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## **THE POTENTIAL OF MUSIC THERAPY IN IMPROVING COGNITIVE FUNCTIONS IN ALZHEIMER PATIENTS: CURRENT STATE OF THE PROBLEM**

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Alzheimer's disease (AD) is a prevalent form of dementia that poses a significant challenge to global health, particularly in the old population. Despite pharmacological interventions, the need for effective non-pharmacological therapies to improve cognitive and behavioural symptoms in AD patients is increasingly recognized. Music therapy (MT) has emerged as a promising intervention to address these challenges, but the evidence for its effectiveness remains inconclusive.

A systematic literature search was conducted to identify randomized controlled trials (RCTs) published between 2012 and 2022 that evaluated the impact of music therapy on cognitive functions in AD patients. Eight RCTs that met the inclusion criteria encompass 689 participants aged 60.47–87.1 years old. MT, such as Active Music Intervention (AMI) (e.g., playing an instrument, singing, clapping) and Receptive Music Intervention (RMI) (e.g., music listening) was used for 6 weeks –3 months. The changes in results on the Mini-Mental State Examination and other qualified methods and tests to assess the main patterns of cognitive status, depression, physical ability after MT were studied (Bleibel M. et al., 2023). Matziorinis A.M., Koelsch S., 2022).

Studies have shown that music therapy can improve mood, cognitive functions, memory, language, orientation and emotional state in people with dementia, including AD. AMI was generally more effective than RMI in improving cognitive outcomes, with individualized music playlists showing promising results in memory enhancement. Significant improvement was observed in depression and anxiety, hallucinations, agitation. The effect on cognitive measures was appreciable after only 4 music therapy sessions but were not sustained 3 months after completion of the study. The Researchers got to the Conclusion that the continuous use of MT can be useful for AD patients either in a short-term or long-term Run.

MT has been shown to induce plastic changes in brain networks, facilitate brain recovery processes, modulate emotions, and promote social communication. The first mechanism that is suggested is stimulation of neurogenesis (i.e., generation of new neurons) and neuroplasticity (e.g., structural changes in the brain, including formation of new synapses, axonal sprouting). A meta-analysis showed that music created feelings can activate the anterior hippocampal structure, and it is tempting to speculate that such activation might also stimulate neural development. Caudal anterior cingulate cortex and the ventral pre-supplementary motor area in healthy adults are also involved in neural encoding of long-known music. A second possible mechanism underlying beneficial effects of music in AD patients is the triggering of dopamine release. A third possible mechanism is related with inflammatory processes. Music raised emotions can reduce stress and give rise to physiological changes through activation of the autonomic nervous system. In addition, music can influence the neuroendocrine stress response and modulate immune system activity (e.g., Control of the release of cytokines).

In conclusion, the systematic review highlights the potential benefits of music therapy as a complementary treatment option for individuals with AD. The positive impact on cognitive functions, emotional well-being, and memory underscores the importance of continued investigation in this field to optimize the efficacy of music therapy in improving cognitive outcomes in AD patients. Further research is needed to better understand the mechanisms underlying the effects of music therapy and to establish standardized protocols (optimal music types, duration, and approach for music therapy interventions) in AD patients for its implementation in clinical practice.