

Research on Music Therapy for Dementia Patients

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Abstract: Music therapy is a new and mature frontier discipline. Based on the theory and method of psychotherapy, it employs the special physical and mental function of music to help patients, under the guidance of a music therapist, overcome psychological obstacles and improve mental and physical well-being. With the ongoing aging of the population, the number of Alzheimer's disease diagnoses is expected to rise. In the management of dementia among the elderly, music therapy stands out as a valuable non-pharmacological approach, impacting cognition, emotion, and behavior positively. Currently, the application of musical interventions for alleviating cognitive and behavioral symptoms in dementia patients has gained widespread acceptance as an alternative treatment method, with many positive results being achieved. This study explores the therapeutic development of music therapy in treating Alzheimer's disease. The main reason music can regulate emotions is that it can trigger emotional reactions and affect an individual's emotional state through various physiological and psychological mechanisms. This article synthesizes existing literature to find that music therapy has specific therapeutic effects on patients, including memory improvement, enhanced cognitive function, and emotional restoration, and presents practical examples of its implementation.

Keywords: Music therapy, Music intervention, Dementia, AD, Alzheimer's disease.

1. Introduction

According to estimates by the World Health Organization (WHO), approximately 55 million individuals globally were affected by dementia in 2021 [1]. Dementia, a neurodegenerative syndrome, is characterized by a progressive deterioration in cognitive functions, primarily memory, and often affects language, motor skills, vision, and most prominently, executive abilities [2].

Alzheimer's disease is the most common type of dementia. As individuals age, degenerative neurological conditions increase their susceptibility to Alzheimer's. This article delves deeper into the exploration of music therapy for Alzheimer's disease. Amid the rapid aging of the population, the proportion of elderly individuals is consistently increasing, accompanied by a yearly surge in the incidence of age-related neuropsychiatric disorders, notably Alzheimer's. Neuropsychiatric symptoms (NPS) and behavioral disturbances are frequently encountered in Alzheimer's disease (AD) patients, with apathy, depression, and agitation being the three most prominent symptoms, in addition to the well-known cognitive indicators such as memory loss and executive dysfunction [3, 4]. These issues place significant burdens on patients, carers and society at large [5]. Despite the availability of pharmacological treatments, these interventions often fail to achieve long-term clinical efficacy [6].

Consequently, non-drug interventions have gained importance as complementary treatment option for managing neuropsychiatric symptoms of Alzheimer's disease. This research aims to investigate the various treatment approaches and applications of music therapy in dementia patients, ultimately culminating in a comprehensive conclusion regarding the efficacy of music therapy for dementia.

While some research in China have addressed the treatment of Alzheimer's disease, there remains a notable lack of studies specifically examining the impact of music therapy on this condition. This study seeks to offer a more comprehensive, detailed, and structured examination of the effectiveness of music therapy in Alzheimer's patients, thereby gaining insights into the significance, methods, and role of music therapy in treating this disease. By doing so, it aims to reduce the burden and pressure on patients, caregivers, and society, enhancing the quality of life for elderly individuals with Alzheimer's.

2. The Significance of Music Therapy

Psychotropic medications play an important role in treating the neuropsychiatric symptoms of dementia. However, the risk of excessive medication remains a great concern[7, 8]. The United Kingdom's National Dementia Strategy [9] advocated for a nationwide decrease in drug utilization, underscoring the importance of non-pharmacological interventions. The Ministry of Health's report [10] emphasized the necessity for additional research into the clinical efficacy and cost-effectiveness of non-pharmacological approaches. By conducting investigations into the clinical and economic benefits of non-drug therapies, healthcare systems can offer patients more financially viable treatment alternatives, alleviate the medical burden, and enhance the efficiency of medical resource allocation. Consequently, music therapy, as a psychosocial intervention, can facilitate the attainment of the objectives outlined in the National Dementia Strategy [9].

The extensive confirmation of music's positive impacts on the human body is well-documented. Researchers at the University of California found that after each rehearsal, the levels of an immunoglobulin called IgA in the bodies of band members increased by 150%, and after a public performance, this immunoglobulin increased by 240%. The person in charge of this study said, "Although we cannot say that music can resist colds, in appropriate circumstances, it can indeed enhance a person's immune system. Liao Changyong, the dean of Shanghai Conservatory of Music, has also highlighted music therapy's historical and modern therapeutic applications, noting its ability to soothe souls and improve the well-being of sub-healthy populations.

3. Music Therapy Session Plan

Effective music therapy begins with understanding the patient's cultural background and musical preferences. Familiar, melodic, and rhythmical music often evokes emotional resonance and triggers memories, aiding cognitive restoration. For patients with language barriers, therapists can communicate with their families and select suitable music.

Once the suitable song has been selected, patients are guided to adhere to the musical elements, including rhythm, tempo, pitch, and tone, during the activities. Therapists can adjust the tone and rhythm of musical instruments during activities based on the patient's state and emotions, in order to soothe or inspire the patient. In addition, patients can also be encouraged to play simple musical instruments and improvise with the sound of the instruments. They can also play word filling games on familiar songs and guide patients to sing them out loud [11-13].

If the patients exhibit reluctance or mood instability, therapists should try to understand the interests and preferences of patients, choose the type of music and tracks suitable for patients, and guide patients to actively participate in the treatment process.

Additionally, facial expressions and body reactions are important parts of emotional expression and can convey delicate feelings and attitudes that words cannot fully express. The significance of non-verbal communication between patients and medical personnel cannot be overlooked during therapy, as it expresses compassion, empathy, and backing.

3.1. Improve Mood

Music has the capacity to diminish adverse emotions, including anxiety and depression, thereby enhancing the psychological well-being of patients. It can regulate emotions [14] by triggering emotional reactions and affecting an individual's emotional state through various physiological and psychological mechanisms.

3.1.1. Physiological Mechanism

Music exerts a direct influence on specific brain regions, modulating heart rate, respiration, and blood pressure to induce relaxation [15]. Calming music can decrease heart rate and blood pressure, diminish the release of stress-related hormones [16] and consequently mitigate both physical and psychological strain.

Furthermore, music can alleviate muscular tension, enhance sleep quality [17], and facilitate improved rest and recuperation.

3.1.2. Psychological Mechanism

Music can trigger emotional reactions [14], which are closely related to mental health. Beautiful melodies can stimulate people's positive emotions, reduce depression and anxiety.

Music has the ability to provoke the brain's release of dopamine [18], a neurotransmitter linked to pleasure and reward pathways. Listening to favorite music can significantly enhance overall happiness [19].

3.2. Improve Cognitive Function

Music therapy activates the cerebral cortex, fostering improvements in cognitive functions, including attention, memory, executive abilities, and spatial awareness. Following music exposure, individuals with Alzheimer's disease (AD) exhibited enhancements in categorical word retrieval [11], autobiographical recall [12], and textual memory retention [13]. People are able to remember lyrics for a variety of reasons, including emotional resonance, repetition and rhythm, language processing, associative memory, visual and auditory integration, brain plasticity, and cultural and social factors. These factors work together in our brain to enable us to recall and retell the words of a song with ease.

This was demonstrated in a study [16] that rhythms with or without musical accompaniment can "promote text recall," meaning that listening to music can help people remember information fragments.

The "Mozart effect" suggests that classical music, including Mozart's compositions, temporarily heightens cognitive performance by increasing arousal and emotional states. Prolonged music exposure, particularly through learning instruments can physically change the structure of the brain, increase the capacity of brain tissue, and further promote brain development and cognitive ability.

In addition, one study [16] found that music can significantly improve the cognitive function of the brain in addition to aiding memory tasks. The study involved both male and female university students undertaking a task that required verbal and spatial processing, with the participants listening to various selections from a Mozart symphony. The results demonstrate that background music was associated with improvements in spatial processing speed (how quickly people can recognize shapes),

object patterns and positions, as well as the accuracy of language processing (the capability to handle words effectively).

Some researchers claimed [20] that, this improvement in brain function can be explained by the "arousal and emotion hypothesis". This hypothesis asserts that music can enhance the level of arousal, which means the degree to which people feel awake and alert, putting us at the optimal level for enhancing memory. This theory particularly emphasizes that adding interesting auditory backgrounds can make learning tasks more engaging, thereby improving the overall arousal level of learners. Music can trigger an implicit memory of certain personal events, causing dementia patients to sing unexpectedly, regardless of how severe their dementia is [21].

Songs play a unique role in awakening individual memories and emotions and can evoke emotional resonance among listeners. Firstly, music reshapes memory through the brain's imaginative compensation mechanism. When memorizing a piece of music, brain clusters support functions such as grammar storage and retrieval, time processing, prediction and comparison with reality, stimulus feature integration, personal memory association, and emotional perception. Secondly, the structure of the song itself helps people remember. A typical popular song lasts about 3 minutes, with an overture, climax, and ending. It can be played repeatedly, breaking the linear timeline and reinforcing recurring impressions [22]. The media conveys people's emotions, and memories are not merely the repetitive stimulation of numerous rigid, lifeless, and disjointed impressions, but rather an imaginative reconstruction or creative building process [23]. Furthermore, as a medium of emotion, music can transcend the limitations of time and space, completing a dialogue between the "past" and the "present". In everyone's heart, there may be a song imbued with special emotional colors, which achieves emotional comfort in the present through the rendering and imagination of past experiences triggered by music.

4. Conclusion

This research underscores the importance of music therapy and examines the methodologies and therapeutic outcomes of utilizing music therapy for Alzheimer's disease, highlighting its benefits in improving mood, cognitive functions, and memory. The results of the study suggested music provides more effective and soothing treatment methods for elderly people with Alzheimer's disease, and reduces the burden and pressure on patients, caregivers, and society, making the elderly population with Alzheimer's disease in society happier and more content in their lives. Investigating Alzheimer's disease can provide us with a more profound comprehension of its etiology and pathogenesis, which is crucial for both prevention and intervention strategies. Advanced neuroscience methodologies are indispensable for the research of Alzheimer's disease and the continuous development of these technologies has also promoted the advancement of research in the entire field of neuroscience.

Nonetheless, the underlying causes and mechanisms of Alzheimer's disease remain incompletely understood, thereby complicating efforts in research and therapy. While emerging disease-modifying therapies hold promise, their long-term efficacy and safety require further investigation. Future research must continue exploring innovative approaches like music therapy to provide comprehensive solutions for dementia care.

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