapy. Some of the study's limitations to consider for future research were the short duration of the treatment, the lack of a long-term follow-up, and only including a specific sample of participants.

In the research of "*Individual music therapy for agitation in dementia: an exploratory randomized trial*," Ridder, H.M., et. al (2013) aimed to "examine the effect of individual music therapy on agitation in persons with moderate/severe dementia living in nursing homes and to explore its effect on psychotropic medication and quality of life" (p. 667). The researchers were focused on nursing home residents with moderate to severe dementia and were able to gather data from representatives for each of the 42 participants. In the two-armed, exploratory study, the

participants were randomly allocated to either a group receiving music therapy as the primary treatment through improvising, singing, dancing, listening, and other activities or a group receiving their standard care in the nursing home. The two groups later switched interventions at the mid-point of the data collection. For 12 weeks, each group was able to receive 12 sessions of individual music therapy. After the 12 sessions, the researchers proceeded with proxy interviews for 30 minutes with each participant to rate the outcome measures of the treatment.

The researchers analyzed quality of life through the Alzheimer's Disease-Related Quality of Life (ADRQL), focusing on social interactions, awareness of self, feelings and mood, enjoyment of activities, and response to surroundings. Quality of life (QOL) appeared to increase for the music therapy group but there was not a statistically significant difference from the standard care group. Because data collection demanded extensive time and careful planning, the researchers were limited with their small sample size and presumedly resulted in unsatisfactory outcomes for improving QOL. However, the study increased reliability in using music therapy as a treatment of agitation for persons with dementia. The agitation levels were assessed through the Cohen-Mansfield Agitation Inventory (CMAI), which is a form completed by the proxy caregiver. During the music therapy sessions, agitation disruptiveness was significantly reduced for these participants in comparison to those who continued their routine care. Determining the decrease in agitation disruptiveness further validates the effectiveness of music therapy on managing dementia symptoms. The music therapist even noted that one participant who started with symptoms of paranoia and aggression was “less aggressive...happier and smiled more often” at the end of the six weeks. In addition, the care providers noticed that “music calms her down...” (Ridder et al., 2013, p. 673). In association with decreasing paranoia and aggression, the usage of psychotropic medications occurred significantly less often in participants

experiencing music therapy compared with the standard care participants. The favorable findings of the study not only illustrate the promising impact of music on mood, but the productive changes on psychological signs and symptoms.

Music Therapy with Art and Movement

The following three studies observed the effects of music therapy in conjunction with other non-pharmacological methods. With the different interventions, the researchers in all the studies chose to observe its impacts specifically on cognitive function.

Music reminiscence activities (MRA) and art therapy (AT) are the primary interventions in the research to seek “[improvement of] cognition of community living elderly with mild cognitive impairment (MCI)” (Manhendran et al., 2017, p.1). The population of interest were older adults aged 60-85 years old who fulfilled MCI criteria. The MCI criteria included at least one age-education adjusted neuropsychological test Z score, does not meet the DSM-V criteria, and are memory and cognitive compliant. The researchers were able to enroll 250 participants, who received interventions weekly for the first three months and then fortnightly in the remaining six months. The three arms of the study were: participants receiving AT, participants receiving MRA, and participants receiving neither intervention.

To assess their neurocognitive functions, the researchers used the Rey auditory learning test List Learning, Delayed Recall, Recognition Trial, Wechsler Adult Intelligence Scale 3rd-edition, Digit Span Forward (Attention and Working Memory), and included the Color Trails test 2 for assessing executive function. By the end of the study, only 68 participants completed the interventions. Art therapy had the most impact on the participants throughout the 9 months, with a higher mean of memory domains and all measured neurocognitive domains in comparison to MRA and the control group (CG). During AT, participants were guided in creating and viewing

art to express their thoughts and inner experiences and had the opportunity to visit an art museum for more guided sessions. The researchers believed AT being delivered as “art-as-therapy and art-psychotherapy” (Manhendran et.al, 2017, p. 7) contributed to the successful cognitive improvements. For MRA, participants were asked to discuss loved experiences through photographs and songs they chose to associate with the memories. The means of memory domains and all neurocognitive domains were higher in the MRA group but were not statistically significant in comparison to the CG. The participants were also assessed for subsyndromal depression and anxiety, sleep quality, and telomere lengths which did not produce any statistically significant results across the study period. The researchers were unable to find significant changes in MRA but were able to supplement the benefits of non-pharmacological interventions.

Shimizu, Umemura, Matsunaga, & Hirai (2018) incorporated physical movements with music therapy, striving “to examine the effect of multitask music movement therapy intervention on the prefrontal cortex and physical and cognitive function” (p. 1614) in older adults with mild cognitive impairment. The inclusion criteria consisted of individuals who voluntarily attended a prevention of dementia care class in 2014, which was provided by the municipality of Eiheji in Fukui Prefecture, Japan. The study contained 45 participants who were enrolled and randomly placed into two groups: the music movement therapy (MMT) group consisting of exercise therapy with music using a Naruko clapper or the single-training task (STT) group, involving the same movements as MMT but without the background music or Naruko clapper. Each group received their treatment for 12 weeks and had a 60-minute session once a week. To assess physical function, the researchers observed systolic and diastolic blood pressure, body weight, body balance, flexibility, gait, muscle endurance and strength, and mobility. Cognitive function

was assessed through the Frontal Assessment Battery (FAB) and through measuring CBF, or the task related changes in the concentration of oxygenated hemoglobin.

As the first research study to report an association between three months of continuous and repetitive MMT and improved CBF, the researchers produced satisfactory findings with MMT. For the participants in MMT, they had significant improvements in the areas of flexibility, functional mobility, gait, and muscle endurance. The MMT required the older adults to actively engage in two different activities, listening to music and following the exercises. The improvements illustrated that “performing repetitive rhythmic movements may decrease the working load in specific brain areas and free up cognitive capacity” (Shimizu et al., 2018, p. 1623). With this study, participants also had significant improvements in motor programming with MMT after receiving the intervention for 12 weeks. Again, engaging in two tasks through MMT contributed to more brain activation because it “requires a high level of prediction (predicting the timing of the instructor’s movements) and is more difficult than simply dancing to music” (Shimizu et al., 2018, p. 1624). Despite having the desired outcomes, one important limitation was being unable to find significant differences compared to STT specifically related to the presence or absence of MMT. Both interventions involved the same exercises, so it was difficult to confirm that MMT was significantly successful in comparison to STT. However, the researchers still developed favorable results and greatly emphasized the value of music with movement for mild cognitive impairment.

Cheung, Lai, Wong, and Leung (2018) were amongst the researchers that were also interested in music therapy with movement. Their study wanted “to examine the effects of the six-week-music-with movement (MM) intervention, as compared with music listening (ML) and social activity (SA) on the cognitive functions of people with moderate dementia over time”

(Cheung et.al, 2018, p. 306). The researchers gathered 165 nursing home residents with moderate dementia. The specific criteria included being at least 65 years old, stage 4 or 5 on the Global Deterioration Scale, and have symptoms of anxiety as screen from the Rating Anxiety in Dementia Scale. The participants were randomly put into three groups. Those in MM listened to their preferred music and performed limb and trunk exercises with the rhythms for twice a week for six weeks. Participants in ML just solely listened to their preferred music and participants in SA chatted casually for twice a week for six weeks.

The MM group greatly contributed to the study's significant findings produced after the six weeks of intervention. The participants in MM experienced improvement in memory storage and delayed memory. For verbal fluency, the participants had a significant improvement from T0 (baseline) to T1 (immediately post-intervention). Both of these findings on cognitive function supports data from previous studies, illustrating that an active form of music therapy fully engages several parts of the brain. The researchers found that there was also a significant reduction of anxiety in the MM and ML group, while the MM group had also shown significant reduction in depressive symptoms. The interventions gave opportunities to interact and socialize with other participants in the groups, which is not a common occurrence for older adults with dementia. Not only did the music and movement stimulate different regions of the brain, the researchers believed it also helped them "relate past pleasant memories and communicate with others" (Cheung et.al, 2018, p. 312). The researchers considered the limitation of not having an additional group without any intervention, causing them to suggest that the true efficacy of MM is still yet to be determined. But as the first study with a large sample to investigate the effects of MM on specific cognitive domains, the researchers presented results that can shape the future of music therapy.

Literature Review Conclusion

Despite the varying approaches to the interventions, all six studies successfully discovered positive effects on persons with dementia and others forms of cognitive impairment through music therapy. Listening and engaging with the melodies and rhythms exercised the participants' brains, producing different outcomes across the cognition spectrum. Many researchers also found improvements in agitation and depressive symptoms between the beginning and end of the sessions, and even past the conclusion of the study period.

Although they accomplished their purpose of the study, the small sample size and short duration of the studies were common limitations for many researchers. Each of the studies received informed consent from their vulnerable population of participants with cognitive impairment, but the standards of protection for the subjects were not thoroughly discussed. In addition, the absence of a control group without any intervention was a barrier to confidently confirming the significance behind the findings. As some of the researchers were amongst the first to study this particular focus, more research is still needed to determine the true efficacy of music therapy.

The current research on music therapy supports its successful implementation in the care for persons with dementia. This non-pharmacological method holds true potential for alleviating aggravating symptoms and enriching cognition. Investing time and effort to continue studying music therapy is worthwhile, as music therapy has already aided many individuals in their challenging journey with dementia.

Research Proposal

Reviewing the literature on music therapy created a new research question for further studies. Because of the success of music therapy and movement therapy, is music therapy only

effective on improving cognitive function if it involves a movement intervention? Many studies in the literature review produced favorable results, but with regards to the research question first presented about cognitive function in this thesis, music with movement therapy appeared to be the only intervention with success on examining cognitive function changes. The research studies explored in the literature review have illustrated the benefits of music therapy with treatment for dementia and its potential to enhance patient outcomes through improving cognitive function, mood, and overall quality of life. To confirm previous findings, a longitudinal study with a large sample size should be conducted on music with movement therapy to support future implementation for persons with dementia. The purpose of the proposed study will be to examine for positive effects of music therapy with movement therapy on the cognitive functions of persons with dementia. The author hypothesizes that participants receiving music with movement therapy will experience more improvements in cognitive function than the music-listening with singing group and the control group.

Theoretical Framework

Caring for patients diagnosed with dementia involves different interventions due to the absence of a definitive treatment for its complex signs and symptoms. However, effective management is more than possible and achievable. In Betty Neuman's (1970) Systems Model Theory, she describes the human being as a client system that is layered and multi-dimensional. Each layer consists of a subsystem, which includes the physiological, psychological, socio-cultural, spiritual, and developmental subsystems. Neuman viewed these subsystems as vital parts to achieving wellness in health, cultivating "harmony with the whole of the client." In support for clients, she believes nurses fully contribute to creating the harmony with "actions... [that] maintain a maximum level of wellness," aiming for "stability of the patient-client system

through nursing interventions to reduce stressors” (“Neuman’s Systems Model, n.d.). Moving patients with dementia toward their optimum health level is a combination of interventions focused not only on medical treatment, but on treatment that optimizes their being as a whole. Implementing a nonpharmacological method, like music therapy, has the potential to improve the client’s abilities beyond just cognitive function, an action Neuman would view as essential to maintaining patient system wellness.

Ethical Considerations

The proposal for the research study will be reviewed through the Dominican University of California Institutional Review Board and will not begin without official approval. Before beginning enrollment, the researchers will speak to the designated surrogate for the participants and obtain a signature for a surrogate consent form that entails a full description of the study. There are numerous ethical issues to consider, especially participants being unable to understand the purpose of the study due to cognitive changes from dementia as individuals with cognitive impairments are considered a vulnerable subject population. The participants’ data will be kept confidential and will only be disclosed to the researchers. Throughout the study, family members, care givers, or any other authorized decision makers of the participants are allowed to be present for all intervention sessions. At any point of the study, the designated surrogate can freely withdraw their participant’s involvement.

Design & Methodology

The study will be a longitudinal, quantitative research design with randomized-control trials. The participants will be randomized into three groups: 1) music-with-movement therapy, 2) music-listening with singing, and 3) no intervention and continuing with one-to-one care, or the control group. Each group will receive their specified intervention twice a week for 12-

weeks. For the two groups with music therapy, the participants will be guided by certified music therapists for each session with assistance from the researchers and facility staff members. To recruit participants for the study, we will request collaboration with seven nursing facilities in Marin County who have partnered with the Dominican University of California nursing program for clinical sites. Many of these nursing facilities care for residents who are diagnosed with dementia and can be potential participants for the study.

The convenience sample goal will be 150 participants with 50 participants in each music intervention group and the control group. The inclusion criteria for the sample will be nursing facility residents with a documented diagnosis of dementia for at least three years and residents who do not have other diagnoses that will conflict with fulfilling the interventions (i.e. weekly laboratory tests or procedures). After finding individuals who fit the criteria, the designated surrogate will fully explain the components of the study to their participant with elaborate support from the researchers.

The instruments for data collection will be the Mini-Mental State Examination (MMSE) and the Frontal Assessment Battery (FAB). The MMSE measures orientation to time and place, recall, attention, ability to solve problems, language, comprehension, and motor skills with a maximum score of 30 points. The FAB is a tool used to differentiate frontal dementias and Dementia of Alzheimer's Type, measuring conceptualization, mental flexibility, programming, sensitivity to interference, inhibitory control, and environmental autonomy. The client can receive a maximum score of 18 points. Each participant will be assessed at baseline, six weeks after implementation, and at the conclusion of the sessions following the 12th week with the MMSE and FAB to observe for changes in cognitive function.

Data Analysis

Following the 12-week clinical trials, the results will be analyzed through inferential statistics, involving an estimation of parameters and hypothesis testing. Parametric statistical tests will be performed to evaluate if the research hypothesis will meet the statistical findings of the study. Because there are three different intervention groups, it is predicted to complete an analysis of variance to find significant differences among the three-intervention group means.

The Future of Music Therapy

In the world of healthcare, the primary goal is to support patients in their journey toward maintaining a healthy, holistic life. Healthcare professionals strive to continuously provide care for every individual, especially for those who no longer have the physical and cognitive abilities to be independent. Music therapy can create remarkable opportunities with improving physiologic changes and enlightening quality of life for the lives of people with dementia. This method could change clinical practices for treatment by not only adding an effective treatment option, but also emphasizing the importance of nonpharmacological and therapeutic interventions. Despite the difficulties with their diagnosis, persons with dementia are often resilient because the compassion and hope given by others empower their minds to cherish each day. Improving the cognitive functionality, along with nurturing their mental health, is possible through the power of music.

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Appendix A

Authors/Citation/Title	Purpose/Objective of Study	Sample - Population of interest, sample size	Study Design	Study Methods	Major Finding(s)	Strengths	Limitations
Cheung, D.S.K., et. al (2018) The effects of the music-with-movement intervention on the cognitive functions of people with moderate dementia: a randomized controlled trial.	To examine the effects of the six-week-music-with-movement intervention, as compared with music listening and social activity on the cognitive functions of people with moderate dementia over time.	Population of Interest: Nursing home residents with moderate dementia; > 65 years old; stage 5 or 6 on the Global Deterioration Scale; has symptoms of anxiety as screened from Rating Anxiety in Dementia Scale Sample size: 165 participants	Multi-center randomized controlled trial	- Participants in the Music Movement group listened to their preferred music and moves their limbs and trunks, twice a week for six weeks - Participants in the Music Listening group listened to their preferred music twice a week for six weeks -participants in the Social Activity group chatted casually for twice a week for six weeks	- Music movement has a greater effect than music listening in improving memory storage and delayed memory - Verbal fluency significantly improved only in the MM group from T0 (baseline) to T1 (immediately post-intervention) - Significant reduction of anxiety in both the MM group and the ML group - Only the MM group showed significant reduction in depressive symptoms	- Purpose of the study was clearly stated with detailed background information - Maintained a large sample size for a study investigating the effects of music interventions over time - Ensured that consent form was received and explained to authorized decision maker for participants who could not make decisions for themselves	- The difference in outcomes between groups in this study did not attain the level of statistical significance - Because of the inability to recruit enough participants to make up an additional group, the true efficacy of the MM intervention is yet to be determined
Cho, K.H. (2018) The Effects of Music Therapy-Singing Group on Quality of Life and Affect of Persons with Dementia	To compare the short-term effects of music therapy-singing group with those of a music medicine-listening group and a control-TV group, on quality of life and affect of persons with dementia at a long-term care facility	Population of interest: residents of a nursing facility with documented diagnosis of dementia who were between 65-100 years old Sample size: 52 participants were enrolled; 37 participants completed the interventions; 35 participants' data were included in the analysis	Randomized controlled trial with pretest-posttest design adopting three groups	Each participant were randomly assigned to three intervention groups: music therapy-singing group; music medicine-listening group; control-TV group 40 minute sessions twice a week for four consecutive weeks	- Significant effects on music therapy-singing group on Quality of Life ($t = 7.02, p = 0.001$); no significant effect on other two groups - Only the singing group changed in total positive affect scores across time	- Data analysis was appropriate for the methodology and was very easy to understand - Demonstrated the importance of engaging persons with dementia in a residential setting	- Complete blinding for participant's group assignment was not guaranteed - Could not blind assessors to the participant's group allocation - Sample size decreased from beginning of study - Accuracy and validity of data may be questioned

Authors/Citation/Title	Purpose/Objective of Study	Sample - Population of interest, sample size	Study Design	Study Methods	Major Finding(s)	Strengths	Limitations
Chu, K., et.al (2014) The Impact of Group Music Therapy on Depression and Cognition in Elderly Persons With Dementia: A Randomized Controlled Study	To determine the effectiveness of group music therapy for improving depression and delaying the deterioration of cognitive functions in elderly persons with dementia	Population of interest: older persons with dementia living in one of the three nursing homes in Taiwan, 65 years old and above Sample Size: 104 participants enrolled; 100 completed the study	Randomized, parallel-group design	Experimental group received group therapy in 30-min sessions conducted twice a week for 6 weeks Control group received usual nursing home care Used the Cornell Scale for Depression in Dementia; Salivary Cortisol as a biological marker; Mini Mental Status exam to evaluate	- Significant difference in change in depression level between music therapy and control groups from baseline (T1) to posttest (after 12 th session) -mild and moderate dementia were significantly improved after intervention at baseline and end of treatment	- Used both subjective and objective outcome measures - Showed improvement in MMSE scores for mild and moderate dementia after study - The strengths and limitations are stated and explained	- Short duration of treatment - There was a lack of long-term follow up - Could have used a broader sample of participants
Manhendran, R., et.al (2017) Art therapy and music reminiscence activity in the prevention of cognitive decline: study protocol for a randomized controlled trial	To explore the feasibility of using art therapy (AT) and music reminiscence activity (MRA) to improve the cognition of community living elderly with mild cognitive impairment (MCI)	Population of interest: age 60-85 years old, fulfills MCI criteria (at least one age-education adjusted neuropsychological test Z score; does not meet DSM V criteria; memory/cognitive compliant) Sample size: 250 participants → 68 completed	Open-label, interventional study	Interventions will be weekly for first three months, then fortnightly for remaining six months Three arms: participants receiving art therapy; participants receiving MRA; participants receiving neither interventions	- Estimated mean change at 3 months from baseline was significantly higher in AT group compared to CG for List Learning - Mean of memory domains and mean of all measured domains were higher in AT	- Challenges the view that interventions are ineffective in MCI - Use of a short time frame for cognitive improvements was appropriate for the design of the study - Researchers stated why results supported and refuted previous studies	- Short time frame - Sample size was small and not powered for hypothesis testing - Did not interview participants to assess their emotional states
Ridder, H.M., et. al (2013) Individual music therapy for agitation in dementia: an exploratory randomized controlled trial	To examine the effect of individual music therapy on agitation in persons with moderate/severe dementia living in nursing homes and to explore its effect on psychotropic medication and quality of life.	Population of Interest: nursing home residents with moderate to severe dementia Sample size: 42 participants	Pragmatic, two-armed, crossover, exploratory, randomized controlled study	- Participants were randomly allocated to music therapy or standard care with conditions switched at the mid-point data collection - 12 sessions of individual music therapy - Conducted proxy interviews for 30 minutes per	- Agitation disruptiveness was decreased after receiving music therapy (-3.51) - Increases in psychotropic medication occurred significantly more often during standard care than during music therapy (McNemar's χ^2 ¼ 5.14, df ¼ 1, p ¼ 0.02).	- Received approval by IRB and protected participants' data - After this research study it can be strongly suggested to use music therapy as a treatment of agitation - Researchers suggest thorough recommendations for further research and for	- Small number of participants due to the data collection being time consuming and demanded careful planning - Interviewers and proxy respondents were not blinded to the treatment allocation

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				participants to rate the outcome measures		clinical practice based on their findings	
Shimizu, N., et. al (2018) Effects of movement music therapy with a percussion instrument on physical and frontal lobe function in older adults with mild cognitive impairment: a randomized controlled trial	To examine the effect of multitask music movement therapy intervention on the prefrontal cortex and physical and cognitive function	Population of interest: individuals who voluntarily attended a prevention of dementia care class in 2014 provided by municipality of Eiheji in Fukui Prefecture, Japan Sample size: 45 participants; 39 participants completed the study	Randomized, controlled, single-blind intervention trial	- Participants were either in the music movement therapy (MMT) group, consisting of exercise therapy with music and use of the Naruko clapper, or the STT (single-training task) group, involving the same movements w/o the background music or Naruko clapper - Cognitive tests were performed during the 1 st and 12 th session - Demographics and physical indicators were administered in the pre- and post-interventions	- Significant improvement in the four areas of flexibility, functional mobility, gait, and muscle endurance after intervention in the MMT group - Significant difference in post-intervention body balance between the MMT and STT groups - Significant improvements in motor programming in the MMT group after intervention (P=0.021)	- There were no significant differences in attendance between both groups - Researchers relate their findings to the purpose of the study, dividing the discussion section into three, coherent categories - First study to report an association between 3 months of continuous and repetitive MMT and improved CBF in the premotor cortex and prefrontal association area	- The amount of participants in each intervention group was unbalanced - No significant differences in improvement of physical function compared to STT control intervention specifically related to presence/absence of MMT