Effects of music therapy on patients with dementia: A systematic review

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Abstract

Introduction: A high percentage (20% to 40%) of residents in nursing homes care and patients in acute hospitals suffering from dementia develop neuropsychiatric symptoms such as anxiety, depression, agitation, apathy and delusions. Neuropsychiatric symptoms are complex, stressful and challenging to manage, which increase caregiver's burden and the cost associated with dementia care. This systematic literature review aims to investigate the effects of music therapy on neuropsychiatric symptoms of patients with dementia. *Methods:* A literature search was performed in databases: MEDLINE, Wiley Online Library, CINHAI and ScienceDirect. The search keywords included dementia, music therapy, neuropsychiatric symptoms, anxiety, depression. The search was limited to scientific articles; only articles in English language; only systematic reviews; articles published from January 2011 to January 2021; articles with full text available; articles about residents, who were clinically diagnosed with dementia; articles on study intervention: music therapy; outcomes of study: reported at least one effect of music therapy on neuropsychiatric symptoms; reviews were required to have an AMSTAR rating of five points or greater. *Results:* We screened 3257 titles, only 12 articles, involving in total 5.978 patients, met the inclusion criteria for review. Overall, the studies showed that music therapy has a significant impact on decreasing neuropsychiatric symptoms of people with dementia. Some of studies found out that there were no significant improvements on cognition or daily functioning and the results on quality of life were ambiguous. *Discussion and conclusions:* Music therapy is beneficial and improves neuropsychiatric symptoms of people with dementia, therefore it could be a powerful treatment strategy in the future. However further randomized studies are still needed.

Keywords: dementia, music therapy, neuropsychiatric symptoms, depression, anxiety.

Introduction

Dementia is a syndrome caused by a brain disease that can be chronic or progressive (World Health Organization, 2020). A large proportion (from 20% to 40%) of residents of nursing homes and patients in hospitals suffering from dementia develop neuropsychiatric symptoms, such as violent behavior, agitation, wandering, socially inappropriate behavior, eating disorders, anxiety, depression, apathy, insomnia, delusions, misidentification, and hallucinations (Aarsland, 2020).

Demographic aging is a global process resulting from improved health-care over the last century. There are more than 10 million new cases of dementia worldwide each year, i.e. one new case every 3.2 seconds (Alzheimer's disease international, 2020; Alzheimer's Association, 2021).

Dementia is also a major economic burden because treatment costs are high. Treatment includes costs attributable to informal care (unpaid care for family and others), direct costs of social care (provided by professionals), and direct costs of healthcare (cost of treating dementia and other conditions in primary and secondary care) (Castro et al., 2010; Gustavsson et al., 2010).

The treatment of patients with dementia is holistic. Both pharmacological and non-pharmacological treatments are important. However, there is now a wide range of non-pharmacological strategies to treat neuropsychiatric symptoms. Among these strategies, music therapy is worth mentioning. According to the World Federation for Music Therapy, music therapy is "the use of music and/or musical elements (sound, rhythm, melody, and harmony) by a qualified music therapist, with a client or group, in a process designed to facilitate and promote communication, relationships, learning, mobilization, expression, organization, and other relevant therapeutic objectives to meet physical emotional, mental, social and cognitive needs". Some studies indicated a beneficial effect on reducing the anxiety of patients with dementia (Svansdottir and Snaedal, 2006; Goddaer and Abraham, 1994; Moroi et al., 2008; Nomi et al., 2005; Tabloski et al., 1995; Tsuchiya, 2003) and a few studies also indicated moderate increase a cognitive function (Miura et al., 2005). On the other hand, some studies reported that music therapy did not have a significant effect on agitated behaviors in those with dementia (Sung et al., 2012).

Methods

A literature search was performed in databases.

Search strategy and selection criteria

A literature search was conducted in following databases: MEDLINE, Willey Online Library, CINHAI and ScienceDirect. The search keywords included *dementia, music therapy, neuropsychiatric symptoms, anxiety, depression*. Databases were searched using the Boolean operators to find the results (dementia AND music therapy AND neuropsychiatric symptoms OR anxiety OR depres-

sion). The search was limited to scientific articles; only articles in English language; only systematic reviews; articles published from January 2011 to January 2021; articles with full text available; articles about residents who were clinically diagnosed with dementia; articles on study intervention: music therapy; outcomes of study: reported at least one effect of music therapy on neuropsychiatric symptoms; reviews were required to have an AMSTAR rating of five points or greater (Table 1).

Table 1: Inclusive and exclusive criteria

Criteria	Inclusion criteria	Exclusion criteria
Topic	Effect of music therapy on decreasing neuropsychiatric symptoms of patients with dementia	Other types of therapy on decreasing neuropsychiatric symptoms of patients with dementia
Population	Residents or patients who were clinically diagnosed with dementia	Residents or patients with other pathologies or matters
Types of study	Only systematic reviews	Other study design
Time frame	1.1.2011 – 1.1. 2021	Published before 1.1. 2011
Language	English only articles	Articles in other languages
Available in electronic databases	articles with full text available	Incompletely accessible articles
Outcomes	reported at least one effect of music therapy on neuropsychiatric symptoms	No outcomes/unclear effect
Rating tool	Five points or greater by AMSTAR	Less than five points by AMSTAR

Legend: AMSTAR- A Measurement Tool to Assess systematic reviews.

Study identification and selection

Without the use of pre-defined exclusion criteria, we obtained 9,327 titles. Of these, the most articles were in the Medline database, namely 3,263, the second database with the most articles was Willey Online Library 1,054 articles, in the CINHALL there were 872 articles, and the least results were in the ScienceDirect database, there were 520 articles. After applying such as time limit, removal of duplicates, full availability of text and articles in English, the number of results was reduced to 549 articles. We further removed an additional 127 articles based on analysis of article titles and/or abstracts due to population, which did not include residents or patients who were clinically diagnosed with dementia, thus removing an additional 100 articles. In addition, 64 additional articles were excluded because we could not accurately understand or the effect of music therapy was unclear. We removed an additional 15 articles because authors use other types of non-pharmacological therapy on decreasing neuropsychiatric symptoms of patients with dementia. At finally phase we evaluated twenty articles with a Measurement Tool to Assess systematic review (AMSTAR). Only twelve articles met other inclusion criteria and get more than five points or greater by AMSTAR.

Twelve articles included in the systematic review of the literature met all the set inclusion criteria. Articles that were in line with the purpose and goal of our systematic review were evaluated with a Measurement Tool to Assess systematic review (AMSTAR) (Table 2). A total of 5,978 patients participated in all studies included in our review. The PRISMA approach () was used to show the course of the literature review (Figure 1) (Moher et al., 2015). We further imported the results into the Zotero program, which is a research tool that also enables the organization, storage of resources, management and citation of our references.

Results

We identified and analysed 12 articles (Ueda et al., 2013; Ing-Randolph et al., 2015; Fusar-Poli et al., 2018; Gomez-Romero et al., 2017; Sherrieff et al., 2017; Rezende Alexio et al., 2017; Zhang et al., 2016; Mercadal-Brotons and Alcantara-Silva., 2019; Bartfy et al., 2019; Li et al., 2019; Long Lam et al., 2020; Morales et al., 2020) showed on (Table 2).

Table 2: Overview of studies

Reference	Type of study	Study goal	Sample size	Research findings	AMSTAR
Ueda et al., 2013	A systematic review	Investigate the effects of music therapy on behavioural and psychological symptoms, cognitive function, and activities of daily living in patients with dementia.	617	The effect of therapy is effective for the management of behavioural and psychological symptoms.	11/11
Ing- Randolph et al., 2015	Systematic review	To review the using group music intervention to reduce dementia-associated anxiety, the delivery of such interventions.	361 people clinically diagnosed with dementia, the age of subjects ranged 62.7-99 years	Group music intervention to treat dementia-associated anxiety is a promising treatment. However, the small number of studies and the large variety in methods and definitions limit our ability to draw conclusions.	9/11

Reference	Type of study	Study goal	Sample size	Research findings	AMSTAR
Gomez-Romero et al., 2017	A systematic review	The aim is to ascertain the conclusions of scientific publications regarding the benefits of music therapy on behavioural problems elderly patients with dementia.	404 subjects diagnosed with dementia.	Music therapy is beneficial and improves behaviour disorders, anxiety and agitation in subjects diagnosed with dementia.	9/11
Zhang et al., 2016	A systematic review of literature	To analysed the efficacy of music therapy in elderly dementia patients, and if so where music therapy can be used at first-line non-pharmacological treatment.	1757 adults with dementia	The meta-analysis suggested that music therapy had positive effects on disruptive behaviour and anxiety and positive trend for cognitive function, depression and quality of life.	11/11
Fusar-Poli et al., 2018	A systematic review of literature	The effect of music therapy on cognitive functions in patients with dementia.	330	It is possible to affirm that the positive effect of music therapy on cognitive impairments in dementia.	9/11
Rezende Alexio et al., 2017	A systematic review of literature	Assessing the efficacy of music therapy in the neuropsychiatric symptoms of people with dementia.	641 elderly with uncategorized dementia, AD, vascular dementia, mixed dementia in mild, moderate and severe stages.	In general, studies indicated the efficacy of music therapy on the decline of depression, agitation and anxiety. There were heterogeneity of interventions, methodological design and instruments of evaluation among studies.	9/11
Sherriff et al., 2017	A systematic review of literature	To establish whether music therapy improves neuropsychiatric symptoms in adults with dementia and/or delirium in the general hospital.	239 patients clinically diagnosed with dementia.	Music delivery was feasible and have a positive effect on some aspects of neuropsychiatric symptoms in various settings, but the studies was generally small at high risk of bias and did not use recognized frameworks for evaluating complex interventions.	9/11

Reference	Type of study	Study goal	Sample size	Research findings	AMSTAR
Hui-Chi Li et al., 2019	A systematic review of literature	Determine the effectiveness of music therapy on reducing depression for people with dementia during different intervention intervals.	388	Music therapy interventions can effectively reduce people depression in people with dementia. The importance of music therapists in music therapy interventions.	9/11
Mercadal-Brotons and Alantara-Silva., 2019	A systematic review of literature	To provide clinical recommendation regarding music therapy interventions on patients with non-Alzheimer disease dementia.	136 patients. 15 patients were diagnosed with dementia.	The results of the sources analyzed show that active music therapy seems to be safe and effective treatment for all types of dementia. However, it is recommended that future studies contemplate and highlight the diversity of symptoms and course of the disease of the different types of dementia in order to identify and better understand the music therapy interventions best suited for each of them	10/11
Bartfay et al., 2019	A systematic review of literature	To examine the effects of music therapy on behavioural psychological symptoms of dementia and the quality of life.	Approximately 1872 patients clinically diagnosed with dementia.	Overall, the studies showed a significant impact on mitigating agitation, reducing BPSD and improving memory, cognition, QOL, and decreasing anxiety and symptoms associated with depression.	9/11
Morales et al., 2020	A systematic review of literature	Effect of music therapy on cognitive function, quality of life, and/or depressive state in people living with dementia.	816	Music therapy could be a powerful treatment strategy. It is necessary to develop clinical trials aimed to design standardized protocols depending on the nature or stage of dementia so that they can be applied together with current cognitive-behavioural and pharmacological therapies.	9/11

Reference	Type of study	Study goal	Sample size	Research findings	AMSTAR
Long Lam et al., 2020	A systematic review of literature	Effects of music therapy on patients with dementia to evaluate its potential benefits on dementia.	No data	Music therapy could improve verbal fluency and reduce anxiety, depression, and apathy to patients living with dementia. There dose not appear to be proven benefits on memory, daily function, or overall quality of life	8/11

Discussion

Nowadays, there is a growing incidence of this disease in the population all around the world, and, therefore, it is important to develop treatments and activities to relieve its symptoms. To reach that assumption, we performed this overview which identified 12 systematic reviews including 228 studies reporting on outcomes of music therapy on at least one neuropsychiatric symptom to patients with dementia. These reviews addressed components that are important for this intervention to be successful, like for example range of different types of music therapy, the intervention length, the number of sessions per week, and the person who conducted music therapy.

Some of the analyzed studies found out that music therapy can alleviate anxiety and depression. Gomez-Romero et al., 2017, found that different types of music therapy (active technique, passive listening, or combined technique) are beneficial for improving anxiety. The results of a study by author Ueda et al., 2013 indicate that music therapy reduced anxiety and depression in people with dementia. However, they were unable to clarify what type of music therapy. Regarding the effects of the intervention type, the singing intervention seemed to produce moderate effects on behavior and anxiety. The listening intervention might produce somewhat more effects on the outcomes of behavior, depression, and anxiety. In the study by Alexio et al., 2017, receptive “relaxation” music therapy is a method that probably better reduces neuropsychiatric symptoms. Studies of authors Zhang et al., 2016, and Long Lam et al., 2020, also showed that music therapy had positive effects on disruptive behavior and anxiety but also a positive trend for cognitive function, depression, and quality of life.

A systematic review from author Long Lam et al., 2020, showed that the effect of music therapy on patients living with dementia suggested significant improvements in verbal and language fluency, alleviation of BPSD including anxiety and depression and reduced levels of apathy. These findings are generally in line with previous reports on the potential benefits of music therapy in improving the behavioral symptoms in patients living with dementia (Zhang et al., 2016; Gomez-Romero et al., 2017). However, this study suggests that the music therapy field significantly improves the overall aspects of cognition (such as

memory, orientation, and registration), agitation, daily functioning, and the quality of life living with dementia. A systematic review with meta-analyses from authors Fusar-Poli et al., 2018, aimed at providing an overview of the possible effects of music therapy on cognitive functions in patients with dementia. Results confirm the conclusions of previous reviews which did not find any significant improvement in global cognition (Chang et al., 2015; Lie et al 2015; Ueda et al., 2013). They did also not find any positive effect of music therapy on domains like cognitive functions, such as attention, language, memory, and perceptual-motor skills.

A study by Li et al., 2019, showed that the intervention length and number of sessions per week of music therapy is very important to reduced depression of people with dementia. The meta-analysis revealed that music therapy was significantly associated with decreasing the degree of depression for medium-term intervention (six to 12 weeks). No significant differences in depressive levels were found between music therapy and control groups in short-term interventions (three or four weeks). The effects of medium-term music therapy may contribute to improved depression in people with dementia while short-term intervention may not. Another similar meta-analysis study suggested that short-term music therapy might not be able to improve cognitive function for people with dementia (Li HC et al., 2015).

The definition of music therapy specifies that sessions must be guided by a qualified music therapist. A majority of analyzed studies showed that the involvement of music therapists significantly reduced neuropsychiatric symptoms (Li et al., 2019; Gomez-Romero et al., 2017; Ueda et al., 2013; Fusar-Poli et al., 2018; Alexio et al., 2017; Sherriff et al., 2017).

Our systematic review includes a relatively large number of subjects and studies. Therefore, we can summarize that music therapy has a significant impact on decreasing neuropsychiatric symptoms of people with dementia. Some studies found out that there were no significant improvements in cognition or daily functioning and the results on quality of life were ambiguous.

Conclusions

Music therapy is beneficial and improves neuropsychiatric symptoms of people with dementia. Therefore, it could be a powerful treatment strategy in the future. However further randomized studies are still needed.

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