Music Therapy in Alzheimer's Disease: Considerations for Implementation in Vietnam

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ABSTRACT

Alzheimer's Disease (AD) is the most common cause of dementia, accounting for an estimated 60-70% of dementia cases. The disease is characterized by a progressive loss of cognitive function associated with an excessive number of senile plaques in the cerebral cortex and subcortical gray matter atrophy accompanied by β-amyloid and neurofibrillary tangles consisting of tau protein. While there has yet to be an effective treatment for Alzheimer's disease, music therapy (MT) has shown promise for reducing a variety of symptoms. For instance, MT was able to reduce agitation, anxiety, and depression as well as aid cognitive, sensory, and socio-emotional abilities. Additionally, MT is easy to implement and well-tolerated by most patients and caregivers. However, MT is currently not widely prescribed in many countries, including Vietnam. We reviewed the literature on MT and dementia, with a focus on AD to better understand factors affecting MT efficacy and barriers to implementing MT for individuals with AD in Vietnam. Further research is warranted to gain a better understanding of factors affecting the efficacy of MT for individuals with AD, with considerations specifically for individuals with AD in Vietnam.

Objective

We aim to review the literature on AD and MT to gain a better understanding of factors affecting MT efficacy as well as potential barriers to implementation MT as a treatment for AD in Vietnam.

Methods

For our literature review, we used the following keywords: "Alzheimer's disease", "music therapy", "dementia", "factors affecting therapy", "factors affecting music therapy", "therapy in Vietnam", "psychology in Vietnam", and "challenges of music therapy" to identify relevant sources.

Alzheimer's Disease

Prevalence

Dementia, currently the seventh leading cause of death worldwide, is recognized by the World Health Organization (2024) as a global public health priority. There were more than 55 million people worldwide with dementia in 2023, and this number is expected to triple by 2050 (World Health Organization, 2023). The global direct and indirect costs of dementia is also expected to increase from 1.33 trillion US dollars in 2020 to 9.12 trillion US dollars by 2050 (Nandi et al., 2024). Alzheimer's disease (AD) is also prevalent in Vietnam, where there were approximately 660,000 individuals living with dementia as of 2015 (T.A. Nguyen et al., 2020). This number is projected double every 20

years, increasing to 1.2 million in 2030 and 2.4 million by 2050. Among a wide range of risk factors for dementia, age was found to be one of the most important in Vietnam (Bich et al., 2019). This is a significant concern since Vietnam is one of the most rapidly aging countries in the world, with more than 10% of the population being 60 or older in 2019 and the percentage is expected to rise to more than 25% by 2050 (Nam & Duc, 2021).

AD is the most common form of dementia, contributing to 60-70% of dementia cases. It is a progressive loss of cognitive function characterized by two hallmark pathologies: an excessive number of senile amyloid plaques and neurofibrillary tangles in the cerebral cortex and subcortical gray matter atrophy, which contains β-amyloid and tau protein (Porter & Kaplan, 2011; Sengoku, 2020; Weller & Budson, 2018). AD progresses through three stages: early, middle, and late (also sometimes referred to as mild, moderate, and severe; Alzheimer's Association, 2024). There is also a preclinical stage, which is when changes to the brain occur before any signs of AD appear.

Symptoms

AD symptoms can be classified into four areas 1) cognitive like memory impairment 2) behavioral like delusions and hallucinations 3) psychological like aggressive behavior and wandering, and 4) psychiatric like depression and anxiety (López & DeKosky, 2008; Lyketsos & Olin, 2002). AD is also characterized by an onset of episodic memory loss (Soria Lopez et al., 2019), which affects patients' ability to learn, remember, and retrieve information about unique experiences in their lives. People with AD may ask questions repeatedly, have the same conversations over again, and face difficulties in recalling details about recent events as well as the names of objects and other people. Visuospatial impairments are also typically attributed to AD, as disorientation of time and place is also observed (e.g., loss of directions, accompaniment requirement, need for reminders about the current date and location). AD symptoms often worsen as the disease progresses, evolving from patients retaining the ability to function independently in the early stage to experiencing personality changes and facing difficulties in expressing thoughts and completing daily tasks without assistance in the middle and late stages which require extensive care.

Treatment

FDA-approved medications are separated into two categories: drugs that mitigate symptoms of AD and drugs that change disease progression. Current drugs that provide symptom mitigation include cholinesterase inhibitors, NDMA antagonists, and atypical antipsychotics. Cholinesterase inhibitors help maintain a high concentration of acetylcholine, increasing nerve cell communication and slowing the disease's progression. Approved cholinesterase inhibitors include donepezil, galantamine, and rivastigmine. Meanwhile, NDMA antagonists, specifically memantine for individuals with AD, block toxic effects associated with excess glutamate and regulate glutamate activation. Atypical antipsychotics are drugs like brexpiprazole used to treat psychiatric conditions in agitated individuals. . In recent years, AD research treatment has made significant progress, especially with FDA approval of aducanumab and lecanemab, two drugs that address its pathology by targeting and removing β-amyloid (Alzheimer's Association, 2024; Kaur et al., 2024). However, safety concerns related to these drugs have been reported (Daly, 2023; Rahman et al., 2023).

Even with these developments, there has yet to be an established efficacious treatment for the disease. Current treatments often vary in their effectiveness across individuals and can lead to unpleasant side effects including nausea, diarrhea, sleep disturbances, and changes in behavior (Arafah et al., 2023). Such treatments may also lack efficacy due to the timing of intervention, as treatments are typically prescribed during the disease's late stage when the brain has already suffered significant damage. There is a lack of understanding regarding the long-term worth of amyloid-lowering to individuals with AD using drugs with amyloid-targeting approaches like lecanemab (Daly, 2023).

The development of more effective treatments for AD has been hindered potentially due to the need for a better understanding of the causes of AD as well as the blood-brain barrier restricting drug efficacy (Srivastava et al., 2021). Although it is known that AD is characterized by the accumulation of senile plaques and neurofibrillary tangles,

its precise etiology remains unclear. Thus, the best target for slowing disease progression remains to be identified (Weller & Budson, 2018). Furthermore, blood-brain barrier is an extremely selective semi-permeable membrane between the blood and the brain interstitium. The barrier allows cerebral blood vessels to regulate molecule and ion movement between the blood and the brain, shields the brain from toxins and harmful compounds, and supplies the brain tissue with nutrients (Alahmari, 2021; Dotiwala et al., 2024; Gawdi & Emmady, 2020). However, drugs developed to treat AD face difficulty in transporting across the blood-brain barrier, as it heavily depends on the properties of molecular size, hydrophilicity, and degree of dissociation (Gawdi & Emmady, 2020). Currently, 98% of small-molecule and almost 100% of macromolecular drugs cannot cross the blood-brain barrier (Pardridge, 2020). Thus, the barrier makes it challenging to test medications treating AD, as the majority of them are unable to reach the brain.

The problem is exacerbated in Vietnam given the lack of awareness and understanding of dementia, which makes diagnosis and care especially difficult.. Dementia is not currently recognized as a health priority in Vietnam (Bich et al., 2019). There are few studies, especially large-scale population ones, exploring the prevalence of dementia among individuals aged 60 or older.

Music Therapy

Music therapy (MT) uses music and its elements (e.g., sound, rhythm, melody, harmony) as an intervention in medical, educational, and everyday environments to improve quality of life and overall well-being. MT involves a variety of activities, including songwriting, singing, listening to music, and discussing music and its effects. MT has been shown to be effective for a variety of conditions, such as Parkinson's disease, stroke, and cancer (Li et al., 2020; Machado Sotomayor et al., 2021; Poćwierz-Marciniak & Bidzan, 2017; The American Music Therapy Association, 2024). Positive effects of MT include decreasing anxiety, improving sleep quality, and reducing pain (Mofredj et al., 2016).

MT has also been shown to provide significant benefits to individuals with AD. With the growing prevalence of AD and the blood-brain barrier restricting drug efficacy, non-pharmacological treatments, especially therapies, have gained increased importance in for people with AD because of their advantages (i.e., few side effects, easy acceptance by patients and their families; Jin et al., 2020). MT is one of the most promising non-pharmacological treatments (Fang et al., 2017) as it has been widely reported to be an effective treatment for people with AD (Fukui et al., 2012; Lyu et al., 2018; Matziorinis & Koelsch, 2022). Therapeutic benefits of MT include anxiety reduction, depression, and aggressive behavior alleviation, as well as mood, communication, and autonomy improvement in patients (Guetin et al., 2013). Furthermore, MT can also reduce cognitive decline, especially in autobiographical and episodic memories, psychomotor speed, executive function domains, and global cognition (Fang et al., 2017). Since MT is risk-free, easy to implement, and well-tolerated by most patients and caregivers, it is a promising means to aid individuals with AD (Matziorinis & Koelsch, 2022).

Factors Affecting Efficacy

Physical Capabilities

AD may result in reduced levels of physical activity, strength resistance of lower and upper limbs, functional balance, and general functioning, especially in elderly individuals (Pedroso et al., 2018). Such deficits may impact music therapy especially when it involves playing an instrument (Barwick, 2014). Thus, some individuals may need assistance from a music therapist or tool modification to play percussion instruments, the guitar, or the piano..

Communicative Abilities

Impairment of communicative abilities is often one of the earliest symptoms in individuals with AD (Pedroso et al., 2018) Impairments to communication involve significant language deficits, including verbal communication, hearing comprehension, and repetition (Banovic et al., 2018). Challenges in communication found in individuals with AD range from difficulties in finding the right word choice or simply unable to find a word at all. This poses a significant challenge to the efficacy of MT, as communication is a crucial means for understanding between therapist and client. Interactional conversations allow the therapist to ensure that the participants' attention and awareness of the session are captured. It may be crucial for the music therapist to have a good understanding of the deficits in communication of the participants so that they can make related adjustments (e.g., speaking with a calmer and quieter tone to minimize agitation and confusion in individuals with AD).

Environment/Surroundings

Patients' attention is highly important during MT sessions, as it is needed for the participant to experience the sessions in a stable environment (Ridder & Aldridge, 2005). The session environment and surroundings are some of the most crucial elements, as participants can be easily distracted by interruptions from staff members and peers, causing participants to be shift their focus from the therapist and session activity (Barwick, 2014). However, specific types of external interruptions have been shown to assist with the MT session. The surroundings or visual stimulation of the session space can help participants connect to the environment, music, and conversation, which may lead to a better mood and experience. One study observed individuals (N = 3) with late-stage AD and related major neurocognitive disorders who completed twelve 30-minute MT sessions over six weeks (Barwick, 2014). They found that MT sessions may be enhanced by having relatives or friends provide peer interaction by talking to participants, playing instruments with them, and supplying the therapist with important information about the participant (e.g., hobbies, favorite songs, preferred music genre).

Session Length

Limited research has explored the optimal session length for MT. Kovach and Magliocco (1998) recommended only 10 minutes, taking participant's fatigue into consideration. However, Barwick (2014) later argued that a longer duration would give participants more time to adapt to the experience. During Barwick's study, participants did not show any signs of fatigue for 30-minute sessions and remained alert throughout the session.

Musical Stimuli

Many elements of music have often succeeded in bringing the participant's attention back to the session activity and therapist (Barwick, 2014). Barwick's qualitative observations showed that this occurrence was clearest when changes and nuances in the songs playing appeared, such as the beginning of a bridge, unexpected silence or pause, and change in guitar accompaniment of a song. Another significant factor for MT efficacy is familiarity. Individuals with dementia were found to listen more closely to songs that were sung by caregivers.

Time of Day

Participant behavior and activity level may also be affected by the time of day in which the session is held (Barwick, 2014; Ridder & Aldridge, 2005). For instance, participants were significantly more alert, talkative, and energetic when

MT was conducted in the morning as compared to the afternoon. Depending on the participant's availability and level of energy throughout the day, it may be important for the therapist to select the appropriate time to conduct MT sessions so the benefits are maximized..

Session Setting

MT sessions may be conducted in either an individual setting or a group setting. Depending on the participant, one setting may be more beneficial than the other. By conducting a MT session in a group setting, participants may have a a wider diversity of style and intensity (Barwick, 2014). For instance, having multiple individuals playing percussions at the same time may create an excited feel fostering participation, or performing a song in a band may reduce participants' reluctance and shyness. However, an individual setting also has its benefits including fostering a more private and secure experience for the participants. Individual sessions may allow for a more personal connection between the therapist and the client.

Choice of Song

MT sessions often include activities such as playing instruments, songwriting, listening to music, and singing (e.g., Baker, 2015; Fukui et al., 2012; Vink et al., 2003). Since a lot of those activities depend on the choice of song, the musical parameters of such song (e.g., tempo, duration, lyrics) may affect the experience of the session. Based on our research, we have not found any definitive article that has explored how such parameters can affect the efficacy of MT for individuals with AD, though they may affect the session given the reported effects of musical parameters for the general population (Kamioka et al., 2014). The tempo often affects the emotional response to a song (e.g., a happy song is often characterized by a fast tempo; Murrock & Bekhet, 2016). Moreover, music with a slow tempo and rhythm has been reported to provide stress reduction by altering heart rates (Thaut & Hoemberg, 2014). Whether the chosen song is lyrical or non-lyrical may also be a factor. For instance, some AD individuals may have difficulties reading lyrics so lyrical songs may cause confusion and frustration for these participants. This may affect their experience of the MT session. Given that sustained attention in individuals with AD has been found to be impaired (Huntley et al., 2017), song duration may also be a factor to examine in future research.

Alzheimer's Disease and Music Therapy in Vietnam

Healthcare in Vietnam

In recent years, certain aspects of Vietnam's healthcare system have improved (Dang et al., 2021), including a more extensive healthcare network, increased accessibility to medical services covered by health insurance, and upgraded infrastructure. However, deficiencies remain when it comes to mental health treatment as numerous analyses and studies have shown limited training for mental illnesses such as dementia for healthcare personnel (e.g., Dang et al., 2021; Huynh-Truong et al., 2023). Inefficiencies in health service delivery for dementia also include a lack of infrastructure for dementia care delivery in grassroots-level facilities and inconsistent readiness and quality of healthcare service across all areas (Dang et al., 2021). Thus, plans or programs specifically targeting dementia are urgently needed in Vietnam (Dang et al., 2021; Huynh-Truong et al., 2023).

Possible Barriers to MT Implementation

One reason why MT might face difficulty in implementation for individuals with AD is Vietnamese cultural perception of mental illness and lack of understanding of dementia. Despite the increasing prevalence of dementia in Vietnam, caregivers, often the patient's family members, still possess a limited understanding of the disease (T.T.T. Nguyen et al., 2019). Caregivers often develop their own diagnosis which range from old age, physical injuries, and psychological distress to bad luck, and fate and karma (K.T. Nguyen et al., 2023). This, combined with Vietnamese cultural values and beliefs of family devotion, self-sacrifice, independence, and autonomy, typically affects what caregivers decide to do. Consequently, they tend to rely on their own caregiving, seeking help only when they feel they can no longer help. This often results in reduced treatment efficacy as it allows AD to progress unabated to the point where intervention may have limited efficacy as the brain may have already suffered significant damage.

Another significant barrier to implementing MT in Vietnam is its cost. According to the American Music Therapy Association (2021), the average MT cost in the US was $119 per hour for individual sessions and $93 per hour for group MT sessions. Meanwhile, the average Vietnamese monthly income was reported to be 7.3 million VND, or about $294 (Vietnam Ministry of Labour - Invalids and Social Affairs, 2023). Thus, most Vietnamese residents may not be able to afford MT.

MT has also received little attention in Vietnam, as there is limited research on the implementation of music intervention for Vietnamese individuals (K.T. Nguyen et al., 2023). Moreover, there is no formal MT training in Vietnam, leading to few qualified MT therapists. Since MT is currently not prevalent in Vietnam, policy makers should look to other countries for guidance. For instance, even though MT is available in the US, many music therapists report a low level of salary satisfaction (Meadows et al., 2024). If MT is introduced it Vietnam, it will be important to provide therapists with reasonable salaries to attract more practitioners.

Discussion

We have sought a literature review on AD and MT to identify factors that may affect MT efficacy and potential barriers to implementing it for individuals with AD, with a focus on patients in Vietnam. Factors that may affect MT efficacy include the physical capabilities and communicative abilities of participants, session environment, musical stimuli, time of day, and session setting. Many potential barriers specifically in Vietnam may explain why MT is not widely implemented in the nation, especially as a treatment for AD. With the lack of understanding about dementia among Vietnamese, the cause of the disorder is often explained by reasons like old age or bad luck. Furthermore, Vietnamese cultural values of self-reliance and family devotion lead to family members relying on their own caregiving abilities until no longer possible. Those two factors often result in a later point of intervention for patients, which makes treatment more difficult as the brain may have already suffered significant irreversible damage. This means that treatment methods, including MT, will not be considered by family members until individuals with AD have developed into later stages of the disease. This may consequently affect MT efficacy for individuals with AD, as impairment of communicative abilities and physical capabilities has been found in the population, especially those who are in the late or severe stage. Another factor is affordability as the per MT session in the US is more than a fourth of the average Vietnamese income, making it unaffordable for many, especially when accounting for other medical costs and caregiving expenses. Moreover, the number of music therapists in Vietnam is currently very limited, as there is MT training in Vietnam is almost non-existent. This may be attribute to the lack of knowledge about MT among Vietnamese. The low number of music therapists may also show that the implementation of MT in Vietnam will require more education and investment to increase the number of qualified professionals. With the number of AD cases rising, the government may want to subsidize some of the treatment and training costs.

Limitations

The factors affecting MT efficacy presented in this paper are not exhaustive. Many of the insights presented in this paper come from Barwick (2014) and Ridder and Aldridge (2005), which present purely qualitative findings. Further research should be conducted to replicate and extend their findings. It is also important to note that many of the participants in these studies experienced other forms of dementia (e.g., frontotemporal dementia). Thus, the factors identified will require quantification to verify whether and to what extent they affect MT efficacy for those with AD specifically.

While the benefits of MT for individuals with AD and the potential barriers to implementation of MT for individuals with AD in Vietnam were presented, the benefit-harm assessment for such implementation remains to be considered. The perception of Vietnamese individuals and the efficacy of other music interventions for this population were also not explored and would be beneficial for understanding more generally the effectiveness of music-based interventions in this population. Side effects and potential long-term negative effects of MT were also not reviewed. Future research should consider having Vietnamese individuals with AD participate in MT sessions, survey their experience (e.g., their opinions, the cost they would pay for the session, their chance of going to another MT session), and observe the effects of MT for these individuals.

Future Directions

While MT is known for having very few side effects, research specifically exploring such aspects of MT should be conducted. Few studies have explored factors that may affect MT efficacy specifically, thus future work may consider testing out the factors listed in this paper in a quantitative analysis.

Research thus far has supported beneficial effects of MT for individuals with AD. Future research analyzing the demographics of MT participants might contribute significantly to understanding the state of MT for people with dementia. Such studies looking at the demographic characteristics of MT participants may open up to more interesting findings and discover more factors affecting the efficacy of MT. Specifically, knowing the main age group of MT participants might be a good indication of the potential of MT for individuals with AD, as MT programs and research can spend more time exploring the factors affecting MT efficacy presented in that age group. Moreover, the nationality or cultural background of MT participants may also be a good indicator of the potential effectiveness of MT for certain regions. For instance, the potential of MT for Vietnamese individuals with AD may be better understood if such demographics show that participants from Southeast Asia tend to sign up to experience MT for more than one session. The cultural influence, the perception of MT in such regions could be examined to further identify the population that would benefit most from MT. Such studies looking at the demographic characteristics of MT participants may open up to more interesting findings and discover more factors affecting the efficacy of MT.

Few articles to date have addressed the Vietnam healthcare system as it relates to AD treatment. Future research should further explore the potential inefficiencies of the system to see whether there are other aspects that require further improvement before considering the implementation of MT. A lack of attention and knowledge about mental health is reported in Vietnam (Bich et al., 2019), so future research should also explore the relationship between mental health symptoms and AD, and how this may affect the prevalence of AD in Vietnam. A MT workforce analysis in Vietnam, where job satisfaction, education level, and related categories are surveyed, would also be beneficial for increasing MT training given the limited number of music therapists in the country.

Significance

As MT has been reported to be effective for individuals with AD, with few side effects and easy acceptance among individuals with AD, factors affecting MT efficacy may be considered to better the experience of the participants and the efficacy of the treatment (e.g., time of the day of MT sessions, instrument for participants to use, length of sessions). Adjusting the parameters of MT sessions can help maximize cognitive benefits with the goal of improving overall quality of life.

Since MT is not widely available in Vietnam despite the well-understood benefits of the method for individuals with AD, it is important to consider the potential of MT for Vietnamese individuals with AD. The present review presented some potential barriers that need to be overcome for meaningful implementation to occur in Vietnam. Such information and the factors affecting MT efficacy presented may be considered for more effective implementation of MT in Vietnam for individuals with AD. For instance, considerations should be given for formal MT training and for competitive compensation to attract needed professionals into the field.

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References

Alahmari, A. (2021). Blood-Brain Barrier Overview: Structural and Functional Correlation. *Neural Plasticity*, *2021*, 1–10. https://doi.org/10.1155/2021/6564585

Alzheimer's Association. (2024). *Stages of Alzheimer's*. https://www.alz.org/alzheimers-dementia/stages

Arafah, A., Khatoon, S., Rasool, I., Khan, A., Rather, M. A., Abujabal, K. A., Faqih, Y. A. H., Rashid, H., Rashid, S. M., Bilal Ahmad, S., Alexiou, A., & Rehman, M. U. (2023). The Future of Precision Medicine in the Cure of Alzheimer's Disease. *Biomedicines*, *11*(2), 335. https://doi.org/10.3390/biomedicines11020335

Baker, F. A. (2015). What about the music? Music therapists' perspectives on the role of music in the therapeutic songwriting process. *Psychology of Music*, *43*(1), 122–139. https://doi.org/10.1177/0305735613498919

Banovic, S., Zunic, L., & Sinanovic, O. (2018). Communication Difficulties as a Result of Dementia. *Materia Socio Medica*, *30*(2), 221. https://doi.org/10.5455/msm.2018.30.221-224

Barwick, C. A. (2014). *Describing the Subtle Factors that Influence Moments of Interactive Responses During Music Therapy Sessions for People with Late-stage Alzheimer's Disease and Other Related Major Neurocognitive Disorders: A Multiple Case Study*.

Bich, N. N., Dung, N. T. T., Vu, T., Quy, L. T., Tuan, N. A., Binh, N. T. T., Hung, N. T., & Anh, L. V. (2019). Dementia and associated factors among the elderly in Vietnam: A cross-sectional study. *International Journal of Mental Health Systems*, *13*(1), 57. https://doi.org/10.1186/s13033-019-0314-7

Daly, T. (2023). Alzheimer's research after full approval of lecanemab: Impetus and variety. *Dementia & Neuropsychologia*, *17*, e20230064. https://doi.org/10.1590/1980-5764-dn-2023-0064

Dang, T. H., Tran, K., Esterman, A., Roughead, E. E., Brodaty, H., Hinton, L., Kim, G. B., Kurrle, S., Crotty, M., Pham, T., Le Pham, T., Hoang, P., & Nguyen, T. A. (2021). Healthcare services for people with dementia in Vietnam: A situational analysis. *Alzheimer's & Dementia*, *17*(S10), e057659. https://doi.org/10.1002/alz.057659

Dotiwala, A. K., McCausland, C., & Samra, N. S. (2024). Anatomy, Head and Neck: Blood Brain Barrier. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK519556/

Fang, R., Ye, S., Huangfu, J., & Calimag, D. P. (2017). Music therapy is a potential intervention for cognition of Alzheimer's Disease: A mini-review. *Translational Neurodegeneration*, *6*(1), 2. https://doi.org/10.1186/s40035-017-0073-9

Fromm, D., Holland, A. L., Nebes, R. D., & Oakley, M. A. (1991). A Longitudinal Study of Word-Reading Ability in Alzheimer's Disease: Evidence from the National Adult Reading Test. *Cortex*, *27*(3), 367–376. https://doi.org/10.1016/S0010-9452(13)80032-9

Fukui, H., Arai, A., & Toyoshima, K. (2012). Efficacy of Music Therapy in Treatment for the Patients with Alzheimer's Disease. *International Journal of Alzheimer's Disease*, *2012*, 1–6. https://doi.org/10.1155/2012/531646

Gawdi, R., & Emmady, P. D. (2020). *Physiology, blood brain barrier*. https://europepmc.org/article/nbk/nbk557721

Guetin, S., Charras, K., Berard, A., Arbus, C., Berthelon, P., Blanc, F., Blayac, J.-P., Bonte, F., Bouceffa, J.-P., Clement, S., Ducourneau, G., Gzil, F., Laeng, N., Lecourt, E., Ledoux, S., Platel, H., Thomas-Anterion, C., Touchon, J., Vrait, F.-X., & Leger, J.-M. (2013). An overview of the use of music therapy in the context of Alzheimer's disease: A report of a French expert group. *Dementia*, *12*(5), 619–634. https://doi.org/10.1177/1471301212438290

Huntley, J. D., Hampshire, A., Bor, D., Owen, A. M., & Howard, R. J. (2017). The importance of sustained attention in early Alzheimer's disease: Sustained attention in Alzheimer's disease. *International Journal of Geriatric Psychiatry*, *32*(8), 860–867. https://doi.org/10.1002/gps.4537

Huynh-Truong, H. L., Shyu, Y.-I. L., Tran, T. K. L., Huang, H.-L., & Do, V. A. (2023). Dementia care practices among community healthcare workers in Vietnam: A qualitative descriptive study. *BMC Geriatrics*, *23*(1), 562. https://doi.org/10.1186/s12877-023-04199-0

Kamioka, H., Mutoh, Y., Tsutani, K., Yamada, M., Park, H., Okuizumi, H., Tsuruoka, K., Honda, T., Okada, S., Park, S.-J., Kityuguchi, J., Abe, T., Handa, S., & Oshio, T. (2014). Effectiveness of music therapy: A summary of systematic reviews based on randomized controlled trials of music interventions. *Patient Preference and Adherence*, 727. https://doi.org/10.2147/PPA.S61340

Kaur, U., Reddy, J., Tiwari, A., Chakrabarti, S., & Chakrabarti, S. S. (2024). Lecanemab: More Questions Than Answers! *Clinical Drug Investigation*, *44*(1), 1–10. https://doi.org/10.1007/s40261-023-01331-1

Li, Y., Xing, X., Shi, X., Yan, P., Chen, Y., Li, M., Zhang, W., Li, X., & Yang, K. (2020). The effectiveness of music therapy for patients with cancer: A systematic review and meta-analysis. *Journal of Advanced Nursing*, *76*(5), 1111–1123. https://doi.org/10.1111/jan.14313

Lyu, J., Zhang, J., Mu, H., Li, W., Champ, M., Xiong, Q., Gao, T., Xie, L., Jin, W., & Yang, W. (2018). The effects of music therapy on cognition, psychiatric symptoms, and activities of daily living in patients with Alzheimer's disease. *Journal of Alzheimer's Disease*, *64*(4), 1347–1358.

Machado Sotomayor, M. J., Arufe-Giráldez, V., Ruíz-Rico, G., & Navarro-Patón, R. (2021). Music Therapy and Parkinson's Disease: A Systematic Review from 2015–2020. *International Journal of Environmental Research and Public Health*, *18*(21), 11618. https://doi.org/10.3390/ijerph182111618

Matziorinis, A. M., & Koelsch, S. (2022). The promise of music therapy for Alzheimer's disease: A review. *Annals of the New York Academy of Sciences*, *1516*(1), 11–17. https://doi.org/10.1111/nyas.14864

Meadows, A., Eyre, L., & Gollenberg, A. (2024). Workforce Characteristics, Work Satisfaction, Stress, Burnout and Happiness of Early Career Music Therapists in the United States. *Voices: A World Forum for Music Therapy*, *24*(1). https://doi.org/10.15845/voices.v24i1.3993

Mofredj, A., Alaya, S., Tassaioust, K., Bahloul, H., & Mrabet, A. (2016). Music therapy, a review of the potential therapeutic benefits for the critically ill. *Journal of Critical Care*, *35*, 195–199. https://doi.org/10.1016/j.jcrc.2016.05.021

Murrock, C. J., & Bekhet, A. K. (2016). Concept Analysis: Music Therapy. *Research and Theory for Nursing Practice*, *30*(1), 44–59. https://doi.org/10.1891/1541-6577.30.1.44

Nam, U. V., & Duc, N. M. (2021). Population ageing and older persons in Viet Nam. *General Statistics Office*. https://vietnam.unfpa.org/sites/default/files/pub-pdf/ageing_report_from_census_2019_eng_final20082021.pdf

Nandi, A., Counts, N., Bröker, J., Malik, S., Chen, S., Han, R., ... & Bloom, D. E. (2024). Cost of care for Alzheimer's disease and related dementias in the United States: 2016 to 2060. *npj Aging*, *10*(1), 13. https://doi.org/10.1038/s41514-024-00136-6

Nguyen, K. T., Vu, N. T. H., Tran, M. T. T., & Chan, C. W. H. (2023). A qualitative study on stress, coping strategies and feasibility of music intervention among women with cancer receiving chemotherapy during COVID-19 pandemic in Vietnam. *Scientific Reports*, *13*(1), 542. https://doi.org/10.1038/s41598-023-27654-9

Nguyen, T. A., Pham, T., Dang, T. H., Hinton, W. L., Nguyen, A. T., Pham, T. L., Crotty, M., Kurrle, S., Bui, Q. T., Nguyen, H., & Roughead, E. E. (2020). Towards the development of Vietnam's national dementia plan—The first step of action. *Australasian Journal on Ageing*, *39*(2), 137–141. https://doi.org/10.1111/ajag.12755

Nguyen, T. T. T., Gia Dinh People's Hospital, Ho Chi Minh City, Vietnam, The, T. H. N., McFarland, P. L., Chiem, M. N. T., Huynh, T. Q., Tran, T. T. T., & Nguyen, T. V. (2019). Dementia Prevalence Among Older Hospitalized Patients in Vietnam and Dementia Understanding of Their Caregivers. *Aging Medicine and Healthcare*, *10*(4), 128–132. https://doi.org/10.33879/AMH.2019.123-1902.003

Pardridge, W. M. (2020). Treatment of Alzheimer's Disease and Blood–Brain Barrier Drug Delivery. *Pharmaceuticals*, *13*(11), 394. https://doi.org/10.3390/ph13110394

Pedroso, R. V., Corazza, D. I., Andreatto, C. A. D. A., Silva, T. M. V. D., Costa, J. L. R., & Santos-Galduróz, R. F. (2018). Cognitive, functional and physical activity impairment in elderly with Alzheimer's disease. *Dementia & Neuropsychologia*, *12*(1), 28–34. https://doi.org/10.1590/1980-57642018dn12-010004

Poćwierz-Marciniak, I., & Bidzan, M. (2017). The influence of music therapy on quality of life after a stroke. *Health Psychology Report*, *5*(2), 173–185. https://doi.org/10.5114/hpr.2017.63936

Ridder, H. M., & Aldridge, D. (2005). Individual Music Therapy with Persons with Frontotemporal Dementia: Singing Dialogue. *Nordic Journal of Music Therapy*, *14*(2), 91–106. https://doi.org/10.1080/08098130509478132

Sengoku, R. (2020). Aging and Alzheimer's disease pathology. *Neuropathology*, *40*(1), 22–29. https://doi.org/10.1111/neup.12626

Soria Lopez, J. A., González, H. M., & Léger, G. C. (2019). Alzheimer's disease. In *Handbook of Clinical Neurology* (Vol. 167, pp. 231–255). Elsevier. https://doi.org/10.1016/B978-0-12-804766-8.00013-3

Srivastava, S., Ahmad, R., & Khare, S. K. (2021). Alzheimer's disease and its treatment by different approaches: A review. *European Journal of Medicinal Chemistry*, *216*, 113320. https://doi.org/10.1016/j.ejmech.2021.113320

Stanyon, M. R., Griffiths, A., Thomas, S. A., & Gordon, A. L. (2016). The facilitators of communication with people with dementia in a care setting: An interview study with healthcare workers. *Age and Ageing*, *45*(1), 164–170. https://doi.org/10.1093/ageing/afv161

Thaut, M., & Hoemberg, V. (2014). *Handbook of neurologic music therapy*. Oxford University Press, USA. https://books.google.com/books?hl=en&lr=&id=5Gb0AwAAQBAJ&oi=fnd&pg=PP1&dq=Thaut,+M.,+%26+Hoemberg,+V.+(Eds.).+(2014).+Handbook+of+neurologic+music+therapy.+Oxford+University+Press,+USA.&ots=ICbvIwNGg0&sig=aImvirnYcnqI5ocDM4rgJ30nNTg

The American Music Therapy Association. (2024). *AMTA 2021 Workforce Analysis*. https://www.musictherapy.org/assets/1/7/2021_Workforce_Analysis_final.pdf

The Merck manual of diagnosis and therapy, 19th ed. (2011). xxxii, 3754.

Vietnam Ministry of Labour - Invalids and Social Affairs. (2023). *Newsletter for Vietnam's labour market update*. https://english.molisa.gov.vn/topic/239637

Vink, A. C., Bruinsma, M. S., & Scholten, R. J. (2003). Music therapy for people with dementia. In The Cochrane Collaboration (Ed.), *Cochrane Database of Systematic Reviews* (p. CD003477.pub2). John Wiley & Sons, Ltd. https://doi.org/10.1002/14651858.CD003477.pub2

Weller, J., & Budson, A. (2018). Current understanding of Alzheimer's disease diagnosis and treatment. *F1000Research*, *7*, 1161. https://doi.org/10.12688/f1000research.14506.1

World Health Organization. (2024). *Dementia*. https://www.who.int/news-room/fact-sheets/detail/dementia