Philadelphia College of Osteopathic Medicine
DigitalCommons@PCOM

PCOM Physician Assistant Studies Student Scholarship | Student Dissertations, Theses and Papers

2012

Is Music Therapy Effective in Improving the Quality of Life in Dementia Patients?

Tricia Gilson
Philadelphia College of Osteopathic Medicine, triciagi@pcom.edu

Follow this and additional works at: http://digitalcommons.pcom.edu/pa_systematic_reviews

 Part of the Medicine and Health Sciences Commons

Recommended Citation

Gilson, Tricia, "Is Music Therapy Effective in Improving the Quality of Life in Dementia Patients?" (2012). *PCOM Physician Assistant Studies Student Scholarship*. Paper 89.

This Selective Evidence-Based Medicine Review is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Physician Assistant Studies Student Scholarship by an authorized administrator of DigitalCommons@PCOM. For more information, please contact library@pcom.edu.

Is music therapy effective in improving the quality of life in dementia patients?

Tricia Gilson, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
Philadelphia, Pennsylvania

December 16, 2011

ABSTRACT

OBJECTIVE:
The objective of this selective EBM review is to determine whether or not music therapy is effective in improving the quality of life in dementia patients.

STUDY DESIGN:
Review of three English language primary studies published between 1996 and present.

DATA SOURCES:
Randomized, controlled clinical trials (RCTs) analyzing music therapy and dementia were found using PubMed and OVID.

OUTCOMES MEASURED:
The main outcome measured was quality of life, which included depression, anxiety and cognitive change.

RESULTS:
Music therapy resulted in several beneficial effects for dementia patients including improvements in self-esteem, depressive symptoms, anxiety, depression, and cognitive change. Participants who attended ≥50% of live music therapy sessions in the Cooke et al study experienced improvement in self-esteem over time. Fewer depressive symptoms were reported in dementia patients, especially if they had attended music sessions. In the Guétin et al study, both anxiety and depression were significantly reduced in participants completing between four and sixteen weeks of receptive music therapy ($p<0.01$). These effects persisted for 8 weeks after cessation of intervention. When group music therapy was employed in the Bruer et al study, cognitive improvements were found in dementia-diagnosed subjects immediately following therapy (+2.00 points) and one day post intervention (+3.69 points) as evident by increased scores on the Mini Mental State Exam. One week post-intervention, no significant cognitive improvements remained.

CONCLUSIONS:
The results of these three clinical trials show that the use of music therapy can be effective in improving quality of life in some dementia patients. The implementation of music therapy into the lives of dementia patients may result in decreased levels of anxiety and depression, higher self-esteem, and increased levels of cognition up to one day after therapy. Although the data on the persisting effects of music therapy is variable, there is potential for music therapy to have effects on anxiety and depression for up to eight weeks following intervention.

KEY WORDS:
Music therapy, depression

INTRODUCTION

Dementia is a broad term encompassing several degenerative conditions that are defined by significant impairment of mental functioning. Loss of memory, changes in language, behavior and judgment typically lead to substantial impairment of daily functioning. While advancements in public health have been successful in lengthening our lifespan, this in turn has led to a marked increase in the population of people most susceptible to the disease, the elderly. Pharmacological therapy has been effective in controlling symptoms of dementia, but the associated side effects have lead patients and providers to desire alternative methods of treatment. This paper evaluated two RCTs with blinding of data collectors and one single-center, comparative, RCT with blinded assessment of results. Each study evaluated the effectiveness of music therapy in improving quality of life in dementia patients.

Each year, 4.6 million new cases of dementia are diagnosed[1]. Worldwide, 24.3 million people are affected by the disease, and that number is only expected to double by the year 2020[2]. These figures are especially staggering for Americans in Assisted Living, where half of residents suffer from dementia or some degree of cognitive impairment[3]. The cost stretches far beyond Assisted Living in the United States, amounting to $604 billion worldwide in the year 2010[4]. Average individual healthcare costs for people with dementia surpassed $33,000 in 2004, over three times the amount paid by people over 65yo without dementia[5]. This cost discrepancy is no surprise considering dementia patients have triple the amount of hospital stays as their non-affected counterparts and eight times more admissions to skilled nursing facilities than other Medicare holders[6]. Furthermore, for every 1,000 Medicare beneficiaries affected by dementia there are 828 hospital stays. Since this population is such high consumers of government-funded Medicare and Medicaid services, these programs take the brunt of the financial burden [5].

Much of the cost associated with having dementia is due to the overarching effects it has on mentation. Alzheimer's disease, the most common form of dementia, begins with damage to brain cells in the segment of the brain where new memories are formed[6]. With progression, symptoms of agitation, aggression, wandering, confusion and apathy result[1]. Later stages of the disease frequently require 24/7 care, as those affected become unable to perform daily activities such as bathing, eating and dressing. A diagnosis of dementia is given when a decline in memory and one of the following four disabilities is present: a) Failure to speak coherently or understand speech or written language b) Inability to recognize or identify objects despite intact sensation c) Inability to perform motor tasks, sensory function, or comprehension of the activity d) Lack of abstract thought, judgment, and ability to plan and complete complex tasks[6].

Currently, no cure exists for dementia; therefore treatment focuses on controlling the symptoms. Five U.S Food and Drug Administration-approved drugs have been found to halt the progression of symptoms in dementia patients for up to one year. However, these drugs are effective in only 50% of those who take them[6]. Often, memory loss, behavioral changes and sleep disturbances must be managed by separate treatments. Cholinesterase inhibitors and memantine are the only two drugs approved for the treatment of cognitive symptoms[7]. Cholinesterase inhibitors work by inhibiting the breakdown of acetylcholine, a chemical vital to learning and memory. Memantine, used in more severe forms of Alzheimer's disease, regulates the chemical messenger glutamate and delays declines in learning and memory. Potential side effects of these medications include nausea, vomiting, loss of appetite, altered bowel movements, headaches and dizziness.

Antidepressants, anxiolytics, and atypical antipsychotics are commonly used to treat the behavioral and psychiatric symptoms of dementia; however, none are specifically approved by

the FDA. An increased risk of stroke and death are associated with these medications, therefore their use is limited. Alternative treatments have been used to treat the side effects of dementia, however a lack of scientific research, uncertainty surrounding their purity, and adverse reactions have restricted the extent of their use[7].

Music therapy for the treatment of dementia is being proposed due to the side effects of pharmacological therapy and the weak evidence supporting alternative treatments. Specifically, it has been explored as a way to communicate to those with dementia who often lose the ability to understand and express language in other ways[1]. Research suggests that the specific area of the brain that is responsible for music comprehension persists even after all other functions, including verbal language, deteriorate[1]. Studies evaluating music therapy as an approach for improving cognition and behavior in dementia support the safety and efficacy of its use.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not music therapy is effective in improving quality of life (QOL) in patients with dementia. To date, recent RCTs have identified several positive effects of music therapy that have limited lasting effects[1]. Music therapy may be a safe therapeutic approach for demented patients experiencing behavioral disturbances and language deficits that interfere with their everyday life.

METHODS

The three studies analyzed in this review all met the following criteria. The population analyzed must consist of older males and females >60yo with a diagnosis of dementia. The intervention used in the study must consist of some form of music therapy. Comparison groups must include similar participants receiving either reading sessions or age-appropriate movies for the same length of time as the music therapy group. The outcomes measured include: QOL and

depression, anxiety and depression, and temporal limits of cognitive change. All of these have been assessed under one encompassing outcome: quality of life. The types of studies selected are all RCTs with blinding of data assessment or data collectors and "intention to treat" analyses. Two studies used a cross-overdesign and one study used a single-center, comparative design.

A detailed search of the PubMed, OVID and COCHRANE databases was completed by the author using the key words "dementia" and "music". Articles were selected based on their relevance to practice and importance to patient-desired outcomes (POEMs: Patient Oriented Evidence that Matters). All articles were published in peer-reviewed journals in English language. Inclusion criteria for article selection were as follows: RCTs published during or after 1996 with blinding of results and patient-oriented outcomes. Review articles, meta-analyses and systemic reviews posted on the COCHRANE database that answered the same question were excluded. Three RCTs were selected and included in this review based on these criteria. Table 1 displays the demographics and characteristics of these three articles. A summary of statistics reported or used include means, p-values, confidence intervals (CIs) and F-scores.

Table 1- Demographics & Characteristics of included studies

Study	***Type***	***# pts***	***Age***	***Inclusion Criteria***	***Exclusion Criteria***	***W/D***	***Interventions***
Bruer[3] 2007	RCT, cross-over design, blinded assessors; "intent to treat"	17	60+ ; mean 74.1	Dementia-diagnosed elderly pts on a geriatric ward in a psych hospital;	Non-elderly status (<60yo); severe hearing loss	0	8wk-45min group music therapy session using songs made popular when pts were 25yo
Guétin[2] 2009	Single-center, comparative RCT with blinded assessment of results and	30	70-95	M/F nursing home pts with mild-mod Alzheimer-type dementia; Baseline MMSE	Non-compliant; life-threatening illness; neuro d/o, stroke,	6	Weekly receptive music therapy streamlined through headphones:

	"intention-to-treat" analysis			score 12-25; Baseline HAS ≥12; Adequate verbal/written expression, visual/hearing abilities; Prior stable ACh tx for 6mo	Parkinson's dz, epilepsy, Lewy body dementia, hallucinations, unexplained confusion, vascular dementia, frontal dementia & psych d/o		1. 20-min musical sequence 2. relaxation stage 3. re-enlivening phase
Cooke[1] 2010	RCT cross-over trial with blinding of data collectors; "intention to treat"	47	65-95	M/F with early to mid-stage dementia; MMSE 12-24; features consistent with Alzheimer's-type dementia; Behavioral hx of agitation or aggression in last 6mo	None listed by author	0	A live group music program 3 mornings/wk for 8wks: 1. 30min of musician-led familiar song singing 2. 10min of pre-recorded instrumental music

OUTCOMES MEASURED

Outcomes used for analysis include temporal limits of cognitive change, quality of life, anxiety and depression. Cooke et al used the Dementia Quality of Life (DQOL) questionnaire and Geriatric Depression Scale (GDS) at baseline, mid-point and post-intervention with live music groups to assess QOL and depression. The Mini-Mental State Exam (MMSE) was also used to determine severity of depression at baseline and post-intervention. Guétin et al used the Hamilton Scale to evaluate anxiety and the GDS to determine depression following individual, receptive music therapy at weeks 4, 8, 16 and 24. Bruer et al assessed cognitive change before, immediately after and remotely after music therapy using the MMSE.

RESULTS

Three RCTs: two cross-over designs and one single-center study presented in this review, evaluated the efficacy of music therapy at improving QOL in dementia patients selected on the inclusion criteria found in Table 1. Similar settings were chosen for each sample of elderly patients. Trials were carried out with an intention-to-treat analysis of data and further served to determine the duration of the therapeutic effect. The primary outcomes of efficacy and duration of effect were reported as results in continuous data, rather than numbers-needed-to-treat, in all three studies.

In the Cooke et al randomized, controlled, cross-over study, live group music therapy was initiated in order to evaluate its effects on quality of life and depression in dementia patients. Forty-seven older males and females diagnosed with mid-stage dementia and a history of agitation/aggression were selected between two aged care facilities. Participants were randomized to either A) 40 minutes of a live group music program led by 2 musicians, or B) 40 minutes of an interactive reading session lead by a trained Research Assistant. The music program consisted of 30 minutes of music-led familiar song-singing with guitar accompaniment and 10 minutes of pre-recorded instrumental music listening. Reading sessions included short-stories, telling jokes, and reading local news stories. After 8 weeks of intervention, a 5-week washout period was implemented, after which participants crossed-over into the opposite arm of therapy. Quality of life and depression were evaluated at baseline, midpoint and post-intervention using the Dementia Quality of Life Scale (DQOL) and Geriatric Depression Scale (GDS). Severity of depression was assessed at baseline and post intervention using the Mini-Mental State Exam (MMSE). Significant findings emerged within two sub-analyses. First, QOL self-esteem scores showed a significant improvement in the 24 patients that attended ≥50% of

music sessions (F (2,46)=4.471, p<.05), especially from mid-point to post-intervention (3.36-3.75). Second, patients with scores >5 on the GDS were found to have a significant difference in depression scores over time (F (2,22)=8.129, p<.01), especially if they had been in the music therapy group (Table 2). In total, 8.7% of the data was found to be missing at random.

Table 2: Music vs. Reading Therapy: Depression Scores in pts with >5 on GDS (Cook et al)

Group	***# in study***	***Baseline***	***Mid-point***	***Post-intervention***
Music Group	12	9.00	6.20	4.40
Reading Group	12	7.71	6.71	4.43

In the Guétin et al single-center, comparative RCT, two main outcomes were assessed: 1) the effect of short and medium-term music therapy on anxiety in dementia patients, and 2) the lasting effect of music therapy on depression two months following discontinuation of the program. Two groups of 15 male and female subjects received either individual, personally-selected receptive music therapy or a rest and reading session. Music therapy was administered as a 20 minute 'U sequence' method which progressively led patients into a state of relaxation followed by a period of re-enlivening[2].The control group received reading and relaxation therapy under the same conditions and time intervals. Anxiety and depression were measured as study endpoints at weeks 1, 4, 8, 16 and 24 using the Hamilton Scale (ranging of 0-56) and the GDS, (max score 20) respectively. Significant findings emerged between the intervention and control group regarding depression and anxiety. As seen in Table 3, by the end of the 16-week intervention, anxiety scores for individuals in the music therapy group compared to the control group had significantly changed (p<0.001). This change correlated to a 60% improvement in anxiety symptoms in the music group versus a 4.8% improvement in the control group. Significant persisting effects were also noted at week 24 (p<0.002).

Table 3: Change in Anxiety Scores from D0-W16 + follow-up: Music Therapy vs. Control

Group	***D0***	***W16***	***W24***	***Approximate improvement D0-W16(points)***
Music Therapy	22 (±5.3)	8.4 (±3.7)	10.6 (±6.3)	13.2 (±5.2)
Control (reading/rest)	21.1 (±5.6)	20.8 (±6.2)	20.5 (±5.4)	0.9 (±7.4)

D0= baseline, Day 0; W16= endpoint, week 16; W24= follow-up, week 24

In the evaluation of the effect of music therapy on depression, significant findings between the two groups emerged by week 16 (p=0.002) and persisted through week 24 (p=0.03) (Table 4). Results correlated to a 47% improvement in depressive symptoms for the intervention group compared to a 1.7% improvement for participants in the control group. Two patients were lost from the intervention group and four patients were lost from the control group, however, all data was included in the intent-to-treat analysis.

Table 4: Change in Depression Scores over Time: Music Therapy vs. Control

Group	***D0***	***W16***	***W24***	***Approximate Improvement D0-W16 (points)***
Music Therapy	16.7 (±6.2)	8.9 (±3.3)	12.5 (±6.4)	7.7 (±4.6)
Control (reading/rest)	11.8 (±7.4)	11.2 (±6.1)	12.1 (±7.6)	0.2 (±4.4)

In the Bruer et al RCT with cross-over design and intent-to-treat analysis, the temporal limits of cognitive change were assessed in 17 dementia patients from an inpatient population at a geriatric service ward of a psychiatric hospital. Patients were randomly split into two groups and offered either group music therapy or an age-appropriate movie once a week. Serving as their own controls, participants were then offered the alternative therapy the following week. Music therapy followed the 'Reality Orientation Methodology' and consisted of popular songs from when patients were 25yo. Additional components of music therapy included instrument playing and a sing-a-long welcome song. Cognitive assessments were completed during the 8-

week study using the MMSE at baseline (Time 0: 10am Thursday morning), follow-up 1 (Time 1: 1 hour following therapy), and follow-up 2 (Time 2: 10am Friday the following morning). A significant decline in attendance from 79% in the first half of the study to 67% in the second half of the study occurred in dementia patients (p=.030). Music therapy resulted in significant improvement in cognitive scores for dementia patients vs. control subjects attending the movie (Table 5).

Table 5: Difference in Mean MMSE Scores for Dementia-Dx: Music Therapy vs. Control[3]

Time Period	*Mean MMSE*	*p-value*	*95% Confidence Interval*	*Z*	*p>|z|*
Time 1 (same day)	2.0002	.0463	0.0331-3.9673	1.99	.0463
Time 2 (next day)	3.6928	.0007	1.5524-5.8332	3.38	.0007
Time 3 (next week)	-0.2958	.5500	-1.2657-0.6741	-0.60	.550

DISCUSSION

Overall, these studies indicate that music therapy is effective at improving quality of life in dementia patients without the associated side effects of commonly-used medications. Although the term “quality of life” has been used in this review to represent several symptoms, the effect of music therapy may be applied only to those symptoms discussed in the three articles: depression, anxiety, and cognitive change.

Cognitive change, which is the most commonly reported side effect of dementia, was found to improve following music therapy in 1 of the 3 studies reviewed. In the Bruer et al study, MMSE scores significantly improved by 2.00 points on the same day following therapy and 3.69 points the day after therapy. These findings did not persist into the following week and indicate that music therapy may be beneficial for only a short period of time. While the remaining studies included assessment of MMSE scores from baseline to post-intervention as an additional

analysis, neither one found that music therapy had a significant effect on cognition. However, enough evidence exists in current literature to believe that potential effects are possible.

Depression, another common symptom of dementia, was evaluated in two studies. In the Guétin et al study, a significant decrease in depression scores occurred over time ($F(2,22)=8.129$, $p<.01$), however, this finding was limited to participants with a score >5 on the GDS and was also found in the reading therapy group. These findings may suggest that music therapy may only be effective in patients with actual depression opposed to depressive symptoms and that reading intervention may be just as effective as music therapy for treating depression. In Guétin et al, the music therapy group achieved a 47.1% improvement in depressive symptoms while the control group experienced only a 1.7% improvement. Because the two groups differed significantly in terms of depressive symptoms at the beginning (mean score of 16.7 in music therapy, 11.8 in control, $p=0.001$), music therapy, therefore, could simply be more effective in those with greater depressive symptoms.

Anxiety, which was also assessed in the Guétin et al study, improved by 60% in the music therapy group versus a 4.3% improvement in the reading control group. Significant findings were maintained at follow-up 2 months later. This finding differs from the Bruer et al study in which the effect of music therapy on cognition diminished after 1 week. Persisting effects of music therapy may then be limited to only certain symptoms of dementia.

Research into the use of music therapy in dementia patients thus far has encountered several issues to which these studies are no exception. Opinions on whether music therapy should be active or receptive, personally-selected or standard, and group or individual still vary. The types of music therapy employed by the three articles discussed here were not uniform, a difference that may account for some of the variation in observed effects. Though no

contraindications to music therapy were found, its use may be limited in the United States where insurance largely dictates accessibility to services. In these studies, conducted in Canada, France and Australia, insurance coverage did not play a significant role. Most studies additionally seem to use musicians or trained professionals and may not have the same effect if other individuals, such as at-home providers, administered the therapy.

CONCLUSION

It is concluded that music therapy is an effective treatment for patients with dementia. The three studies reviewed here show that music therapy can have a significant impact on cognition, agitation, depression and self-esteem, all vital components of a person's quality of life. The results obtained from these studies are not without limitations however. Although most of the studies evaluated used a significant population size, the sample in Bruer et al amounted to just 17 participants when only those with a dementia-diagnosis were considered. Exclusion criteria, furthermore, differed widely between studies from none being specifically mentioned (Cooke et al) to exclusion of participants with Lewy body dementia, vascular dementia, Parkinson's disease and unexplained confusion (Guétin).

Because of the relative lack of side effects and wide range of benefits, the use of music therapy for dementia patients remains a worthwhile topic for research. Future studies would benefit by exploring its ability to slow the progression of dementia, opposed to simply alleviating the symptoms, with the use of equipment such as MRI. Music therapy's effects on different stages and types of dementia, as well as its use outside of aged care facilities and administration only by music therapist may help to clarify the extent of its use.

REFERENCES

1. Cooke M, Moyle W, Shum D, Harrison S, Murfield J. A randomized controlled trial exploring the effect of music on quality of life and depression in older people with dementia. *J Health Psychol*. 2010;15(5):765-776.

2. Guétin S, Portet F, Picot MC, et al. Effect of music therapy on anxiety and depression in patients with Alzheimer's type dementia: randomised, controlled study. *Dement Geriatr Cogn Disord*. 2009;28(1):36-46.

3. Bruer RA, Spitznagel E, Cloninger CR. The temporal limits of cognitive change from music therapy in elderly persons with dementia or dementia-like cognitive impairment: a randomized controlled trial. *J Music Ther*. 2007; 44(4):308-328.

4. World Alzheimer's Report 2010: The Global Impact of Dementia, Executive Summary. Alzheimer's Association web site. http://www.alz.org/documents/national/World_Alzheimer_Report_2010_Summary(1).pdf. Published 21 Sept 2010. Accessed 1 Oct 2011.

5. Alzheimer News. Alzheimer's Association web site. http://www.alz.org/news_and_events_2009_facts_figures.asp. Updated 03/25/2009. Accessed 1 Oct 2011.

6. 2009 Alzheimer's Disease Facts and Figures. Alzheimer's Association web site. http://www.alz.org/national/documents/report_alzfactsfigures2009. Published 2009. Accessed 1 Oct 2011.

7. Alzheimer's Treatments. Alzheimer's Association web site. http://www.alz.org/alzheimers_disease_treatments.asp. Updated 12/16/2010. Accessed 1 Oct 2011.