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# ALZHEIMER'S DISEASE AND THE IMPACT OF MUSIC THERAPY

*A Systematic Literature Review*

Hayley Guess



## ABSTRACT

Although a cure for Alzheimer's disease (AD) has yet to be discovered, several non-pharmacological treatments can improve patients' quality of life and provide temporary relief from the disabling symptoms. One of these treatments is music therapy. This systematic literature review evaluates the existing research on the relationship between Alzheimer's disease and music therapy, with a narrowed focus on familiar music therapy, the potential mechanisms of action that explain the efficacy of this intervention, and the resulting nursing implications that may be utilized in practice. A search of the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database returned 13 articles, which were analyzed and compared based on their level of evidence, sample size, intervention, outcome measures, results, and limitations. The results of the literature review affirm a clear relationship between music therapy and improved memory and cognition.

Currently the sixth leading cause of death in the United States, Alzheimer's disease (AD) has become the most prevalent form of dementia, a term commonly associated with memory loss and other progressive cognitive deficits that compromise patients' lives. What may begin as a misplaced object or a momentary inability to recall newly learned information will eventually advance to a loss of personal identity, forgotten loved ones, and utter misperception of reality. Although a cure for AD has yet to be discovered, several non-pharmacological treatments can improve patients' quality of life and provide temporary relief from the disabling manifestations. One of these treatments is music therapy. Music can be deeply connected with emotional processing and memory recall, and, when utilized as an interventional therapy for AD patients, can yield numerous cognitive and behavioral symptomatic benefits. The purpose of this project is a systematic literature review that evaluates the therapeutic relationship between AD and music therapy with a narrowed focus on familiar music therapy, the potential mechanisms of action that explain the efficacy of this intervention, and the resulting nursing implications that may be utilized in practice.

## METHODS

An exhaustive literature review was conducted using the database CINAHL (EBSCO). The search terms included "Alzheimer's disease AND music therapy," "Alzheimer's AND music therapy," "Alzheimer's disease symptoms AND music therapy," "Alzheimer's disease AND music therapy AND familiar music," and "Alzheimer's disease AND active music therapy." The literature search included full text articles from academic journals in the English language, including international articles. Only articles published between 2007 through 2017 were reviewed, with the exception of one relevant article from 2005. From the initial search results, 35 articles matched the preliminary criteria and were further reviewed if they addressed a) Alzheimer's disease, b) elements and types of music therapy, c) outcomes of music therapy, d) scientific explanation of music therapy efficacy, and e) nursing implications. A total of 13 articles met the inclusion criteria and were included in the literature review. Six of these articles focused on familiar music therapy and are summarized in Table 1.

## ALZHEIMER'S DISEASE

Alzheimer's disease (AD), an irreversible progressive brain disorder, has an unrelenting course that adversely impacts every aspect of a patient's reality and often results in utter dependency on others for self care. With a new diagnosis every 66 seconds, AD affects more than five million individuals in the United States alone, and the Alzheimer's Association (2017) estimates this number to more than triple by 2050.

While AD often progresses gradually through three stages—mild, moderate, and severe—every patient endures the associated manifestations differently, which can make it difficult to discern which stage a person is experiencing. An individual displaying the early symptoms of AD may show signs of forgetfulness, possibly misplacing objects or failing to recall a friend's name, but will likely remain independent through the first stage of the disease. As the patient's condition progresses into the middle stage, personality and behavior changes will be noted, such as frustration, anger, refusing to shower, etc., as well as a greater need for assistance with daily activities. The most disabling manifestations of the disease appear in the final stage, including a loss of environmental awareness, severe communication impairments, crippling physical limitations, and the need for constant supervision and care (Alzheimer's Association, 2017).

*Non-pharmacological therapies for AD symptom management have been identified and implemented to improve patients' quality of life.*

One of the most troubling aspects of AD lies in the inevitable imminence of death once the disease begins to unfold, despite the pharmacological options that exist. Treatment efforts for AD patients currently focus on symptom management utilizing a multidisciplinary approach that combines both pharmacological and non-pharmacological interventions to achieve the highest possible quality of life. While beneficial, most pharmacological treatments yield limited improvement and may result in further patient deterioration due to the adverse effects associated with antipsychotic and/or psychotropic drugs (Guétin et al., 2013). In contrast, the various non-pharmacological therapies for AD symptom management have been identified and implemented to improve patients' quality of life, and researchers continue to vigorously pursue answers to better understand the disease, determine effective treatment options, and prevent its development entirely.

## MUSIC THERAPY

The use of non-pharmacological strategies as a potential treatment method for cognitive and behavioral disorders has become a more prevalent occurrence in patient care plans, with a specific emphasis on music therapy as an exceptionally effective intervention for AD, as acknowledged by the French Agency for Health Accreditation and Evaluation (Narme et al., 2013). Music therapy, as defined

**TABLE 1**

<b>SUMMARY OF ARTICLES FOCUSING ON FAMILIAR MUSIC THERAPY</b>					
<b>Authors, Year, Level of Evidence (LOE)</b>	<b>Intervention</b>	<b>Sample</b>	<b>Outcomes Assessed</b>	<b>Results</b>	<b>Limitations</b>
<p>Guetin et al. 2009</p> <p>LOE II</p>	<p>Individual receptive music therapy</p>	<p>N=15 treated group (individual, receptive music therapy)</p> <p>N=15 control group (reading sessions)</p>	<p>Anxiety and Depression</p>	<p>Patients in the treated group showed significant improvements in anxiety and depression, sustained up to 8 weeks after discontinuation of music therapy sessions.</p>	<p>Only studied patients in mild-to-moderate stages of AD.</p>
<p>Arroyo-Anlló, E., Díaz, J., &amp; Gil, R. 2013</p> <p>LOE II</p>	<p>Familiar music stimulation</p>	<p>N=20 experimental group (familiar music stimulation)</p> <p>N=20 control group (unfamiliar music stimulation)</p>	<p>Impact of familiar music on self-consciousness (SC)</p>	<p>Familiar music therapy can significantly maintain or improve aspects of SC in AD patients.</p>	<p>Music stimulation conducted in patient homes by caregivers. Length of each session questioned (2-4 min).</p>
<p>Dassa, A., &amp; Amir, D. 2014</p> <p>LOE VI</p>	<p>Singing familiar songs</p>	<p>N=6 participants</p>	<p>Conversation</p>	<p>Familiar songs elicited past memories. Singing generated related conversation. Group singing elicited spontaneous verbal response.</p>	<p>Small sample size. Researcher role conflict. No control group.</p>
<p>Cox, E., Nowak, M., &amp; Buettner, P. 2011</p> <p>LOE IV</p>	<p>Live, familiar violin music played one-on-one</p>	<p>N=7 participants</p>	<p>Agitated behavior</p>	<p>This intervention reduced short-term agitated behaviors, and the total number of agitated behaviors decreased significantly.</p>	<p>Small sample size. No control group. Potential bias by the investigator. No suitable standardized measurement instrument available—specific one designed for this study has yet to be validated.</p>
<p>Ledger, A., &amp; Baker, F., 2017</p> <p>LOE III</p>	<p>Group music therapy</p>	<p>N=26 experimental group (group music therapy)</p> <p>N=19 control group (usual nursing and therapy care)</p>	<p>Agitation</p>	<p>The experimental group showed short-term reductions in agitation. There were no long-term significant differences between the two groups.</p>	<p>Inter- and intra-patient variability. Low endorsement of CMAI (Cohen-Mansfield Agitation Inventory) behaviors.</p>
<p>Peck, K., Girand, T., Russo, F., &amp; Fiocco, A. 2016</p> <p>LOE V</p>	<p>Music exposure</p>	<p>95 articles providing anecdotal and empirical evidence</p>	<p>Cognitive function, memory, potential mechanisms of action</p>	<p>This paper identifies three potential underlying mechanisms that may be responsible for music's effects on AD</p>	<p>Limited existing research articles.</p>

by the World Federation of Music Therapy, is “the use of music and/or its 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 in order to meet physical, emotional, mental, social, and cognitive needs” (Guetin et al., 2013, p. 621).

*There is hieroglyphic evidence suggesting the Egyptians treated a variety of ailments, such as pain, depression, and sleep disorders, with melodic hymns and incantations.*

While music therapy has gained popularity in recent years as an effective tool to manage a variety of health care needs, such as procedural pain control, behavioral disorder manifestations, and physical rehabilitation, this non-pharmacological intervention has ancient roots dating as far back as the sixth century BCE (Cox, Nowak, & Buettner, 2011). There is hieroglyphic evidence suggesting the Egyptians treated a variety of ailments, such as pain, depression, and sleep disorders, with melodic hymns and incantations (Guetin et al., 2013). Plato, during ancient Grecian times, dubbed musical training a form of “mental hygiene,” as well as “medicine for the soul” (Guetin et al., 2013, p. 622). The 20th century brought about the scientific discovery of the physiological effects music can produce on blood pressure and heart rate, which helps explain the earlier findings detected by dental surgeons, who noticed their patients seemed to experience decreased pain and anxiety during procedures if a phonograph was playing simultaneously (Guetin et al., 2013).

Although primitive, these historical efforts laid the foundation to legitimize music therapy professionally. The National Association for Music Therapy, created in the United States during the mid-20th century, became the original representative professional organization and was shortly followed by the emergence of the American Association for Music Therapy in 1971. Since then, these two associations have been consolidated into the present-day American Music Therapy Association (AMTA), which is responsible for setting the educational requirements for aspiring music therapists. In order to become Music Therapist-Board Certified (MT-BC) in the United States, these individuals must receive a bachelor’s, master’s, or doctoral degree from an accredited program, complete a

clinical internship, and partake in 1200 clinical training hours before sitting for the board certification examination (Ahn & Ashida, 2012). The AMTA also established professional competencies, standards of clinical practice, and a code of ethics to maintain the quality of services provided by the music therapy profession. The standards of clinical practice outline the general order in which music therapy services are delivered: 1) referral and acceptance, 2) assessment, 3) treatment planning, 4) implementation, 5) documentation, and 6) termination (American Music Therapy Association, 2015).

## ACTIVE VS. RECEPTIVE MUSIC THERAPY

Although the exact physiological mechanisms responsible for the efficacy of music therapy on Alzheimer’s disease are not yet fully understood, the behavioral, cognitive, and physical improvements that have been noted during both therapy sessions and research studies are undeniably significant. The degree of improvement following musical intervention is primarily influenced by music therapists’ understanding of how best to utilize the distinct elements within music, which is further based on their knowledge of how each aspect will impact a patient’s cognitive and behavioral status (Guetin et al., 2009). The broader concept of music therapy encompasses two fundamental methods, active and receptive. Active music therapy requires the patient to be physically engaged, such as through the use of sound-producing objects, singing, dance-like movement, or playing instruments (Guetin et al., 2013). Receptive music therapy, considered a “controlled method for listening to music,” is comprised of specifically selected songs or live music played for the patient, with song choice based on individually meaningful elements, such as generation, culture, or personal history (Guetin et al., 2009). Both active and receptive music therapy can be used to target specific AD symptoms, such as memory loss, language deficits, depression, anxiety, and/or agitation, with the degree of symptomatic improvement primarily dependent on which method is utilized. Therapists may use a single method individually or combine methods, depending on the desired outcome.

Active music therapy provides an opportunity for patients’ continuation of self-expression, for although verbal skills are often inhibited early in the disease process, musical and rhythmic abilities endure. This method, especially when conducted within a group, prompts patient creativity and communication, which not only alleviate feelings of isolation through a regained ability to socialize, but also enhance self-image (Guetin et al., 2013). Furthermore, this method is particularly useful for patients suffering from a language deficit. Singing, for example, can help compensate for speech loss following the onset of aphasia,

maintain articulation, and support breath control. This type of music therapy heavily encourages physical engagement, purposefully exercising parts of the body through specific activities. Rhythm-based exercises pinpoint psychomotility (bodily movements influenced by mental processes), allowing patients to maintain a feasible level of mobility and coordination, and playing instruments assists in improving fine and gross motor skills (Guetin et al., 2013).

Receptive music therapy, generally considered to be a more passive approach, encompasses three distinct techniques: analytical, reminiscent, and relaxation. Analytical receptive music therapy is a type of psychotherapy in which the therapist utilizes music as a therapeutic tool to evaluate the patient before and after listening to carefully selected songs, with the intent of promoting expression and thought development. Reminiscent receptive music therapy involves playing meaningful and familiar songs unique to each patient, and aims to improve short- and long-term memory, evoke forgotten memories, and boost patient confidence to facilitate social interactions. The objective of relaxation receptive music therapy is to overcome distressing symptoms, such as pain, depression, and anxiety, by providing a calming environment. This result is most commonly accomplished through use of “U” sequences, or “music sequences of 20-30 minutes, subdivided into several phases,” which guide the patient progressively towards a state of relaxation (Guetin et al., 2013, p. 625).

Flexibility and adaptability are key concepts the music therapist must consider during sessions in order to maximize patients’ engagement and participation (Ahn & Ashida, 2012). Therefore, the musical techniques selected are tailored to patients’ ability level, as well as behavioral and cognitive status (Guetin et al., 2013). Specific therapeutic activities that hold meaning for these individuals, or that somehow relate to their earlier years of life, should be utilized since musical interventions that include an element of familiarity will elicit the most beneficial outcomes (Guetin et al., 2013).

## FAMILIAR MUSIC & THE PERSONAL PLAYLIST

Due to the “close links that exist between the elements that make up music and the subject’s individual history,” the use of meaningful, familiar songs with both active and receptive interventions often acts as a key, unlocking forgotten memories and allowing them to resurface to the patient’s conscious mind temporarily (Guetin et al., 2013, p. 623). In order to determine familiar music, music therapists conduct a thorough patient assessment, following the previously listed standards of clinical practice. By exploring the patient’s cultural background, assessing aspects such as socioeconomic status, religion/spirituality, race, ethnicity, language, family experiences, etc., music therapists are able to formulate an

individualized music therapy program (American Music Therapy Association, 2015). Selecting music, both active and passive, that reflects patients’ generation, personal experiences, and/or emotional associations will stimulate neural networks in several parts of the brain to regenerate affiliated memories through the auditory pathways. Based on this understanding, researchers developed the concept of personal playlists, providing Alzheimer’s patients with instant access to personally evocative music through a simple, inexpensive digital audio player, such as an iPod Shuffle or MP3 player (Tomaino, 2011).

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This idea originated from the “Well-Tuned: Music Players for Health” program, which was collaboratively created by MusicandMemory.org and the Institute for Music and Neurological Function, and sanctioned by licensed music therapists (Tomaino, 2011). The success of this program is rooted in the personalization of music, which is achieved by customizing playlists to incorporate songs related to personal “experiences, cultural backgrounds, and frame of reference” (Tomaino, 2011, p. 20).

Patients are encouraged to have access to multiple individualized playlists because the musical selections in each can be modified to elicit specific desired outcomes throughout the day, such as rousing patients early in the morning or soothing them as bedtime approaches (Tomaino, 2011). Furthermore, these uniquely tailored playlists can assist patients in achieving other therapeutic goals, such as relaxation or exercise, which become more difficult over time as the disease progresses (Tomaino, 2011).

Arroyo-Anlló, Díaz, and Gil (2013) examined the effects of familiar music therapy on AD patients’ self-consciousness (SC), and, although the described methodology did not directly reference the term “personal playlist,” a comparable approach was utilized during the study. The researchers focused on seven components of SC that deteriorate with the progression of AD: “personal identity, anosognosia (lack of insight or self-awareness), affective state, body representation, future memory, introspection, and moral judgments” (Arroyo-Anlló et al., 2013, p. 1). As music therapy has the ability to enhance these aspects in AD patients, the researchers selected this intervention to explore whether the use of familiar music would considerably improve parts

of the participants' SC in comparison to unfamiliar music (Arroyo-Anlló et al., 2013).

The study's inclusion criteria mandated that all participants be in the mild to moderate stages of AD; they were then evenly divided to eliminate any age, gender, or educational discrepancies, and randomly assigned to either the experimental or control group. Both groups underwent the same pre- and post-intervention assessments, during which each participant completed two cognitive tests and a SC questionnaire. The SC questionnaire, previously devised by the same researchers for an earlier study, was comprised of 14 simple questions designed to assess the seven components of SC. The intervention phase introduced a 36-week period of musical stimulation, which was broken down into 2-4 minute sessions, three times a week. In a manner equivalent to that of the personal playlist, each patient in the experimental group listened to pre-selected popular Spanish music in their homes via headphones, while those in the control group were assigned unfamiliar non-Spanish songs (Arroyo-Anlló et al., 2013).

Researchers determined from the pre-intervention questionnaire results that there were no significant differences in any aspects of SC between the experimental and control groups. However, following the musical interventions, a slight change was noted in the experimental group's overall SC questionnaire score, while the control group's score indicated further deterioration. Therefore, researchers found a significant difference in the pre- and post-intervention scores between the two groups. All SC aspects of the control group demonstrated further impairment or were left unchanged following musical intervention with the exception of body representation, which was shown to improve (Arroyo-Anlló et al., 2013). Additionally, the experimental group revealed significant improvements in personal identity, affective state, moral judgments, and body representation after familiar music stimulation, while anosognosia, prospective memory, and introspection remained unchanged (Arroyo-Anlló et al., 2013).

Arroyo-Anlló et al. (2013) concluded that the results confirmed their initial hypothesis, which surmised that exposing AD patients to familiar musical selections would lead to improvements in their SC. Although the control AD group demonstrated progressive mental decline throughout the study, it remains undetermined whether this symptomatic deterioration was due to the unfamiliar musical exposure, the progression of AD, or other potential explanations. Regardless, the findings of this study led the researchers to conclude that "familiar music could be considered as an enhancer not only of SC in AD, but also of the general cognitive state," suggesting that familiar music intervention could be an important therapeutic tool to improve quality of life for these unfortunate patients (Arroyo-Anlló et al., 2013, p. 6).

## THERAPEUTIC INDICATIONS: SYMPTOM RELIEF

Due to the cognitive, affective, and behavioral stimulatory responses elicited through both active and passive familiar music therapy, there are a diverse number of indications for the use of this therapeutic intervention with AD patients (Guetin et al., 2013). Music therapy arouses autobiographical memories, evokes conversation through speech facilitation, alleviates anxiety and depression, and diminishes the occurrence of agitated outbursts.

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## MEMORY LOSS

Memory loss is one of the most distinguishing symptoms of AD, gradually stealing away individuals' personal identities, recognition of loved ones, and most cherished lifelong experiences. Fortunately, however, "emotionally charged memories are better encoded and remembered than those with a low affective valence," allowing patients to recall sentimental events more easily than unremarkable ones, reinforced through the stimulation of personally significant music (Guetin et al., 2013, p. 629). The temporary recollection of such meaningful autobiographical memories can help trigger patients' remaining cognitive abilities, potentially leading to a revival of verbal expression as they attempt to communicate these past experiences (Guetin et al., 2013).

## SPEECH AND COMMUNICATION DEFICITS

Language deficits often develop as a result of deteriorating neurological capabilities, which can lead to the inability to generate spontaneous speech, naming difficulties, comprehension impediments, and discourse deficiencies. Discourse deficiencies are comprised of empty speech, ambiguous words, and useless repetitions. As the disease progresses, AD patients attempt verbal communication less frequently, indicating the need for therapeutic interventions that address these manifestations. Singing lyrics, interestingly enough, seems to target the language centers in the brain, improving language capabilities through the promotion of verbal fluency, articulation, and speech production (Dassa & Amir, 2014).

In one study exploring the impact of familiar music on conversational abilities in patients with middle- to late-stage AD, the researcher encouraged the six participants to accompany her in singing carefully selected songs, each followed by conversation facilitated through the use of open-ended questions. As intended, the topics of each question evoked related memories that spurred conversation pertaining to relevant concepts, experiences, or emotions. The results of this study revealed several other enlightening findings, especially about the unexpectedly enduring conversational abilities that remain well into the later stages of AD. The researcher discovered, for example, that the act of singing elicited spontaneous remarks from the participants. These included comments expressing not only their individual enthusiasm and pride for successfully partaking in the interventions, but also the unity and sense of belonging they experienced as a group—an important revelation to note, for the inability of AD patients to communicate with others can result in feelings of isolation and loneliness (Dassa & Amir, 2014).

## DEPRESSION AND ANXIETY

Depression and anxiety become apparent as the patient shows signs of disinterest and apathy towards social interaction and/or previously enjoyed activities (Guetin et al., 2009). As each manifestation of AD progressively worsens, the patient's sense of identity unravels, which according to theoretical literature is closely connected to escalating feelings of depression and anxiety. When researchers then explored this proposed connection between identity, mood, and quality of life, the resulting empirical evidence was corroboratory (Caddell & Clare, 2012). Thus, interventions that preserve patients' sense of identity can lessen the burden of depressive and anxious symptoms.

In order to assess the efficacy of therapeutic musical intervention on both depression and anxiety, Guetin et al. (2009) conducted a randomized, controlled study utilizing receptive music therapy, in which the experimental group participated in weekly music therapy sessions guided by the "U" technique, while the control group took part in reading sessions conducted under the same conditions. The music therapy group demonstrated significant symptomatic improvements in anxious and depressive behaviors, which were sustained for up to eight weeks following the cessation of treatment, confirming music therapy as an effective therapeutic tool for the short-term alleviation of anxiety and depression (Guetin et al., 2009).

## AGITATION

Agitated behaviors are a particularly troublesome manifestation of the disease, occurring in approximately 90% of AD patients. Agitation in AD patients can be exhibited aggressively

or non-aggressively through both physical and verbal mannerisms (Cox et al., 2011). The incidence of agitated behaviors tends to fluctuate intermittently throughout the course of the disease, with the severity of symptoms remaining fairly consistent over time. Often occurring simultaneously with unmet personal needs, periods of under- or over-stimulation, or interactions hindered by communication impediments, agitation is viewed as an expression "of despair, frustration, boredom, or loneliness" (Ledger & Baker, 2007, p. 331). Music therapy can lessen these agitated behaviors by heightening patients' level of arousal, redirecting their attention, creating a less fearful environment, providing an outlet for self-expression, and potentially reinstating meaning back into their lives (Ledger & Baker, 2007).

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One study conducted in a Specialized Care Unit explored the impact of relaxing music on the overall agitation level commonly present during dinnertime. Using the Cohen-Mansfield Agitation Inventory to measure the participants' agitation behavioral level, Hicks-Moore (2005) discovered there was a reduced incidence of agitated behaviors during the two weeks that relaxing music accompanied dinnertime, in comparison to music-free dinner times during the other observed two weeks. This musical intervention yielded not only a reduced level of agitation, but also an increase in socialization and communication among residents (Hicks-Moore, 2005).

## THEORIES OF MECHANISMS OF ACTION

While ample evidence exists that demonstrates the beneficial effects of music-based interventions for AD patients, there is a research gap regarding the potential mechanisms of action responsible for the witnessed effects of music therapy (Peck, Girard, Russo, & Fiocco, 2016). This specific body of knowledge, once better explored and established, would provide the means to legitimize music therapy as an evidence-based treatment for AD, rather than a non-pharmacological alternative intervention (Ahn & Ashida, 2012).

Through advances in medical imaging technologies, "music has been shown to activate regions associated with emotion, reward, and decision-making" (Peck et al., 2016, p. 950). Both the ventral medial prefrontal cortex and orbitofrontal



cortex are deeply involved in emotional regulation and decision-making, and work closely with the limbic system to integrate emotional and sensory information (Peck et al., 2016). As the disease interrupts neural connections and leads to brain cell death, these structures eventually become compromised; however, these areas are some of the last to encounter these destructive effects, thus allowing the stimulatory properties of music to influence AD patients well into the final stages of the disease (Tomaino, 2011).

Peck et al. (2016) hypothesize that three underlying mechanisms are responsible for the efficacy of music therapy, stemming from pathways that involve dopamine, the autonomic nervous system, and neuronal connectivity. While each mechanism of action independently plays a role in the neurocognitive responses to music, all three are closely intertwined (Peck et al., 2016).

Dopamine, a neurotransmitter vitally important in the regulation of reward and motivation, is partially responsible for learning, memory consolidation, and various aspects of the reward system, such as acquisition and anticipation. Dopaminergic depletion is a damaging byproduct of AD, associated with cognitive impairment in patients due to the reduced availability of dopamine in limbic structures and decreased receptor binding. However, regions in the brain influenced by dopaminergic pathways, such as the hypothalamus and amygdala, have demonstrated responsiveness to music, leading researchers to ponder whether “music can be used to stimulate and strengthen dopaminergic pathways and interconnected brain structures that are commonly compromised in persons with AD” (Peck et al., 2016, p. 953). If proven scientifically effective, music therapy could then be utilized to specifically target these areas, ultimately enhancing AD patients’ reward systems and motivational drive (Peck et al., 2016).

Emotionally impactful music activates the autonomic nervous system, which induces physiological changes through sympathetic and parasympathetic activity. The sympathetic nervous system, responsive to louder, faster music, increases autonomic functions, such as blood pressure, heart rate, and respiration, when aroused; whereas slower, relaxing music activates the parasympathetic nervous systems, sequentially slowing these physiological responses. In the case of AD patients exhibiting agitated behaviors, likely originating from heightened physiological arousal, studies have concluded that therapeutically relaxing music drastically reduces these symptoms—a result, researchers postulate, that may be attributable to the activation of the parasympathetic nervous system (Peck et al., 2016).

There is extensive neuronal connectivity throughout the brain, including the default mode network (DMN), which

“is a system of interconnected brain regions that are active during resting state when individuals are awake and alert, but not actively engaged in directed attentional task” (Peck et al., 2016, p. 954). Many of the self-referential processes influenced by the DMN, such as introspection and autobiographical memory recollection, become impaired with the progression of AD. Research suggests that the damaging effects of AD cause brain regions connected by the DMN to atrophy, leading to the network’s dysfunction in areas of cognitive functioning, such as memory retrieval. Fortunately, studies have revealed that high activity music can activate the DMN, stimulating the network connectivity to an optimal level and allowing the patient’s introspective ability, autobiographical memory retrieval, and memory processing to improve (Peck et al., 2016).

## NURSING IMPLICATIONS

The rapidly increasing prevalence of AD in the elderly population means that there is a range of opportunities to integrate therapeutic music interventions into the scope of nursing practice, including interdisciplinary collaboration between music therapists and nurses, educating family members and/or caregivers about the benefits of music therapy, or simply a bedside intervention to alleviate bothersome symptoms.

*There is a range of opportunities to integrate therapeutic music interventions into the scope of nursing practice.*

In both long-term care facilities and acute care settings, nurses are frequently tasked with ensuring that patients receive adequate nutrition, regular baths, and other daily self care. The findings of the study conducted by Hicks-Moore (2005) on the effects of relaxing music on agitation levels during dinner time may be applicable to nursing practice in a broader sense, perhaps demonstrating how receptive music therapy can facilitate a more alert and oriented state of mind in AD patients, thus allowing nurses to perform activities of daily living (ADLs) without the agitation and resistance that often hinder the fulfillment of such tasks. Caregivers, for example, have reported instances of engaging patients through singing while simultaneously assisting with ADLs—a tactic that bedside nurses might implement when performing similar activities (Carson, 2012).

When verbally and physically aggressive behaviors arise from agitation, such as shouting, kicking, punching, etc., nurses must consider their own safety and the patient’s risk of self-harm. Utilizing therapeutic music techniques

to subdue an agitated individual may not only decrease the need for physical and chemical restraints, but can also provide the facility with a noninvasive, cost-effective alternative (Witzke, Rhone, Backhaus, & Shaver, 2008). Even with potentially provocative situations, such as painful blood draws or wound dressings, the nurse can use music as preventative tool to avoid aggressive encounters altogether (Carson, 2012).

The interdisciplinary teamwork that transpires between music therapists and nurses may be potentially beneficial, particularly during group sessions where continued assessment of patients' responses would be required. The nurse would likely assume this responsibility, additionally monitoring for any unsatisfactory or objectionable reactions elicited in the participants. During an exercise utilizing headphones, for example, the nurse would adjust the volume for each individual to ensure the optimal level of auditory stimuli was being provided (Witzke et al., 2008).

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Another potential way in which music therapy could be integrated into nursing practice might be through the initial assessment of newly admitted AD patients into nursing homes, where nurses would examine any existing need for music therapy. Furthermore, nurses could play a role in the implementation of music therapy as well, possibly utilizing this therapeutic intervention as a means to engage the individual while providing patient-centered care, or while partaking in interdisciplinary teamwork, as discussed above. If nurses were to become this involved in the implementation of music therapy at the bedside, they could then educate patients' family members and/or caregivers on the numerous benefits of including music therapy in patients' treatment plans.

## LIMITATIONS

Overall, the greatest limitations of this literature review include 1) a lack of clinical research aimed at understanding how music interacts with the underlying bodily systems, and 2) a lack of research studying the long-term effects of music therapy. A full list of limitations of the six articles that address familiar music therapy included in the review

is available earlier in Table 1. Common limitations included small sample size (Cox et al., 2011; Dassa & Amir, 2014), participant variability (Ledger & Baker, 2007), no control group (Cox et al., 2011; Dassa & Amir, 2014), research bias or role conflict (Cox et al., 2011; Dassa & Amir, 2014), and a lack of standardized measurement instruments (Cox et al., 2011).

## CONCLUSION

Music therapy offers AD patients an escape, a means through which they can regain their sense of personal identity, recall their most significant life experiences, and once again recognize their beloved family and friends. Despite the progressive and incurable nature of AD, the continual utilization of therapeutic music intervention provides these patients with an opportunity to not only maintain a grasp on reality, but to reminisce on everything that brings joy and meaning into their lives. As sustained symptomatic improvement requires routine exposure to music therapy, caregivers, family members, nurses, and other healthcare professionals must take it upon themselves to implement this uniquely beneficial intervention into all aspects of AD patients' lives, especially as they lose the means to do so themselves. The therapeutic use of music seems to present an unparalleled opportunity to enrich these individuals' quality of life once more—an invaluable gift, one that provides real comfort to the affected individual as well as the individual's family. As humans, when we approach the end of life, when our abilities start to fail us and our best work is behind us, our memories and the love we share with others provide a sense of self and satisfaction. Any retrieval of these experiences, even if only momentary, is a blessing. That music can conjure such blessings is a wonder. It well behooves nursing professionals to facilitate this process through the application of music therapy.

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