

Positive physical and mental outcomes for residents in nursing facilities using music: a systematic review

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Objectives: The objective of this study was to investigate the applicability and effectiveness of the use of music in providing for positive physical and mental outcomes in nursing facilities.

Problem: Lack of quality of life (QOL) has been a significant issue within nursing facilities. With the rise in census due to Baby Boomers, it has become imperative to find ways to increase overall QOL.

Methods: The research team participants conducted a literature review via Cumulative Index of Nursing and Allied Health Literature, PubMed (MEDLINE), and Academic Search Ultimate to collect data regarding the use of music to provide for positive physical and mental outcomes in nursing facilities.

Results: The most common facilitator mentioned was increased socialization or communication (18%), followed by reduced depression (12%), improved physical health (11%), and reduced agitation or behavior problems (9%). The most common barriers were as follows: cannot isolate effects of music (26%), cost prohibitive (11%), difficult to implement (11%), and no significant improvements in QOL or well-being (11%).

Conclusion: The use of music showed positive outcomes for residents in nursing facilities and should be considered for implementation as part of the normal culture within such facilities.

Keywords: music, music therapy, nursing facilities, skilled nursing, outcomes

Introduction

By the year 2030, one of every five residents in the USA will be above the age of 65 years.¹ For the first time in history, there will be more people over the age of 65 years than under the age of 18 years residing in the USA. It is currently estimated 4.74 million people utilize home health care agencies, 1.4 million reside in nursing facilities, 1.24 million utilize hospice, 713,000 live in residential care communities, and 273,000 utilize adult day service centers that help serve the growing population.² The number of individuals projected to require use of long-term care services is projected to increase to roughly 27 million by the year 2050.³ Because of the rapidly growing elderly population, health care agencies and government health organizations have been anticipating ways to meet the upcoming need. The focus by long-term care providers has shifted to finding easier ways to give a higher quality of care overall.

Background

The effects of music for the promotion of health have been explored throughout history. From the ancient cultures in Asia, Egypt, Romania, Africa, and America, music was utilized to improve spirits, ward off diseases, and provide an overall calming effect on

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people.⁴ Music has become a valuable resource when working with the elderly in nursing facilities and has been utilized for many years to reduce agitation, stress, and depression.^{4,5} When thinking in terms of body, mind, and spirit as being interconnected, music is a method of connection that touches every aspect of our being and can have positive effects on the quality of life (QOL) as we age.⁵ Music and music therapy have been proven to work in psychiatric hospitals, drug and alcohol programs, correctional facilities, rehabilitation facilities, acute care hospitals, as well as hospice services and nursing facilities.⁵

Significance

Studies on the positive effects of music in palliative or hospice care have been documented well,^{6,7} but more specific research has been done to analyze the effects of music on the elderly within nursing facility setting. As the morbidity rate decreases and the elderly population increases, there is a need to find ways to improve the QOL for the elderly, especially for the oldest-old (over age 85) who have the increased probability of showing signs of depression, dementia, and other health issues.⁸

There are ~92% of elderly adults who have at least one chronic illness and ~77% have at least two or more health issues.⁹ Chronic illnesses reduce the ability of a person to perform normal activities, which is a major contributor to depression.^{6,8,9} Due to the need to administer medications for these ailments, to add another pharmacological remedy for depression or anxiety can cause adverse side effects and unwanted drug interactions.⁹ The Centers for Disease Control and Prevention in 2007–2008 provided statistics that 76% of the elderly were taking two medications and 37% of them were taking more than five medications.⁹ Music and music therapy can positively reduce the need for additional medications and have positive effects on the elderly if conducted in the proper manner.^{4,6,8–11}

If nursing staff and family caregivers understand the effectiveness of music therapy with increasing the QOL for the elderly and how it is best applied, low-cost and non-pharmaceutical measures can be taken to make positive changes.^{6,9,10} As resident behaviors are time consuming and stressful for staff and residents, the need exists to continue research in this area to show methods to measure the impact of music and music therapy in the care of the elderly.¹⁰ In addition, there is evidence to suggest that the use of music in a nursing facility environment can prevent depression, which would be an asset for use in resident care.¹¹ Music and/or music therapy can be a low-cost and effective intervention to improve physical health and psychological well-being.

Materials and methods

Design

For this study, the authors conducted a systematic review of peer-reviewed articles that were found across three databases. The PRISMA guidelines were utilized to ensure a consistent and exact reporting of the results. The search began on June 16, 2018 and it was completed on July 1, 2018. The databases utilized were Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed (MEDLINE), and Academic Search Ultimate.

The Medical Subject Headings at the National Center for Biotechnology Information were used to discover initial keywords. However, the initial search terms did not generate enough germane studies on the topic of interest and it was expanded to include other key words that could be applied to nursing facilities, music therapy, and QOL or measures of well-being. After carefully examining the literature and the key terms for the search scope, the keywords that were used were placed in the complex, three-string Boolean search that is displayed in Figure 1. Duplicates from each of the databases were removed and a final search to add other relevant articles found in the citations that met the inclusion criteria was conducted.

Inclusion criteria

The authors reviewed the articles individually to determine which articles were germane and then summarized the themes. Authors then agreed upon inclusion of the final sample of articles to be included in this study. Criteria for inclusion were articles that were published in the English language, peer-reviewed articles, and had only human subjects. In addition, the articles needed to have been published by academic journals between January 1, 2013 and July 1, 2018. Articles were included if they examined the effects of music or music therapy on physical or mental health for residents in some type of geriatric living environment.

Exclusion criteria

Articles were included only if they were determined to be germane by all authors. Literature reviews, study protocols, meta-analyses, trade industry reports, and poster presentations were excluded from the search. If an article did not display a clear, scientific format, it was also excluded from the results. Articles that did not reference music as a main research component were excluded. Bias was not a factor in selecting articles for this study. After examining all the articles as a group and coming to a consensus on germane articles, the final number of articles to be included in this

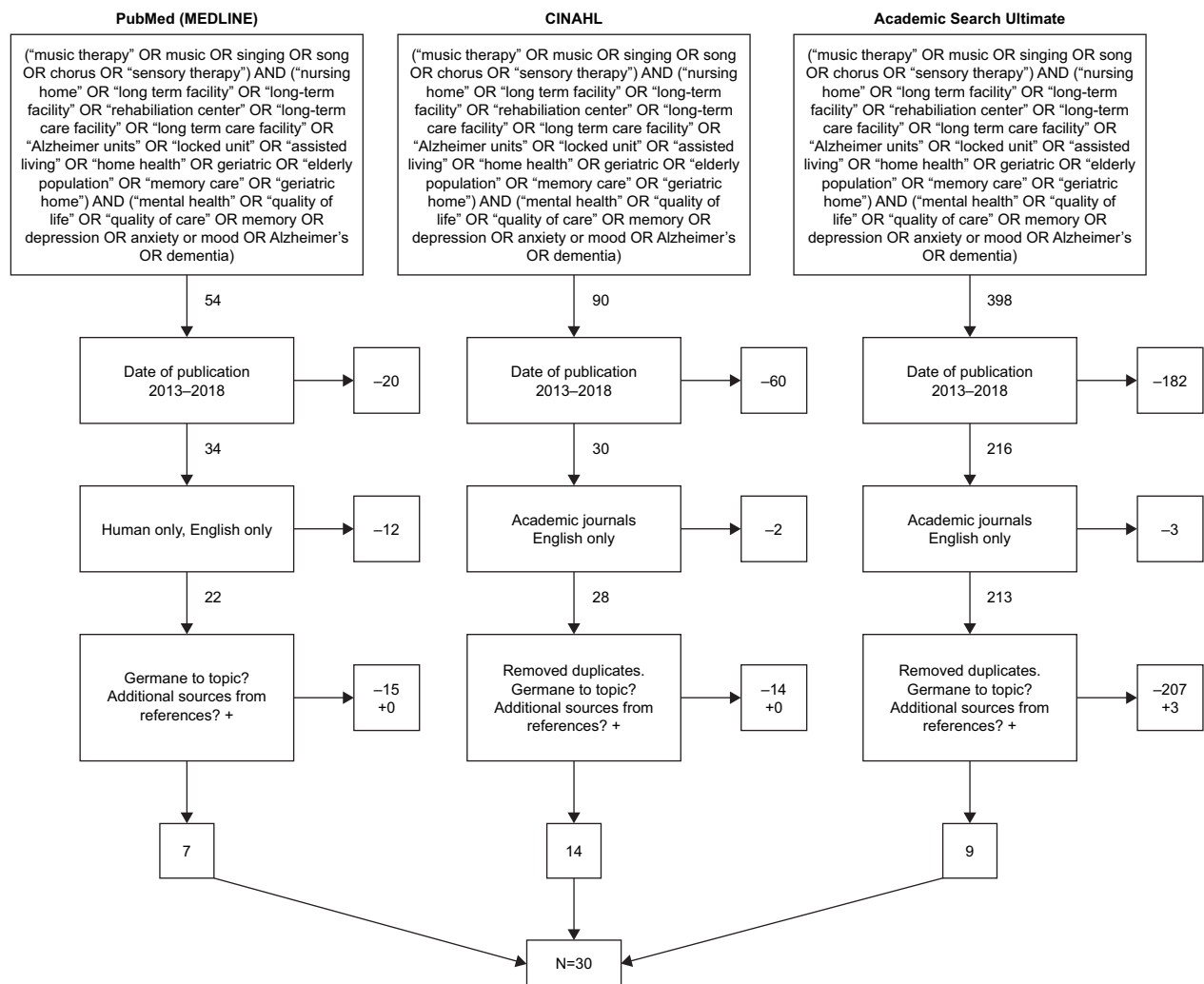


Figure 1 PRISMA diagram.

review was 30. This final sample was then analyzed by all authors for consensus which was achieved. This yielded a kappa statistic ($\kappa=1$), showing strong reliability.

Data analysis

Brief narrative summaries related to the impact of music on physical and mental health factors were extracted from each of the articles. The authors then identified facilitators and barriers to the effectiveness of the music or music therapy. General observations were also noted, and all the information was compiled into a literature matrix (Table 1). These facilitators and barriers were then grouped into larger themes within each category; the themes were chosen together and with consensus of all the authors. Two affinity matrix tables (Tables 3 and 4) were then created for the facilitators and barriers. Each table shows the themes, how often they occurred in the articles, their frequency sum, and the frequency percentage.

Results

Study selection

The process of selecting articles is shown in the PRISMA diagram in Figure 1. The initial search yielded a total of 542 articles from the CINAHL, PubMed (MEDLINE), and Academic Search Ultimate databases. There were 515 articles excluded because they did not meet a set of inclusion criteria, which left 27 germane articles. Looking through the citations for other relevant articles, three additional articles were added. A total of 30 articles were then used for the analysis.

The studies being considered in this systematic review were conducted in hospice settings, in aging communities, and in nursing facilities. It includes 14,104 participants of which $<0.1\%$ were <60 years old. The studies included both male and female sexes from 10 different countries. Studies were conducted with patients with low to medium cognition

Table 1 Studies selected for review and a summary of design, methods, and results

Author/date/location	Aim	Sample/settings	Methods	Assessment tool	Key findings
Altan Sarikaya and Oguz ¹² /2016/Turkey	Determine the quality of sleep and the effect of passive music therapy given at bedtime on sleep quality	31 people aged 34–91 years excluding those with severe hearing impairment and memory problems	Quasi-experimental	Questionnaires; Pittsburgh Sleep Quality Index; pre-test and post-intervention test	The study found that passive music therapy given at bedtime to elderly subjects has positive effects on the quality of sleep
Cheung et al ¹³ /November 2016/China	To examine the effects of the 6-week MM intervention, as compared with music listening and social activity, on the cognitive functions of people with moderate dementia	165 nursing home residents with moderate dementia	Multi-centered randomized controlled trial	Pre-test and post-intervention test	The finding reveals that the MM intervention may be useful for enhancing the cognitive function of people with dementia
Clements-Cortes ¹⁴ /December 2014/Canada	To study three of Hettler's six dimensions of wellness: physical, emotional, and social health while participating in choir sessions	16 participants in a large metropolitan long-term care facility	Mixed-methods	Pre-test and post-intervention test; interviews; Likert scales	Finding indicate that singing in a choir facilitated by a music therapist and accompanist was a beneficial intervention for improving mood, happiness and energy for decreasing pain and anxiety over the entire 16 weeks both for cognitively intact older adults and those diagnosed with a cognitive impairment
Davidson et al ¹⁵ /June 2014/Australia	To evaluate the effect of singing program developed specifically for older community-dwelling people on measures of health and well-being	36 people recruited into the intervention and 29 completed from Silver Chain, a large health and aged care service provider in western Australia and the readership of a local community newspaper	Mixed-methods	Pre-test and post-intervention test; post-intervention semi-structured interviews	Well-structured community-based singing programs have the potential to impact positively upon the well-being of older people, program viability depends on support with recruitment, transport, and funding
Davison et al ¹⁶ /2016/Australia	To search for an intervention that would prove so engrossing that agitated behaviors were reduced both in frequency and severity; would address high levels of depressive and anxious symptoms exhibited by people with dementia and could be personalized	16 residents from 2 nursing homes entered study, 11 completed the protocol, ages ranging from 76 to 95 years with dementia	Single-blinded, cross-over design	Cornell Scale for Depression in Dementia; Rating for Anxiety in Dementia scale; MMSE; Clinical Dementia Rating scale, staff-interviews	The findings reported by participating residents, their relatives, and nursing home staff members were overwhelmingly positive, and the majority would recommend intervention for other residents with dementia

(Continued)

Table 1 (Continued)

Author/date/location	Aim	Sample/settings	Methods	Assessment tool	Key findings
	by family members and required minimal support, even for residents with moderate degrees of dementia				
Edwards ¹⁷ /May 2015/Europe	Relates how Music Mirrors, simple digital resources can be used to help and stimulate those with dementia, whether by encouraging engagement or by sparking personal memories	1 male with history of a stroke that left him with severe brain damage	Retrospective	Music Mirrors	Music Mirrors is an intervention as a simple way to record signs of our lives so that other can find us later and help to keep our memories and feelings alive
Eggert et al ¹⁸ /2015/USA	Explore how exposure to preferred music and nature images affect engagement, cognitive ability, and dementia-related disorder behavior such as agitation for those diagnosed with AD and other dementias	300 residents including a maximum of 48 individuals in assisted living, 24 in Memory Care, and 44 receiving short-term rehabilitation and long-term care	Quasi-experimental, nonrandomized controlled, interrupted time series	Cohen-Mansfield Agitation Inventory; Individualized Dementia Engagement and Activities Scale; Montreal cognitive Assessment; MMSE; pre-test and post-intervention test	Music and nature images are effective positive distractions for reducing anxiety or stress using environmental features or conditions as mature images have proven to be effective in reducing stress in health care settings and controlled laboratory setting plus the use of preferred music has shown to be effective in reducing agitation and improving mood during bathing
Fu et al ⁴ /February 2018/USA	Assess the feasibility, acceptability, and impact of a 12-week group singing program on cognitive function, lung health, and QOL	49 participants from 3 senior communities aged >60 years, no self-reported dementia diagnosis	Quasi-experimental	Pre- and post-test surveys, pulse oximeter to measure O ₂ saturation	Group singing may promote memory, language, speech information processing, executive function, and respiratory strength
Gill and Englert ¹⁹ /October 2013/USA	Test the hypothesis that music will reduce falls in institutionalized persons with dementia	55 participants aged 65–90 years in a dementia unit over 4-month time frame; all participants have some form of dementia	Quasi-experimental, 1-group time-series	Medical records	No significant difference in fall reduction
Gök Ugur et al ²⁰ /July 2017/Turkey	Determine the effect of music therapy on depression and physiological parameters in elderly people living in a Turkish nursing home over 8-week time frame	64 elderly people currently residing in a nursing home	Randomized controlled trial, single-blind	Pre- and post-test data, GDS, and physiological parameters measuring BP and HR	Music therapy decreased the depression level and blood pressure

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Table 1 (Continued)

Author/date/location	Aim	Sample/settings	Methods	Assessment tool	Key findings
Hamilton et al ²² /May 2013/USA	Explore how religious songs were used to cope with stressful life events and to explore the religious beliefs associated with these songs	65 African American men and women aged ≥ 50 years	Cross-sectional	Survey and interview results	Religious songs improved mental health, QOL, and socialization
Johnson et al ²³ /April 2013/Finland	Examine the relationship between perceived benefits associated with choral singing and QOL among community-dwelling older adults	117 adults aged ≥ 65 years	Cross-sectional	WHOQOL-BREF questionnaire	Choral singers reported few symptoms of depression and high overall QOL and health satisfaction
Kerer et al ²⁴ /December 2013/Austria	Test and analyze explicit memory of participants to music in different stages of early dementia in terms of identification of familiar music excerpts	43 participants aged ≥ 60 years, 23 participants had AD or mild cognitive impairment	Interrupted time series, quasi-experimental	Mini mental state examination, verbal and figural memory test	Mild cognitive impairment and patients with AD showed significantly poorer performances in tasks requiring verbal memory of musical excerpts than healthy participants
Kirkland et al ²⁵ /January 2015/Canada	Analyze the outcomes of a co-led combined spiritual care and music therapy. Also, to identify useful intervention strategies by defining meaning and significance of the group	12 long-term care residents aged 52–99 years	Mixed methods	Dementia care mapping, observation, videotaping, and interviews	Residents' experiences increased social involvement, identify, attachment, and a connectedness to their spiritual beliefs
Lancioni et al ²⁶ /February 2013/Italy	Assess the impact on the social capabilities of patients with AD with active, compared to passive music conditions	10 patients with moderate to high stages of Alzheimer's, aged 78–84 years	Interrupted time series	MMSE, observations, Hamilton Rating Scale, and the GDS	An active music stimulation can be an effective and socially preferable way to obtain positive participation from patients with AD, but they were not able to activate the music on their own
Liao et al ²⁷ /February 2018/China	Determine if the combination of music and Tai Chi (motion) would have a positive effect on elderly persons with depression	107 participants with GDS scores of 11–25 years, aged >60 years, residing in community for 1 year, and adequately alert to complete intervention	Two-armed randomized controlled, cross sectional	Split-Plot ANOVA used to identify changes in depression	Use of Tai Chi in combination with music therapy significantly lowered depression scores and is a viable non-pharmacological intervention

(Continued)

Table 1 (Continued)

Author/date/location	Aim	Sample/settings	Methods	Assessment tool	Key findings
Liu et al ²⁸ /2015/USA	Compare music therapy referral reasons and delivery for hospice patients living in skilled nursing facilities compared to home	2,930 patients living in nursing homes and 1,837 living at home who were seeking hospice services	Retrospective	Medical records	The referral reasons for music therapy were different based on the location of care and diagnosis and individual care plans need to be created
Matto et al ²⁹ /2015/USA	Evaluate the results from music, imagery, and movement when introduced into a long-term facility for persons with impaired cognition and depression	Two groups of 10 participants each with MMSE with cognitive scores between 17 and 30 and with depression based on the (GDS over 3 months)	Two-armed randomized controlled	MMSE, Mini-Cog, which is used to assess cognition and the Generic Depressive Scale	Introducing music, imagery, visual expression, and movement increased cognition scores, and significantly lowered depression scores
Melhuish et al ³⁰ /2017/UK	Evaluate the attitudes and perceptions of staff who participated in music therapy and dance movement therapy with dementia patients in a nursing home	8 of 34 staff members were chosen for the study. 12 men and 18 women with an average age of 76 years and diagnosed with dementia in 90% of cases	Two-armed randomized controlled	In-depth interviews were conducted with 7 of the 8 staff members. Interpretive phenomenological analysis was used to analyze the data	Both interventions, music therapy and dance movement therapy, had a parallel positive effect in the way the staff were able to discover the skills and feelings of the participants and had a positive influence in providing a meaningful care environment
Onieva-Zafra et al ³¹ /January 2018/Spain	Investigate the effect of an 8-week nursing intervention using reminiscence therapy and reality orientation to determine if there would be a positive effect on anxiety and depression for patients with dementia	19 participants with a diagnosis of AD, aged >65 years, and able to communicate in a nursing home	Quasi-experimental, nonrandomized controlled, interrupted time series	Questionnaires; state examination; pre-test and post-intervention tests	Depression symptoms can be reduced in patients with AD after a twice-weekly, 8-week music intervention program
Raglio et al ³² /2015/Italy	Assess the effects of active music therapy and individualized listening to music on behavioral and psychological symptoms of dementia	120 participants with moderate to severe dementia were randomly selected for 1 of 3 treatments	Non-randomized controlled	Cornell Scale for Depression, Cornell-Brown Scale for QOL and Music Therapy checklist before and after treatment and after a follow-up period	The addition of music therapy and listening to music did not show positive improvement in patients with dementia, although it did have a very small effect on communication and relationships
Ray et al ³⁴ /November 2017/USA	Describe music assisted care of people with dementia for caregivers, which will lessen agitation and anxiety especially during bathing	1 participant with dementia who has a history of anxiety and agitation when bathing over a period of 30–60 minutes	Quasi-experimental	Direct observation by care givers that had worked with participant prior to the intervention with music	Music-assisted bathing can lessen the aggressive and agitated behaviors during and just prior to bathing in people with dementia

(Continued)

Table 1 (Continued)

Author/date/location	Aim	Sample/settings	Methods	Assessment tool	Key findings
Ray et al ³⁴ /2017/NY, USA	Evaluate whether the effects of music therapy influence the symptoms of depression, agitation, and wandering for patients with severe dementia	132 participants with moderate to severe dementia in 3 nursing homes in Brooklyn, New York	Quasi-experimental, nonrandomized controlled, interrupted time series	Cornell Scale of Depression, the Algase Wandering Scale, and the Cohen Mansfield Agitation Inventory	Depression and agitation symptoms decreased, and the symptom of wandering showed no change for sessions three times a week over 2 weeks
Ridder et al ³⁵ /2013/ Europe	Examine the effect of individual music therapy on agitation in people with dementia living in nursing homes and to see the effect of music on psychotropic medication and QOL	42 participants with dementia in 14 nursing homes in Denmark and Norway	Exploratory, randomized controlled, crossover	Skilled nursing facility reported data; pre-test and post-intervention tests	Six weeks of music therapy prevents medication increases and reduces agitation disruptiveness in people with dementia
Solé et al ³⁶ /2014/ Spain	Evaluate the effect of group music therapy on QOL of people with dementia in a nursing home and identify and analyze changes based on participation	16 participants with dementia in a nursing home in Spain	Exploratory, nonrandomized controlled	Direct observation; pre-test and post-intervention tests; staff-reported data	Significant improvement for emotional well-being but no significant difference in QOL. Interpersonal relations were worsened and there was a high level of participation in the program
Tai et al ³⁷ /June 2015/ Taiwan	Identify the effect of music therapy on depression and cognitive function in residents of senior citizen apartments	A control group of 19 participants and intervention group of 41 participants – all healthy senior apartment residents aged ≥ 65 years	Experimental, interrupted time series	State examination; pre-test and post-intervention tests	Music therapy may postpone cognitive decline and intense contact with participants may improve mood
Thomas et al ³⁸ /April 2017/USA	Compare resident outcomes with the implementation of an individualized music program that was created to address psychological and behavioral symptoms in patients with dementia	12,905 participating facilities and 12,811 comparison facilities across the USA who implemented the Music and Memory program	Retrospective	Minimum data set information	The individualized music program may result in a reduction of anxiolytic medication use and antipsychotic medication use, as well as reduce psychological and behavioral symptoms
Verrusio et al ³⁹ /June 2014/Italy	Evaluate the impact of music therapy and physical training in participants with depression	A control group of 12 participants and an intervention group of 12 participants	Randomized controlled	Pre-test and post intervention tests; medical record data	In the exercise/music therapy group, there was a reduction in anxiety and depression
Werner et al ⁴⁰ /September 2015/ Germany	Examine the effect of interactive group music therapy vs recreational group singing on depressive symptoms in nursing home patients	117 residents in 2 German nursing homes	Two-armed randomized controlled, cluster design	Direct observation; pre-test and post-intervention tests	Music therapy decreases depressive symptoms more effectively than recreational singing

Abbreviations: AD, Alzheimer's disease; GDS, Geriatric Depression Scale; QOL, quality of life; MM, music with movement; MMSE, Mini-Mental State Examination.

scores, high Geriatric Depression Scale scores, mild to severe dementia, and Alzheimer's disease.

Assessment tools

A summary of all 30 articles utilized in the qualitative analysis is found in Table 1. The authors carefully examined the 30 articles and detailed outcomes for residents in nursing homes using music therapy. Each factor was then sorted into positive facilitators or negative barriers and themes were assigned to each point (Table 2). A total of 13 facilitator themes and 11 barrier themes were identified.

Discussion

Elderly people living in long-term care facilities face cognitive and physical health difficulties which can create challenges for caregivers, loved ones, and health care professionals. Incorporating music can be a simple and effective approach for professional caregivers giving them an additional tool in their efforts to reduce anxiety, feelings of isolation, behaviors, physical decline, and reliance on antipsychotic medications. All stakeholders can benefit from a calmer and more supportive social environment where caregivers may regain valuable time otherwise lost to behavior

Table 2 Positive outcomes for residents in nursing homes using music

Author	Facilitator	Theme	Barrier	Theme
Altan Sarikaya and Oguz ¹²	Passive music therapy helped elderly people increase sleep quality	Improved sleep hygiene	Passive music therapy cannot be isolated alone as that which increased sleep quality	Cannot isolate effects of music
Cheung et al ¹³	Music interventions are thought to be useful in reduction of anxiety based on Progressively Lowered Stress Threshold Model	Reduced anxiety or stress	The postulation of reduction of anxiety and depressive symptoms can improve cognition was not confirmed through analysis	Difficult to measure changes in memory and cognition
Clements-Cortes ¹⁴	Singing in the choir facilitated by a music therapist and accompanist was a beneficial intervention for improving mood, happiness, and energy	Positive mood changes	Extenuating factors that may have caused anxiety and rather than show the music therapy was being effective in producing positive results	Cannot isolate effects of music
Davidson et al ¹⁵	A singing program can provide positive social, musical, physical, and emotional experiences	Improved QOL or well-being	Singing programs are dependent on satisfactory financial support	Cost prohibitive
	The singing program highlighted the social elements such as isolated residents participating in the activity	Increased socialization or communication		
Davison et al ¹⁶	Memory boxes (visual with music accompanying video) are recommended for residents with dementia	Improved cognition	It is unsure if residents heard memory box for the duration played because they could leave their room	Difficult to implement
	This study showed positive effects for adults with dementia by reducing agitation	Dementia/Alzheimer's care	It is expensive to produce the memory box	Cost prohibitive
	Materials from the distant past provide pleasure and provide positive exchanges both with family and staff members	Increased socialization or communication		

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
Edwards ¹⁷	Music Mirrors toolkit is utilized to speak to individuals with dementia	Increased socialization or communication	Music is embedded in narratives	Cannot isolate effects of music
	Music Mirrors toolkit can be utilized in care plan	Personalized care plan		
Eggert et al ¹⁸	Approaches with nature images and music used on AD or other dementias led to increased engagement and reduced disordered behaviors	Reduced agitation or behavior problems	Half of the participants in music therapy in addition to the study approaches	Cannot isolate effects of music
Fu et al ⁴	Participants had improved cognition following 12-week group singing sessions	Improved cognition	Singing sessions did not necessarily improve sleep quality, sleep duration, sleep efficacy, and sleep disorder	QOL or well-being not significantly improved
	Participants reported increased respiratory strength and health	Improved physical health		
	Participants had increased socialization during and after group sessions	Increased socialization or communication		
Gill and Englert ¹⁹	Autonomic responses were in sync with melody and music	Improved physical health	There are reasons to believe that falls are somewhat seasonal, and music might have an impact with further research	Showed aspects of physical health decline
Gök Ugur et al ²⁰	Music decreased the symptoms of depression	Reduced depression	Music did not have any effect on ventilator residents' heart rate or blood pressure	Showed aspects of physical health decline
	The study also found that music lowered blood pressure and heart rate	Improved physical health		
	Participants reported an increase in self-confidence and coping mechanisms	Reduced agitation or behavior problems		
Gopi and Preetha ²¹	Music decreased depression	Reduced depression	Participants excluded those who are being treated for mental health issues, and those who have a chronic medical condition	Applies to specific population only
Hamilton et al ²²	QOL was improved with spirituality	Improved QOL or well-being	Participants were already from religious organizations and already well socialized within religious or spiritual groups	Applies to specific population only
	There was a decrease in mental health issues when religious music was part of one's life	Increased spirituality		

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
	Religious music helped lessen the effect of stressful life events	Reduced anxiety or stress		
Johnson et al ²³	The participants reported a higher QOL of those that participated in the group singing sessions	Improved QOL or well-being	The researchers found that QOL decreased with age, regardless of group singing sessions	Cannot isolate effects of music
	There was a decrease in physiological functions within those in group singing sessions	Improved physical health		
	Participants were living in a culture where choral singing is popular	Increased socialization or communication		
	The study found that the participants had improved socialization following sessions	Increased socialization or communication		
	Participants reported a decrease in symptoms of depression and isolation	Reduced depression		
Kerer et al ²⁴	There was a decrease in physiological functions, such as lower heart rate and blood pressure, while listening to music	Improved physical health	It is difficult to measure memory function in those with AD	Difficult to measure changes in memory and cognition
	There was reported increase in memory performance in the test group	Improved cognition		
Kirkland et al ²⁵	Music made dementia residents feel socially connected	Increased socialization or communication	This study did not give participants with dementia time to build rapport with the researchers	Decreased socialization
	The music caused dementia residents to feel a spiritual connection to a higher power	Increased spirituality		
Lancioni et al ²⁶	There was positive participation when music, and specifically favorite songs, were played	Increased socialization or communication	Participants were unable to utilize the ability to self-regulate the use of music when made available	QOL or well-being not significantly improved
			There was no improvement in participation when Alzheimer's participants had the ability to control when they listened to music	QOL or well-being not significantly improved
Liao et al ²⁷	The depressive symptoms among community dwellers were suppressed with the combination of music and Tai Chi	Reduced depression	The benefit of Tai Chi remains controversial. Those differences may be attributed to population characteristics	Applies to specific population only

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
	The limbic system is positively affected by musical pitch and rhythm	Improved physical health		
Liu et al ²⁸	Music provides spiritual support for patients and family	Increased spirituality	Treatment plans need to be tailored to patients with different primary diagnoses, referral reasons, and personal characteristics. Decisions regarding music therapy should be made by both the family and the patient	Difficult to implement
	Emotional and spiritual support is the number one reason patients who choose hospice services	Increased spirituality	Data could not determine if music therapy is both cost effective or time prohibitive	Cost prohibitive
			After a 6-week follow up, patients regressed slightly back to pretreatment results	Positive improvements were only temporary
Matto et al ²⁹	This study showed a statistically significant reduction in depression	Reduced depression	Initially some participants hesitated to participate, or they did not add to the conversation as the words did not come out	Decreased socialization
	Patients showed a slight increase in cognitive scores	Improved cognition		
	Patients enjoyed remembering, recognizing, and expressing what they were feeling when listening to music	Positive mood changes		
	Patients felt more supportive and expressive	Positive mood changes		
	Patients learned about other peers and felt more connected with the community	Increased socialization or communication		
	Individuals had a reduction in agitation	Reduced agitation or behavior problems		
	Music helps a person organize external sensory stimuli in familiar ways, as opposed to being overwhelmed with unfamiliar external sensory stimuli	Improved cognition		
	Relationships within group activities can reduce pain, improve mood and well-being	Improved QOL or well-being		

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
Melhuish et al ³⁰	Music can help the staff understand the residents' emotional experience and develop more positive and interactive relationships with them	Increased socialization or communication	It was hard to coordinate staff participants with changing schedules	Difficult to implement
Onieva-Zafra et al ³¹	Reduction of depression symptoms in patients through 2 interventions per week	Reduced depression	There were no significant changes in symptoms of anxiety	No difference or an increase in anxiety or agitation
	Easy to implement by a typical nursing team working in a nursing home (once the relevant skills and knowledge to conduct music, reminiscence therapy, and reality orientation are acquired). The nurse should be the principal contact in music therapy	Personalized care plan		
	Depressive symptoms were lessened in patients with AD	Dementia/Alzheimer's care		
Raglio et al ³²	The increase in communicative musical behaviors may be related to changes in emotional involvement during the music therapy sessions	Increased socialization or communication	No significant differences were observed between persons with dementia who were treated with music therapy in addition to standard care	QOL or well-being not significantly improved
	The goal of music therapy is to bridge the communication gap between staff and persons with dementia	Increased socialization or communication		
Ray and Fitzsimmons ³³ (first article)	Music-assisted bathing made shower times easier for people with dementia	Positive mood changes	The wrong kinds of music or volume can have adverse effects on participants	Negative emotions from music could occur
	Research shows that it is important to pay attention to verbal and nonverbal responses to music, adjusting where necessary	Increased socialization or communication		
	Music-assisted care may address neuropsychiatric symptoms of dementia by reducing agitation and improving mood	Increased socialization or communication		
Ray and Mittelman ³⁴ (second article)	Interventions reduced systems of depression and agitation	Reduced agitation or behavior problems	Music did not reduce the symptom of wandering	QOL or well-being not significantly improved

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
	Effects of music therapy reduced the symptoms of dementia better than the effects of medication	Improved physical health	1 month after the intervention, improvements began to dwindle	Positive improvements were only temporary
	Rhythm and physically based music programs significantly affected behaviors impacted by dementia	Positive mood changes		
	Participation in music therapy and gentle movements can decrease neuropsychiatric behaviors considered to be negative	Reduced agitation or behavior problems		
	Effects of music therapy can affect symptoms in as little as 2 weeks	Positive mood changes		
Ridder et al ³⁵	Music therapy reduces agitation disruptiveness in persons with dementia	Reduced agitation or behavior problems	Music therapy requires interdisciplinary collaboration to be successful	Difficult to implement
	Music therapy prevented psychotropic medication increases	Reduced medicine intervention	Decreases in the frequency of agitated behavior were non-significant when music therapy was used	No difference or an increase in anxiety or agitation
	The music therapy was person-centered and catered to the participant's interests	Personalized care plan		
	Music therapy helped prevent caregiver burnout and stress	Reduced anxiety or stress		
Solé et al ³⁶	Music therapy showed significant improvement for emotional well-being	Improved QOL or well-being	Participants experienced a significant worsening for interpersonal relations	Decreased socialization
Tai et al ³⁷	Music intervention may postpone cognitive decline	Improved cognition		
	Intense contact with other people seemed to improve the mood status of the participants	Increased socialization or communication		
Thomas et al ³⁸	Individualized music program (music and memory) reduces in antipsychotic and anxiolytic medication use	Reduced medicine intervention	No differences were observed in symptoms of depression using the individualized music program	No difference or an increase in depression
	Reductions in behavioral disturbance presence and frequency associated with dementia	Reduced agitation or behavior problems	There are extra costs for implementing the program including iPod and music purchases and staff training	Cost prohibitive
	The music program was effective for dementia participants	Dementia/Alzheimer's care		

(Continued)

Table 2 (Continued)

Author	Facilitator	Theme	Barrier	Theme
Verrusio et al ³⁹	Exercise and music therapy reduces symptoms of depression	Reduced depression	Music therapy may need exercise to be most effective	Cannot isolate effects of music
	Exercise and music therapy reduces the symptoms of anxiety	Reduced anxiety or stress		
	Music genres were chosen based on participant interest which was beneficial	Personalized care plan		
Werner et al ⁴⁰	Depressive symptoms improved when participants were assigned to music therapy (6 weeks, 12 weeks)	Reduced depression	Recreational singing increased symptoms of depression	No difference or an increase in depression
	Music therapy was effective in patients with and without dementia	Dementia/Alzheimer's care		
	Music therapy attends to basic needs and resource-oriented development by focusing on social competences and individual competences like creativity	Personalized care plan		

Abbreviations: AD, Alzheimer's disease; QOL, quality of life.

management actions and other behavior issues. A review of the literature found that music positively impacts physical and mental health factors.

Thirteen facilitator themes were identified that occurred 66 total times within the review of the literature. Their description, occurrence, sum, and frequency percentages are shown in Table 3. The most common facilitator for the impact of music on physical and mental health factors was increased socialization or communication in 18.18% of articles reviewed.^{4,15-17,23,25,26,29,30,32,33,37} The importance of socialization and communication was described as intense contact with other people, which seemed to improve the mood status of participants.³⁷ Participants were shown to have increased socialization before and after group singing sessions.⁴ The introduction of music and reminiscent memories provided positive exchanges between participants, family members, and staff members,¹⁶ and the use of music caused residents with dementia in a nursing home feel socially connected.²⁵

Other articles suggest that music improved physical health.^{4,19,20,23,24,27,34} Improvements in physiological functions such as decreases in heart rate and blood pressure, coupled with improved respiratory rates, were a few of the recurring themes within the discussion of physical health.^{19,20,23,24}

Reduced depression was a theme in 12.12% of the articles.^{20,21,23,27,29,31,39,40} Two separate studies utilized pre- and post-test results of depressive symptoms and found that reported depressive symptoms significantly improved following the implementation of music.^{4,29} Actively utilizing music as an approach to behavior management of depressive symptoms can be useful in the nursing facility setting.^{21,23}

Researchers found that music reduced agitation and behavior problems in residents with dementia, Alzheimer's, or mild cognitive deficits.^{18,20,29,34,35,38} Two studies demonstrated the positive effects of providing agitated long-term care residents a therapeutic outlet, such as music and singing with implications for health care professionals to consider nonpharmacological treatments.^{34,35}

Another facilitator was improved cognition.^{4,16,24,29,37} Mini-Mental State Examination (MMSE) scores improved after the music, imagery, and movement treatment intervention in one study was implemented in a long-term care facility for persons with a dementia diagnosis.²⁹ Also, MMSE pre- and post-test scores showed improved cognition²⁹ and music use may even postpone cognitive decline in the therapeutic-music experimental group vs the MMSE scores of the control group.³⁷

Table 3 Facilitator themes associated with positive outcomes using music in nursing homes

Facilitator themes	Occurrences	Sum	%
Increased socialization or communication	4, 15, 16, 17, 23, 25, 26, 29, 30, 32, 33, 37	12	18.18
Improved physical health	4, 19, 20, 23, 24, 27, 34	7	10.61
Reduced depression	20, 21, 23, 27, 29, 31, 39, 40	8	12.12
Reduced agitation or behavior problems	18, 20, 29, 34, 35, 38	6	9.09
Improved cognition	4, 16, 24, 29, 37	5	7.58
Improved quality of life or well-being	15, 22, 23, 29, 36	5	7.58
Personalized care plan	17, 31, 35, 39, 40	5	7.58
Reduced anxiety or stress	13, 22, 35, 39	4	6.06
Dementia/Alzheimer's care	16, 31, 38, 40	4	6.06
Positive mood changes	14, 29, 33, 34	4	6.06
Increased spirituality	22, 25, 28	3	4.55
Reduced medicine intervention	35, 38	2	3.03
Improved sleep hygiene	12	1	1.52
Total		66	

Other facilitators suggest that music improved participants' QOL or well-being.^{15,22,23,29,36} One study evaluated the effect of singing programs developed specifically for older adults and discovered that these programs had a positive impact upon the well-being and QOL of the participants. The group singing program facilitated a new sort of experience that participants reported looking forward to.¹⁵

Evidence also showed that utilizing personalized care plans as behavioral interventions in nursing facilities was effective.^{17,31,35,39,40} This is significant for long-term care facilities that utilize an interdisciplinary approach to nonpharmacological-based interventions to behavior management.

A reduction in anxiety or stress occurred in 6.06% of studies reviewed.^{13,22,35,39} Results found that the music therapy group reported positive effects and a reduction on their overall level of anxiety over a 6-month time frame vs the group that began pharmacological interventions for their anxiety and did not participate in a music therapy group.³⁹ Caregivers are at risk of burnout when behaviors in a clinical setting are not managed, and when it feels as though all interventions have been put in place. Utilizing music as an intervention has shown to decrease not only the anxiety and stress of the residents but also the overall anxiety and stress level of those caring for them.³⁵ The Minimum Data Set was used to evaluate these changes in symptoms of anxiety and stress. Music was found to have overall significant positive changes for caregivers when caring for those with dementia and Alzheimer's due to the decrease in behaviors, anxiety, stress, and stimulation.^{16,31,38,40}

Music use was also associated with positive mood changes.^{14,29,33,34} Both participants with cognitive

impairments and those without were found to have more positivity, reported happiness, increased energy, and a feeling of connectedness with others when involved in a choir directed by a music therapist.¹⁴ Patients enjoy remembering, recognizing, and expressing the feelings associated with music and they found a way to be more expressive toward caregivers and loved ones.²⁹ Whereas some studies discovered that music takes time to improve mood, one found that music can positively affect mood and behaviors in as little as 2 weeks.³³

Music and spirituality have long been associated with each other and a couple of studies explored the connection.^{22,25,28} One study suggests that spirituality transcends the biological and psycho-social, which is especially important for those with dementia in that dementia threatens one's personhood and loss of self.²⁵ The incorporation of religious songs into spiritual care interventions may allow someone living in a community to feel connected not only to a higher power but also to those participating in the spiritual music rituals as well.²²

Listening to or participating in singing and music has positive physical and mental outcomes in that there was a reduction in the use of antipsychotics and anxiolytic medications.^{35,38} This is especially important for nursing facilities not only to manage the overall health and well-being of their residents but also to follow regulatory guidelines showing strict adherence to psychotropic dose reductions and interventions for behavior management. One study found a decrease in usage of both anxiolytic and antipsychotics following the implementation of music and memory programs, offering a low-cost non-pharmacological solution to a growing trend in the USA.³⁸

Passively listening to music at bedtime may improve sleep hygiene in those with severe memory problems. Significant improvements within the group that listened to music while trying to fall asleep and that they were found to have better sleep quality, duration, and efficiency.¹²

Eleven barrier themes were identified regarding the effect that music has on mental and physical health as shown in Table 4. A review of the literature identified that 25.71% of studies found that the most prevalent issue surrounding this topic was that research cannot isolate the effects of music.^{12,14,17,18,21–23,27,39} Research barriers found that extenuating circumstances may mitigate the results found in studies such as sleep quality due to existing sleep patterns or clinical issues.¹⁷ Stimulation outside of music intervention may have caused more anxiety for those in a nursing facility and these residents may find themselves over-stimulated by instruction.¹⁸ One study excluded participants with mental health issues or a chronic medical condition. Excluded groups could have been utilized to determine further if physical and/or mental health could be improved through interventions, however they were not included.²¹ One study gathered participants from a religious organization who were already well socialized and well connected.²³

Music intervention was found to be cost prohibitive in some cases.^{15,16,28,37} Costs accrued may be equipment such as iPods and required staff training,³⁷ or digital Music Memory Boxes.¹⁶ Data were not available as to whether hiring a music therapist was cost effective in the long run.²⁸

Another barrier to implementing music is that the program may be difficult to implement.^{16,28,30,35} Two studies suggested that music therapy requires interdisciplinary collaboration to be successful,³⁵ which is difficult due to shifting staff schedules.¹⁶ Also, decisions need to be made with the

clinical team, the resident, and their representative which takes organization, time, and follow through.²⁸

QOL and well-being were not significantly improved when music intervention was implemented in 11.43% of the studies.^{4,26,32,34} Pre- and post-test interviews did not find that QOL was improved following a 12-week group singing program.⁴ No significant differences were observed in one study exploring therapeutic music activities in addition to standard nursing home care of persons with dementia.³² Wandering residents were not affected by music, and their QOL and well-being did not change in an observational study that implemented music and iPod therapy.³⁴

Three studies demonstrated that music decreased socialization.^{25,29,36} Participants with cognitive deficits were not given enough time to build rapport with the researchers²⁵ or the participants were unable to communicate their thoughts and feelings.²⁹ One study found that participants with cognitive impairments experienced significant worsening of interpersonal relations due to the stimulation and stress or music and physical movement.³⁶

Another barrier to determine the physical and mental health benefits of music is the difficulty in measuring changes in memory and cognition in a sample of participants who have deficits in memory and cognition.^{13,24} It is very difficult to measure self-reported changes in cognition when one is already cognitively impaired with a dementia or Alzheimer's diagnosis. Studies put excessive demands on subjects' memory and ability to verbalize their thoughts and feelings.²⁴

Two different studies show that there was no difference or an increase in anxiety or agitation^{31,35} or that there was no difference or an increase in depression.^{38,40} An increase in depression was found in one study utilizing recreational group singing because participants had trouble following

Table 4 Barrier themes associated with negative or null outcomes using music in nursing homes

Barrier themes	Occurrences	Sum	%
Cannot isolate effects of music	12, 14, 17, 18, 21, 22, 23, 27, 39	9	25.71
Cost prohibitive	15, 16, 28, 37	4	11.43
Difficult to implement	16, 28, 30, 35	4	11.43
Quality of life or well-being not significantly improved	4, 26, 32, 34	4	11.43
Decreased socialization	25, 29, 36	3	8.57
Difficult to measure changes in memory and cognition	13, 24	2	5.71
No difference or an increase in anxiety or agitation	31, 35	2	5.71
No difference or an increase in depression	38, 40	2	5.71
Positive improvements were only temporary	28, 34	2	5.71
Showed aspects of physical health decline	19, 20	2	5.71
Negative emotions from music could occur	33	1	2.86
Total		35	

along with the instructions either due to existing physical or mental impairments, which led to feelings of frustration and hopelessness.³⁵

Positive improvements of physical and mental health due to music were found to be temporary.^{28,34} One study found that the benefits of music dwindled a month after the initial implementation,³⁴ and the other study found that 6 weeks following the study yielding positive results, residents were found to have regressed to pre-test levels of physical and mental health.²⁸

Another barrier to utilizing music is that some studies showed aspects of physical health decline.^{19,20} More falls happened during and after music were played in those with dementia, which researchers felt was attributed to sensory overload.¹⁹ One study suggests that music and singing increased heart rate and respiration for those participating in group singing exercises.²⁰ The wrong type of music or volume showed that negative emotions from music could occur.³³

Limitations

This review had a limitation in that the term music was open to interpretation of the reviewers and researchers alike. The date range for the article search criteria allowed the reviewers to go back 5 years, which examined older adults in that timeframe. The articles identified different age groups as elder adults, making it difficult to identify whom exactly is considered the older adult age. This is seemingly interpreted differently by different researchers.

Conclusion

The results of the recent research on the relationship between music and positive mental and physical health outcomes are significant. The positive effects include improved mood, cognition, physical health, QOL and well-being, spirituality, sleep, increased socialization, and communication. There is also evidence of reduced depression, anxiety, stress, agitation and behavior problems, as well as fewer medical interventions. Music has an integral part in elder care and studies continue to show its relevance.

Analysis of music used in nursing facilities has several positive outcomes including but not limited to reduced depression, reduced agitation, improved cognition, improved QOL and well-being, and positive mood changes. Most articles noted that larger samples and/or additional studies would need to be conducted to help correctly identify and pinpoint the aspects that are beneficial to the nursing facility residents. The barriers and limitation identified are not necessarily negative aspects of the review but also include areas that

need to be evaluated and augmented for future studies. The data collected in this review support that incorporating music improves the QOL in the elder population; therefore, music should be a component of elder care in nursing facilities.

Author contributions

All authors contributed toward data analysis, drafting and revising the paper, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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