

Music Therapy and Advanced Dementia

Jiajun Qiu

Lord Byng Secondary School, Vancouver, Canada.

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***Corresponding author:** Jiajun Qiu, Lord Byng Secondary School, Vancouver, Canada.

Abstract

Advanced dementia is a progressive neurodegenerative disease that incurs substantial suffering and costs to the patient, family members, and care providers. In 2019, dementia affected an estimated 55.2 million people worldwide and was the 7th leading cause of death. Common symptoms of advanced dementia include impairment in behavioral, cognitive, and social function, which can severely compromise a patient's ability to perform activities of daily living (ADL). While there is no known cure, music therapy (MT) has risen in popularity as a non-pharmacological, palliative treatment. This paper examines existing literature on the effects of musical intervention on patients with advanced dementia. Most study results are positive, suggesting that MT may improve patients' quality of life. For example, some have shown that MT can improve pleasure, personal well-being, sundowning, swallowing, etc. Nonetheless, limitations in the studies are to be considered and future investigations on a greater scale are recommended to explore the clinical significance of these results.

Keywords

Musictherapy, Advanced dementia, Methods

1. Introduction

1.1 Overview of Dementia and Music Therapy

Dementia is a neurodegenerative disorder characterized by progressive deterioration of cognitive function and ability to perform activities of daily living (ADL) [1] [9] [15] [16]. Center for Disease Control and Prevention, Alzheimer's Disease and Healthy Aging Program). It presents an increasing threat in the aging world, as age is the biggest known risk factor [1] [3] [9]. WHO has projected that 1 in 6 people in the world will be aged 60 years or older by 2030. Further, WHO anticipates dementia case numbers to grow exponentially in the coming decades: 78 million people with dementia worldwide in 2030 and about 139 million in 2050. Alzheimer's disease (AD) is the most common form of dementia, constituting 60-80% of all cases [9]. Reported survival after diagnosis ranges from 3 to 12 years [11].

1.2 Advanced Dementia

Advanced or severe dementia is the final stages of dementia in which symptoms are more pronounced. Common symptoms include profound memory loss, minimal communication/interaction, inability to perform ADL, eating disorders, urinary and fecal incontinence, and sundowning symptoms such as agitation, aggression, depression, and apathy, which typically worsen in the afternoon with changes in lighting [3] [8] [9] [12] [13] [15] [16].

The most common clinical complications in dementia are eating problems and infections with pneumonia being the most common underlying cause of death in AD [14] [23]. Such symptoms can severely compromise a patient's quality of life. Currently, there is no known cure for dementia. Available medications have questionable effects, and those for dementia-related symptoms may harm the patient [12] [19]. Furthermore, treatments for patients with ad-

vanced dementia are largely palliative, aiming to promote comfort only [15] [16].

1.3 Music and Music Therapy

Music has long been appreciated for its therapeutic value. Historically, music was believed to heal the mind and body, though the underlying rationale was largely magical [20]. It has been shown that music can express and arouse emotions, as well as memories in healthy seniors. Further, there seems to be a correlation between music-evoked emotion and memory. Salakka et al. (2021) found a strong correlation between emotion, memory, and music [20]. Interestingly, Jacobsen et al. (2015) found that brain regions storing musical memory in people with AD showed substantially minimal cortical atrophy, meaning musical is well preserved [10]. These findings may explain why people with advanced dementia react to their favorite music and why music can have a positive impact on dementia therapies.

Music therapy (MT) is an engaging, multi-faceted, and mind-body therapeutic treatment approach that is used to address a variety of physiological and neurological symptoms [14]. It has risen in popularity as a non-pharmacological palliative treatment for dementia. Though MT is still a relatively new area of study, ample evidence has validated its benefits.

There are two forms of MT: passive and active. Passive MT often involves listening to a highly individualized playlist of songs. Procedures for creating such a playlist often include the following. First, questionnaires are given to patients, family members, or caregivers in close contact with the patient to determine a patient's musical preference. Top hits in the patient's teenage years or early 20s are sometimes included. Lastly, clips of music are played, and either the patient verbally confirms whether to keep the song or researchers can infer from their behavioral signals such as nodding and clapping [4] [5] [6] [12]. Sometimes family members may also contribute personal music playlists that the patient enjoys [6]. On the other hand, active MT requires a patient's participation, whether through singing, playing, clapping, creating music, or other interactive activities.

Surprisingly, classical music may not be better than individualized playlists of music. In a 2000 study, Gerdner compared the effects of these two types of music on people with AD [8]. Individualized music consisted of music family members believed a resident would enjoy. Classical music was from *Meditation - Classical Relaxation Vol. 3*, which a team of music therapists judged to be soothing. Residents either received individualized music or classical music sessions for 6 weeks, followed by two weeks of no music, and 6 weeks of the other type of music. This study found that agitation significantly decreased within the first 10 minutes of listening to individualized music and effects were sustained about 30 minutes immediately after the listening session. By contrast, subjects listening to classical music did not show a significant reduction until 20+ minutes and the palliative effects lasted only ~10 minutes [8].

2. Methods

This paper will review and evaluate some study reports published on sources such as Google Scholar, Pubmed, and NEJM. There are three selection criteria. First, the study has at least three participants ($N \geq 3$), which ensures that when the first two results disagree, there are results to compare to. Nevertheless, it is preferable to have a bigger sample size, which is more representative than a smaller one. Second, all or some of the subjects are diagnosed with advanced dementia, according to the diagnosis in the study. Third, the study implements active/passive MT intervention. There is no specific requirement for the number of MT intervention sessions and span because most studies employed multiple sessions over a period of time. The keywords are the following: music therapy; advanced dementia; aggression, agitation, depression, sundowning symptoms, all of which are common symptoms in advanced dementia; pleasure, or the improvement in quality of life, which is severely undermined in advanced dementia; swallowing and eating disorders; and social interaction, as advanced dementia compromises social functions.

3. Results

Many recent studies yielded results supporting that MT could improve affective and behavioral symptoms associated with advanced dementia. For example, some saw a statistically significant improvement in pleasure, sundowning symptoms, and swallowing emerged after subjects listened to personal playlists. However, it was unclear how music induced some results and whether the results could be clinically significant yet. Also, none of the following studies had evidence of music effectively improving cognitive symptoms.

3.1 Music and Pleasure

Cohen-Mansfield et al. (2011) reported a significant increase in pleasure after exposure to stimuli involving music, such as stimulated social stimulus and music stimulus [5]. Stimulated social stimulus that included videos that often presented a person singing and asking the viewer to join in. Music stimulus included listening to recorded music, which matched a person's preference. Some genres included classical, gospel, Yiddish, and Persian music. Using Lawton's Modified Behavior Stream, researchers measured pleasure during the first 3 minutes after the stimulus was presented. The researchers quantify behavioral indications of pleasure (smile, laugh, or any indication of happiness) using a 5-point scale based on the duration of such behaviors. There were significant increases in pleasure after exposure to stimuli involving music. Interestingly, widows, people with better ability to perform ADL, and those with clearer speech were more likely to show more pleasure [5].

3.2 MT and social interaction

A 2018 study conducted by Hilycord & Farrer reported significant improvement in social interaction in women but not men [6]. 12 individuals participated in the study (8 female, 4 male, and 1 passed away during the study). In the creation of personalized playlists, two subjects' family members contributed personal CDs. When the playlist was established, each participant received an iPod and headphones. 15 minutes before a pre-notified family visit, a researcher would either greet the participant as control, or let the participant listen to their personal playlist. Each resident did not receive the same treatment more than three times in a row and their family members did not know whether the subject listened to music. Family members were asked to fill in a 12-question questionnaire that assessed levels of social interaction during and after the visit [6].

Hilycord & Farrer's preliminary analysis showed overall no significant difference in interactiveness between the music and non-music conditions [6]. However, female residents demonstrated a significant increase in alertness and happiness. In addition, on the 5th visit with music listening, a significant correlation began to emerge between behavioral response to music prior to visit and interactiveness during visit. The researchers thus hypothesized that the effect of music is cumulative and noted other studies' findings supported this hypothesis [6].

3.3 MT and sundowning symptoms

Sundowning is a state of confusion in the late afternoon to early evening and can be expressed through different behaviors. Lineweaver et al. 2021 found improvement in affective, behavioral, and sundowning but not cognitive symptoms after listening to personalized playlists [12]. Although 6 months of MT intervention did not lead to additional improvements after the initial 3 months, the long-term effect was unclear [12].

This study assesses 7 sundowning symptoms: disengagement, confusion, agitation, aggression, restlessness, repetitiveness, and unresponsiveness [12]. 282 participants enrolled in the study (202 women) and during their 6-months intervention, each listened to a personal playlist for at least 30 minutes at least once a week. Throughout the study, there was a significant short-term improvement in sundowning symptoms following music-listening sessions. In the first 3 months, the study also found significant improvements in depression, agitation, and neuropsychiatric symptoms. Although those improvements persisted and stabilized through the second 3 months period, there were no additional improvements during that period [12]. Other studies reported similar improvements: music listening decreased agitation, aggression, and depression [7] [20].

3.4 MT and Dysphagia

In a 2018 study, Cohen et al. reported that music-listening before dinner increased food intake [4]. Each of the 5 participants received an iPod loaded with individualized playlist and listened to music 30 minutes before dinner. However, 1 participant was overly reactive to iPod and was removed from the study. Of the 4 remained, there was an average food intake of 71.4% with music intervention compared to 41.1% without music, and a statistically significant 72.5% overall increase. Associated benefits included decreased incidents of choking, improved nutrition status, reduced weight loss, reduced need for speech interventions/thickened liquids, and enhanced quality of life. Additionally, caregivers reported a reduction in time needed for care, fewer falls and fewer moments where staff were taken off the floor for resident irritation, and enhanced quiet and joyful moments with residents and staff [4].

4. Discussion

All studies have encountered problems and limitations that future studies can help resolve. Although Cohen-Mansfield et al. found exposure to musical stimuli increased pleasure and the increase was statistically signifi-

cant, the observable improvement was small [5]. Nonetheless, the researchers contended that the result was clinically significant [5]. To confirm/reject this assumption, further investigations are required. In addition, the study found a more significant improvement in certain groups of people, though the causes were unknown [5]. Future studies can help distinguish the effects of music on various groups.

Hilycord & Farrer reported a significant increase in social interactiveness in women but a conflicting decrease in men after listening to personalized playlists [6]. They believed part of the reason was that the number of female participants was twice the number of male participants, a ratio of 8 to 4 [6]. While women with dementia do outnumber men worldwide, men may be underrepresented in this study [1]. Regardless of the ratio, the study had a small sample size and the one participant who passed away during the study likely confounded the results [6]. Furthermore, the researchers asked family members to evaluate a participant's activeness without professional guidance and relied exclusively on those data [6]. Thus the reliability of the study's results is questionable. Further studies are required to support/reject the conclusion drawn from its data.

Also, Cohen-Mansfield et al. and Hilycord & Farrer did not account for the effects of time and related environmental factors [5] [6]. Factors like sundowning, which occurs with changes in time and lighting, could have significantly reduced or undermined any possible benefit of music. Future investigations can focus on the effects of MT at different times of the day.

Lineweaver et al. saw immediate improvements in seven sundowning symptoms and lasting improvements in depression, agitation, and neuropsychiatric symptoms after individualized music-listening sessions [12]. During the study, some participants passed away, moved to another facility, or no longer wanted to participate, possibly affecting the results. Next, although the initial improvements lasted, there were no additional improvements after the first three months. The researchers outlined three probable explanations. First, with minor changes to a playlist, subjects may be bored with music after frequent listening sessions, reducing music's effectiveness to continuously bring positive effects. Second, the effectiveness may be limited and that limit was reached in the first months. Third, progressive neurodegeneration of dementia could offset additional improvements. Interestingly, the researchers noted that music seemed to slow the progression of dementia [12].

Cohen et al. found individualized music listening sessions before dinner improved swallowing [4]. Like the above studies, a participant left the study due to overstimulation by and discomfort with the devices used, decreasing the sample size from persons to 4 persons. Because of the study's small sample size, the resulting data may not be representative and more large-scale studies are needed to determine the validity of this result [4].

There are additional factors that most above studies did not account for. First, the senior home where most studies were conducted may have other music enrichment programs, possibly augmenting the benefits of the studies' MT sessions [12]. Second, although some studies recorded that participants were diagnosed with mild to severe dementia, they did not make the distinction in their analysis [5] [6] [12]. Likewise, it was unclear whether different ethnic groups or people from different backgrounds would react differently to music, although some studies recorded rudimentary distinctions (white vs. non-white) in sampling [12]. Future studies can investigate music's effectiveness for people with different stages of dementia and people from different cultural backgrounds. Third, the possible positive effects of music likely are not applicable to certain individuals because 3 to 5 percent of the world's population has apathy toward music [2]. Fourth, cochlear implants (CI) in older adults with dementia are increasing. Because people with CI report that they enjoy listening to music, extending the investigation of music therapy on CI users with dementia can potentially benefit this population [17].

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