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Music on the Brain

MUSIC THERAPY TREATING DEMENTIA

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Table of contents

Introduction

As science finds ways to extend life, life finds ways to challenge science. One of the biggest challenges scientists have been fighting is dementia. Dementia eats away at memories and cognitive abilities, but does not directly affect the physical body (Alzheimer's Association, 2018). Despite a person's physical health, the disease can progress all the way to forgetting how to do basic tasks like walk. Dementia is a broad diagnosis of the continued loss of cognitive processes including thinking processes, memory, reasoning, and speech (Alzheimer's Association, 2018). Different diseases can cause dementia including, Lewy body dementia, frontotemporal disorders, vascular dementia, and Alzheimer's.

One element in life that is a part of our memories is music. There are some songs that people can recognize with the first few seconds of playing. This strong connection has led to the interest in further research regarding the connection of music and memory. It did not take long for researchers to see the common connection between memory with music and dementia. Now psychologists, neurologists, and other relating professions are finding how music can have an effect of those suffering with dementia. Within the past ten years many studies of music and dementia have been conducted, leading the way to discovering the beneficial properties of music therapy. Music therapy has mostly been used for emotional soothing in mental disorders, but new research is expanding on its true potential and how it can help patients with dementia. The increase in awareness of music therapy makes it an opportune time to invest in music therapy programs, especially aimed towards those with dementia.

Most Common Causes of Dementia

Dementia is now a leading cause of shorten life spans and death, particularly in western nations, and is predicted to worsen (Matthews, 2015). In all forms of dementia, researchers currently believe that damage to the brain is happening long before symptoms show (U.S.

Department of Health and Human Services, 2016). Damage can be apparent for years, especially with previous injuries like a history of concussions or other brain trauma. This can put a person at higher risk for dementia and further decay of the brain tissue. A broader description of what happens within the brain during dementia is, “Abnormal deposits of proteins form amyloid plaques and tau tangles throughout the brain, and once-healthy neurons stop functioning, lose connections with other neurons, and die” (U.S. Department of Health and Human Services, 2016). The neurons are similar to the planks that make up bridges, the brain tissue, which connect the different parts of the brain, when planks of wood start to rot and fall off the bridges begin to weaken until their inevitable extinction. When the connections in the brain are gone and the physical tissue dies, a person is incapable of fully functioning as they previously had. Research has lead to the belief that this process begins in the hippocampus which is the essential part in the brain for forming memories (U.S. Department of Health and Human Services, 2016). This is why newer memories and short term memories are the first to show signs of struggle and not until later stages of the disease are older memories effected and other symptoms begin to present themselves. The neurodegeneration of the brain is inevitable with age, but the diseases that cause dementia quicken the progression of the diseases Alzheimer's or Lewy body cause the formation of the proteins that then kill the neurons connections in the brain are cut off.

Alzheimer’s is the most common dementia causing disease within the elderly community. The Alzheimer’s Association has found that 5.7 million Americans are living with Alzheimer’s. They project by 2050 that fourteen million adults will be living with Alzheimer’s. It is the sixth leading cause of death, and one out of three seniors will die with Alzheimer’s or dementia (Alzheimer's Association, 2018).

Dementia is not a disease itself but can sometimes appear to be. Traumatic Brain Injuries, TBI, can seem to be healed and something to move on from, but there can be last effects that are not seen until later during aging. TBI range from mild, moderate, and severe. After a moderate or severe TBI a person is twice to four times more likely to develop a neurodegenerative disease (Shively, Scher, Perl, and Diaz-Arrastia, 2012). The injuries sustained from a TBI can heal, but not back to its previous state. Severe TBI result in permanent changes to the brain. This damage weakens the physical state of the brain making it more susceptible to more neurodegeneration like Alzheimer's disease. Even if the brain does not develop a disease associated with dementia, it can sustain similar effects of quickened deterioration not seen until the later years of aging. This more recent discovery and awareness has been largely influenced by the athletic world. Heavy contact and physical sports like boxing, hockey, and football having hallmarks for what untreated TBI can lead to. Many athletes of these sports have developed chronic traumatic encephalopathy, CTE (Shively, Scher, Perl, and Diaz-Arrastia, 2012). The similar patterns and outcomes of those who have experienced multiple TBI have lead the establishing of the diagnoses CTE. CTE can lead to long term alterations of the brain, difficulties with cognitive abilities, and overall alter a person's personality and self. The average brain follows an average timeline of ageing. When it is severely injured it is like taking a healthy twenty year old brain and jumping to forty year old's. This sudden jump in the quality of the physicality of the brain means the rest of the aging process still continues and can even quicken, putting that individual's body and brain structure in different spots on the timeline.

Treatments and Preventions

Because there is no clear cause to dementia causing diseases there is no cure. Researchers have found phenomenons who's statistics show they can help prevent the onset of dementia even

if the exact science is still not clear as to why or how. Cognitive neuroscientist, Dr. Zane Zheng, (2019) gave a presentation on a collection of studies that found lifestyle changes which seem to have a correlation to positive neurological aging.

Diet has been shown to have a large influence in the health of the brain. Fish; salmon, sardines, tuna, halibut, and trout have large amounts of omega 3 fatty acids which helps the creation of cells and overall quality of cells. This aid in cell reproducing helps the connections in the brain stay in tact. Nuts; walnuts, almonds, peanuts, pecans, pistachios and cashews have shown to improve neurological connections in areas of the brain that control cognitive functions and memory. The compound in nuts and the chemistry behind these reactions is unclear, but several studies have been conducted, rat and human, that show an improvement in cognitive functions. Leafy greens; spinach, kale, and spring mixes contain folac, vitamin B9. Without clear reasoning, folac has been shown to improve short term, but more so, long term memory. Coffee and caffeine increases a person's heart rate which increases blood flow and the increase in blood flow increases the amount of oxygen getting the brain which improves the overall maintenance of the brain and neurological connections. Cocoa in dark chocolate contains antioxidants that help maintain youthful cells which also keeps the connections in the brain in tact. Possibly the most interesting food is curry. Researchers saw that one area in the world had little no documented cases of neurodegenerative diseases that seem to be increasing in the western part of the world. South Asia had remarkable statistics compared to the rest of the world. The connection these researchers found was curry powder. It is used in majority of dishes and cooking in countries like India and Pakistan. Turmeric, which is in Curry, is found to reduce inflammation and oxidative stress which are linked to Alzheimer's. It is one food that has lease concrete scientific explanation, but also shows strong evidence to preventing neurodegeneration.

Another topic of lifestyle change to combat dementia which Dr. Zheng discussed was exercise. Cardio related workouts increase positive chemical production, but most importantly increases the heart rate increasing the blood flow in the brain. The oxygen the brain receives keeps the neurological connections strong and reduces the risk of blood clots. Blood clots can cause strokes and after a person endures a stroke their chance for vascular dementia is near certain. Anything that increases blood flow in the brain will keep the brain youthful helping combat dementia.

Most of these preventions do not do much once dementia has already begun. Since there is no cure for dementia the only treatments out there are focused more on symptoms of dementia. There are two FDA approved drugs that help with cognitive symptoms, cholinesterase inhibitors and memantine (Alzheimer's Association, 2019). Both of these often are prescribed to help reduce cell damage by increasing chemicals which help carryout messages between the brain. Cholinesterase inhibitors are prescribed in the early stages on Alzheimer's and similar dementia causing diseases. It decreases the breakdown of acetylcholine which is a chemical messenger for memory and learning. There are three main types of cholinesterase inhibitors; Donepezil works well during all stages of dementia, Rivastigmine and Galantamine work during mild to moderate dementia stages. As dementia progresses memantine and donepezil are the main medications prescribed. Memantine helps with improving memory, attention, reason, and language. It regulates the chemical glutamate which helps with information processing (Alzheimer's Association, 2019).

The lack of scientific reasoning for the cause of dementia causing diseases has made it hard to find pharmaceutical treatments, leaving caregivers to rely more on non-pharmaceutical treatments. Caregivers are trained to help maintain a person's comfort and personality. Keeping

them socialized and stimulated has shown to help slow the progression and symptoms, but more importantly, it simply improves the quality of their life. Continuing to stay in touch with loved ones, being physically active, and keeping their mind entertained and stimulated (Alzheimer's Association, 2012) . There has been a shift in the past decades of care for those with neurodegeneration. The past inhumane treatment of locking them away to wither away is now looked at as unethical and immortal. There are more and more programs being created for those with dementia. There are support groups where people can talk to each other about their experiences and find support from those in similar situations. More art therapy programs are being developed that have some cognitive tasks but mostly are for entertainment and fun. Music therapy is one of the biggest non-medication options available. It gives the chance to socialize, exercises cognitive functions, induces nostalgic memories, and is fun.

Neurological Effects of Music

To fully understand how music can treat dementia, scientists need to look at the physical reaction caused by music. In 2001 Anne Blood, PhD Neuroscience, and Robert Zatorre, PhD Neurology, conducted a study at Montreal Neurological Institute and McGill University. They wanted to see how brains reacted to music, and how stimulation caused by music could create emotional responses, specifically positive and pleasurable. First, the team looked at how musical dissonance affected the brain. They found that a lack of harmonies and going against musical rules stimulated the areas of discomfort in the brain. Their study showed that blood flow increased in the parahippocampal gyrus, a part of the brain connected with memory encoding and retrieval, when shown emotionally unpleasant images (Blood & Zatorre, 2001). This means, the parahippocampal gyrus is a part of the brain that recognizes unpleasant things and tells the person those are unpleasant things. The orbitofrontal, subcallosal, and frontal polar cortex are

also areas in the brain that have shown reaction to emotional stimuli that is unpleasant. Participants who had a form of damage in the parahippocampal gyrus struggled or were even unable to label an emotional reaction to the musical dissonance (Blood & Zatorre, 2001), furthering the theory that the parahippocampal gyrus is also responsible for recognizes emotionally unpleasant things in addition to memory encoding and retrieval.

Blood and Zatorre's more recent study looks at the brain's reaction to pleasure, specifically pleasurable music. The hypozoic with the addition of pleasurable music would show a reaction in the reward/motivation, limbic, paralimbic, and arousal brain regions and would have a correlation with the intensity levels of the 'chills' and emotional reactions caused (Blood & Zatorre, 2001). The 'chills' is describing the feeling of goosebumps or butterflies in a person's stomach when something deeply affects them.

The researchers asked participants to select their own musical choice that always causes a pleasurable emotional response, including chills. They found this was the most reliable way to ensure participants would have a reaction. However, the participants were instructed to select from the classic genre and included pieces like Rachmaninoff's *Piano Concerto No. 3 in D Minor, Opus 30,* and *Intermezzo Adagio*. The music had to be instrumental to ensure lyrics did not add another element complicating the study. Participants had to also report no personal association or memory attached with the song. Certain sections of the songs showed a consistent reaction. Those sections were trimmed to ninety seconds and a dot graph marked the chill intensity through the song. Participants were given their 'controlled' song ahead of time and were instructed to become familiar with it. Researchers hoped that this would minimize the effects of the song, similar to the effects of being 'overplayed'. All controlled songs were used as chill songs for other participants, showing that a song which induced an emotional response for

one participants became that controlled song for another participants simply by becoming very familiar with the song. As chills increased scans showed an increase in blood flow in the left ventral striatum, dorsomedial midbrain, bilateral insula, right OfC, thalamus, anterior cingulate cortex (AC), supplementary motor area (SMA), and bilateral cerebellum. (Blood & Zatorre, 2001). The striatum is a part of the reward system, the midbrain is a part of the brainstem and part of excitation and motivation, the insula cortex helps in cognitive-emotional processes, the orbitofrontal cortex cues responses, thalamus is the relaying system between different areas, anterior cingulate cortex helps in emotional awareness, supplementary motor area is a part of motor function, the cerebellum receives sensory information and processes them into motor functions, causing the chills. All of these areas and more are affected by ninety seconds of music.

Musical Memory

Our brains are programmed so that we store certain music in our long-term memory. This is why we can remember the theme song to a show we watched as children and how we can recall certain songs from our youth. The ability to associate certain songs with emotions is a key connection between the brain and music and helps make this long-term connection even stronger. In cases of people with dementia, music can be a valuable tool to reconnect with one's' past.

Nicholas Simmons-Stern, Brandon Ally, and Andrew Budson found that patients with Alzheimer's disease recognized lyrics better when they were sung versus spoken out of rhythm or pitch (Simmons-Stern, Deason, Brandler, Frustace, O'Connor, et. al., 2012). They looked at the episodic memory which is a part of the autobiographical memory that recalls specific events. Patients with Alzheimer's Disorder and healthy older adults studied printed out song lyrics that were accompanied by either a sung or a spoken recording (Simmons-Stern, 2012). Both groups remembered the general content of lyrics better when they were sung verses spoken. They did

not find anything significant with the memory of the specific lyrics. They concluded that the general content questions were based more off of familiarity where specific lyrical recall requires exact memory (Simmons-Stern, et. al., 2012). They also found no difference with those with dementia and those without.

Emotional and Social Change in Dementia

Music is a role in human societies, Stefan Koelsch suggests that this is partially due to its ability to evoke powerful emotions. Dr. Stefan Koelsch is a Professor of Music Psychology at the Freie University Berlin. He found that music activates parts of the brain responsible for emotions such as the amygdala, nucleus accumbens, hypothalamus, hippocampus, insula, cingulate cortex and orbitofrontal cortex (Koelsch, 2014). Often, we associate music with pleasure which correlates with its interaction with the nucleus accumbens, a part of the brain's pleasure center. Music is a valuable tool in helping soothe agitation as a result of its interplay with these parts of the brain. This concept is also found in another study where it was concluded that listening to music can help calm your bodies psychobiological stress system. (Thoma, La Marca, Brönnimann, Finkel, Ehlert & Nater, 2013). In this study, several women were given stress tests. An equal number of people was split between had melodic music playing while the other group did not. People who listened to music before the test had there stress levels back to baseline quicker than those without. This research provided more information into how music can benefit our mental health and help relieve stress more effectively.

Agitation is a main side effect that people with dementia battle. The Department of Psychology at Inland Norway University of Applied Sciences in Norway explained how agitation results in a handful of behaviors including repetitive acts, restlessness, wandering and aggressive behaviors toward oneself or others (Pederson, Andersen, Lugo, Andreassen, Sütterlin,

2017). These symptoms make daily life a struggle and increase the obstacles for psychological wellbeing; the results of agitated behavior is a vicious cycle because it often leads to the hospitalization, institutionalization and lack of positive social interactions which in turn leads to limited stimulation. There have been few studies conducted thus far on musics' effects on agitation in people with dementia, but this meta-analysis is the first to combine all of the findings, showing promising clinical and statistical results for the use of music to relieve agitation in people with dementia. The consensus that musical intervention had a medium overall effect on agitation in dementia has opened the door for further research into this non-pharmaceutical approach. In the case of this meta-analysis, music intervention was defined as "the controlled use of music in a therapeutic setting to accomplish individualized goals within physiological, psychological, and emotional well-being during the treatment of an illness or disease" (Pederson, Andersen, Lugo, Andreassen, Sütterlin, 2017).

Music therapy includes a broad range of choices. All of these choices are focused on helping decrease aggression. However, in all of the studies done to prove that music therapy works, they were done on extremely small sample sizes. For example, one study shows that out of thirty-two patients, interactive music helped even the most severe patients. It was shown that pre-recorded music was also effective, but far less than the interactive music (Nair, Browne, Marley & Heim, 2013). Another study showed that when the patients picked the music they listened to, it not only decreased their aggression, but also anxiety (Nair, Browne, Marley, & Heim, 2013).

When it comes to music therapy and how it helps patients decrease their aggression, multiple types of music have been tried and tested. Overall, out of the 118 studies done to prove that music therapy helps lessen aggression in Alzheimer's patients, only twenty-five were

considered standard quality studies. This means that more studies need to be done to prove whether or not music therapy helps specifically aggression. O'Conner, et. al. stated some recommendations on how to improve future research. These recommendations include: making sure the studies done are easily replicable, have larger sample sizes, and have the behaviors recorded by somebody who does not know the purpose of the study. (Nair, Brown, Marley, & Helm, 2013) If proven that music therapy works, it will be a great alternative treatment to medication because of its low cost, easy accessibility, and low chance to cause harm.

Emotion and Social Change by Music in Dementia

For the average mind, music can evoke emotional responses. Most songs are driven by emotion if it is anger, heartbreak, happiness, excitement, ect. The emotional sound and lyrics can affect a person. However, music that has a memory attached evokes the most emotion (Jäncke, 2008).

Neuroscientist, Susann Eschrich and team conducted an experiment in which they asked one group of participants to focus on the emotion in forty songs that were picked by musically trained raters (Jäncke, 2008). Another group was asked to just memorize the pieces. One week later the groups re-listened to the songs mixed with forty new songs. While listening, they were asked to label the songs new or already listened to. In both groups the more emotionally filled and evoking songs were recognized more. Eschrich stated that the emotion was evoked by the songs for each group and that was the reason those songs were more recognizable (Jäncke, 2008). Eschrich's results support what many others have found; emotion enhances memory and musical memory. It also shows the large role music can play in building autobiographical memory (Jäncke, 2008). Eschrich also found that music can increase the blood flow in the brain

which can also help the recall of memory. This then helps the network connections in the brain and shows strong activity in these connections as well as the peripheral nervous system.

Researcher, Steve Matthews, presents the example of Henry, a man diagnosed with severe dementia, to illustrate the power of music therapy. Henry is described to often sit slumped in his chair, barely responsive, and unable to even recognize his own daughter. He is in a state of ill-being in which self-esteem, agency, social confidence and hope seem to have gone (Matthews, 2015). Henry's case seems hopeless, but it is not with the help of music therapy. A video catches the moments that Henry's care takers put on his favorite music. His body is brought back to life as he straightens up and begins to sing and dance in his chair. Even after the music is off, Henry retains a cognitive awakening for a period of time. When asked how he feels about music he responds enthusiastically that "It gives me the feeling of love, romance… The Lord came to me and he made me a holy man, so he gave me these sounds" (Matthews, 2015). Henry's positive response to music is not an isolated case.

Music therapy and our ability to implement it into how caregivers interact with their patients will change the course of how we care for those with dementia. This method of care is symbiotic in its ability to assist the ill as well as their providers. Those interviewed reported that music helps calm irritated patients and instilled a more 'upbeat' atmosphere in the nursing home. It decreased anxiety, medication need, and overall quality of life (Beer, 2017).

Enhancing the quality of life for people with dementia is vital because as of yet, there is no cure for the disease. We need to utilize more techniques that make living with dementia more tolerable and not simply rely on day to day tasks because having dementia does not mean someone has to stop living. They can still make connections and feel joy despite it coming from different aspects than before the diagnosis. "The need for meaning in life is basic to human

existence and the capacity for feeling emotions lasts long into dementia and so should not be overlooked in care." (Nelson, Rosenfeld, Breitbart, and Galietta, 2002)

Beer stresses that there is not enough written literature explaining the different applications of music therapy and how it can influence daily interactions between caregivers and their patients. She explains that while researchers are beginning to understand the importance of providing further care to people with dementia, the medical field often overshadows this with the theory that physical care is enough to constitute an adequate quality of life (Beer, 2017).

"Nostalgic experiences are characterized by autobiographical memories that feel self-relevant and are filled with warm, positively toned feelings about friends, romantic partners, family, or childhood that contribute to making one's life feel meaningful...negative feelings may also be present, often as longing for someone or something in the past or grieving for something gone" (Hepper, Ritchie, Sedikides, & Wildschut; 2012). In a study done by Juslin, Liljestrom, Vastfjall, Barradas, and Silva (2008) it was shown that when music was played it affected sixty-four percent of their subjects feelings. However, for this to work best, researchers have found that they should play popular songs from the participants adolescents. This is due to the fact that memories formed in this stage of your life are more likely to be remembered in the future.

In a study done by Michels-Ratliff and Ennis (2016) they had two goals. The main goal was to study the method of evoking nostalgia and autobiographical memories. (Specifically, autobiographical memories that evoke nostalgia.) When looking at results they found that fifty-nine percent of people rated their pandora songs moderately high to very high on the likert scale when it came to evoking nostalgia. Ninety-nine percent of the subjects rated at least one of the songs played for them five or more on the nostalgia likert scale. These findings were then proved to be significant. As the researchers hypothesized, the strongest predictor of nostalgia are

autobiographical memories. It was also found that nostalgia was typically a positive emotion, but every once in a while somebody did relate it to a negative emotion. Some subjects even found that the songs brought both positive and negative emotions at the same time.

Music Therapy

"Music Therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program." (Music Therapy, 2019) Music therapy can be used for emotional, social, cognitive, and physical aid for the patient. Music therapy can be traced all the way back to 1789. Once the 1800s hit you would see two medical dissertations relating to music therapy and the first experiment done to learn about music therapy. (Music Therapy, 2019) In the early 1900s society began to see the first music therapy organizations being made. However, due to lack of funding and properly trained personnel these organizations eventually all closed. Music therapy came back in the 1940s when the first college level programs for music therapy started to arise. Eventually in the 1950s the National Music Therapy Association was created followed shortly by the American Music Therapy Association in 1971. (Music Therapy, 2019)

As research continues to get published, the use for music therapy in dementia cases grow. We can now see music therapy being used in hospitals, rehabilitation centers, nursing homes, clients homes, and many more diverse settings. One article stated: "Increasing articles have demonstrated that MT can improve multiple domains of cognitions in AD patients, including attention, psychomotor speed, memory, orientation and executive functions." (Fang, Ye, Huangfu, & Calimag, 2017). This means that due to music therapy, patients are able to regain some of the cognitive skills they were starting to lose due to Alzheimer's disease.

Every music therapy group is run differently. However, there are some basic steps that each group typically goes through. The first thing that happens in the music therapy group is an "Opening" (Moore, 2011). This could be anything from reviewing what was done in the session beforehand to just going around and introducing yourself. The next section would be the "Intervention" (Moore, 2011). This is where you play, listen to, or even compose music. Most music therapy groups will incorporate at least two of these activities into each session. Lastly, the "Closing" section (Moore, 2011). This could range from playing a goodbye song to each member saying something they liked about the session. Two other noted parts that are important to music therapy are "Transitions" and "Environment" (Moore, 2011). Transitions between activities are very important because if this is not done properly it is possible for clients to lose control or interest. Environment is very important because the room should feel safe. This could mean making sure the lighting is not too harsh or making sure that not too much outside noise is coming into the space. Creating a music therapy program can be easier than it sounds.

Grant Proposal

Introduction

Individuals with dementia often live in assisted living to ensure their safety and quality of life. That is why we feel bringing therapy to the living facility increases the participation and quality for clients. We focused on designing this program to be a social group, an independent growth experience, and that still provides individualized, focused assistance. Our program is designed to be individualized while still cost effective and prioritized. There is an important distinction that the group is not to become a better musician, but to use music as a therapy to treat mood and possibly help slow memory loss.

Program Information

Our program will take place in nursing homes or dementia units in hospitals. It will be offered three times a week to ensure the most participants and availability. Our clients will be those who suffer from mild to severe dementia. We will have six licensed music therapists and one researcher in the room. One of the music therapists will lead the group while the other five will have two clients each to help with the activity. This allows for approximately 10 participants. We will have a researcher to take notes and evaluate if the clients are making progress, if the program is working, and what we can change about the program to achieve the maximum success. Each client will pick one instrument and either follow a pattern given by the lead instructor, or they will come up with their own pattern and the rest of the group will mimic it. The money we are requesting will be to pay the staff and buy the materials and equipment needed. Our total staff costs for one year is $221,588. Our materials that require eventual replacement cost $133.28. Our equipment total is $6,371.82. These will not have to be replaced

often except occasional repair or replacement from use overtime. This puts our total costs at $228,039.10 to begin.

Staffing

Our facility will be staffed with seven trained members. This includes one main musical therapist who will lead the programs, one research scientist who will help evaluate the program's success and five assisting musical therapists who will work with pairs of patients so that there is individualized care. Having numerous staff members to a small group will allow for a personalized experience where each participant gets to have support catered towards their progress and overall experience within our program. It is important that our staff be knowledgeable in dementia and not just music therapy exclusively. An approach where the staff truly understands the experience of the patients will allow for more progress within the programs. Someone with knowledge and experience teaching music therapy would be sufficient, but not ideal and we believe that having background in working with people with dementia or having a strong understanding of dementia will foster an environment of understanding, empathy and patience. These characteristics will further the benefits of an already outstanding curriculum.

. Our lead musical therapist will have a vast understanding of musical therapy and how to conduct an effective program catered towards people with dementia. They will guide the program and decide the pace at which each program will run. The other music therapists will follow his/her guidance while working with two patients; this structure will help balance the different rates at which each person performs and interacts. If someone is struggling with a task, there will be a trained professional with them to help alleviate any frustrations with personal performance and guide the exercise so that troublesome tasks are supported. While this may seem excessive, it is important to note that aggression and frustration are common symptoms for

people with dementia and any interventions that can be taken to relieve those troubles should be taken actively. This program is designed to help individuals combat negative emotions and a hands on approach will be exceptionally beneficial in achieving this.

Our program also includes one research scientist. We decided to include this role in our program as a means of properly monitoring progress within sessions. It allows for an unbiased, outside professional to study and compile data to help evaluate our programs overall performance. Having a researcher who is impartial to our program will allow for program growth and unbiased feedback. Some features our researcher will be looking for is a change in each client's mood as well as where our program can make improvements. For example, if there is a pair of patients that is not performing at the same rate as the rest of the participants, our researcher will report back to us.

Each of the individuals caretakers will be asked to attend the programs to monitor the health and safety of the patients but to also foster a positive bond between the two. Having caretakers take a hands on role in the emotional health of their patients will allow for the benefits of our program to exceed the limits of the brief program time. We want our participants to benefit from our program beyond our sessions. We believe that cultivating an emotional bond between patient and client will strongly impact the patients overall quality of life in a tremendously positive way.

Evaluation

Weekly reports documenting specificities will allow us to work on flaws immediately. Additionally, our researcher will be gathering data on how or if the client has made progress at the end of our program. There are a variety of ways in which this information will be collected;

written evaluations from the clients as well as their caretakers will be completed regularly and observations in individuals change are key.

Program Structure

Our group will consist of four stages. Stage one is transitioning our clients into the room where we will hold our program and making sure they feel comfortable and safe. This is an important step to ensure a well-run group without any distractions or unneeded pauses. The second stage will be to follow the pattern the main music therapists teaches and then incorporate it into a popular song all the clients know. This ensures the clients are paying attention and engaged in the group as well as inducing positive nostalgic memories. The third step is to go around the circle and let everybody come up with, and teach, their own pattern on the drum. Once taught, the group will mimic their pattern. Lastly, we will end the group with everybody saying one positive thing about their day. This will help them leave with a feeling positive. This feeling of positivity will help them conquer whatever obstacles they run into during the rest of their day. As the groups go on, the researcher will evaluate how well the clients can do each drum pattern and help the music therapists determine if they need easier or more challenging patterns. We will also introduce new instruments if the clients are going beyond what we thought their capabilities were.

Budget

The programs biggest expense will be our staff. It is vital to the program that we hire licensed music therapists. Without proper training, music therapists can do more harm than good by aggravating and frustrating clients. We will also have a researcher to help evaluate the program by getting clients to complete surveys and just by watching the group every day and taking down notes on progress or lack of progress. Our second biggest expense is the equipment

needed to run this program. We will be buying two each of ten types of drums to make sure clients have a variety to choose from (Appendix B). These drums can be expensive because we will only buy good quality drums to make sure clients get the best sound and to make sure they will last a long time. Our cheapest expense is our materials. These are items such as pens, paper, and staples that you will run out of and need to replace. We need these items to make sure the researcher will have the proper tools to evaluate the program. We also need these tools so we can print out music if need be. A full spreadsheet of the budget can be found below (Appendix A).

Conclusion

We feel passionate in helping those with dementia to continue living a full meaningful life and not wither away. It is a priority that we help our aging population, especially those who are losing parts of them as they continue their lives. Music has been a part of everyone's life and being able to keep that in one's life can sustain a part of them. As simplistic as the program seems, it can bring joy into someone's day without doing something extravagant. It brings residents together to socialize, reminisce about music and the memories it brings, physical activity that is not excessive, and something unique not currently available to them. Music has benefits that we need to utilize because it is simple, but the positive effects can be life changing.

Category	Object	Quantity	Cost	Notes
Staff	Main Music Therapist: MT BC	1	$73,933	Leading the sessions Music Therapy - Board Certified
	Assistant Music Therapists	5	$53,933	able to float between clients during sessions
	Research Scientist	1	$93,722	
Space				The space will be free because the nursing homes and dementia facilities will be gaining a free service from us.
Materials	Paper	4,000 pages	$55.99	
	Pens	4	$8.69	
	Clorox Wipes Variety Pack		$18.42	
	Staples Standard Staples	2 Boxes	$6.69	1/4" Leg Length 5000 staples per box
	Epson EcoTank T502 Ink Bottle Color Multipack	1	$43.49	
Equipment	Chairs			Provided free by the facility
	Toca Synergy Conga Set with Standard Bongos	2	$538.98	$269.99 a piece X2= $538.98
	LP Performer Series Conga with Chrome Hardware	2	$473.98	$236.99 a piece X2= $473.98
	Gon Bops Alex Acuna Signature Special Edition Cajon	2	$599.98	$299.99 a piece X2= $599.98
	Toca Street Series Djembe	2	$91.98	$45.99 a piece X2= $91.98
	Remo 100 Series Tunable Tubano	2	$410.00	$205.00 a piece X2= $410.00
	Meinl Copper Doumbek	2	$339.98	$169.99 a piece X2= $339.98
	Remo Ocean Drum	2	$91.62	$45.81 a piece X2= $91.62
	Timber Drum Company Stilt Tongue Log Drum with Mallets	2	$199.98	$99.99 a piece X2= $199.98
	Remo Table Tom in Island Finish with Mallets	2	$99.98	$49.99 a piece X2= $99.98
	Meinl Sonic Energy HOD15-FOL 15-Inch Native American Style Hoop Drum, Flower of Life Symbol	2	$239.98	$119.99 a piece X2= $239.98
	Laptop: MacBook Pro	1	$2,799	
	Printer: WorkForce ET-4750 EcoTank All-in-One Supertank Printer	1	$399.99	
	Stapler	1	$16.89	One Touch Plus Desktop Stapler, Full Strip Capacity, Black
	Binder	1	$11.49	Staples Better 2-Inch D 3 Ring View Binder, Blue
	Three Hole Punch	1	$57.99	One-Touch Adjustable Hole Punch
Trasnportation				No Need
Utilities				No Need
Miscellaneous				No Need

Toca Synergy Conga Set with Standard Bongos

LP Performer Series Conga with Chrome Hardware

Gon Bops Alex Acuna Signature Special Edition Cajon

Toca Street Series Djembe

Remo 100 Series Tunable Tubano

Meinl Copper Doumbek

Remo Ocean Drum

Timber Drum Company Stilt Tongue Log Drum with Mallets

Remo Table Top in Island Finish with Mallets

Meinl Sonic Energy HOD15-FOL 15-Inch Native American Style Hoop Drum, Flower of Life Symbol

Appendix C
Resumes Attached

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