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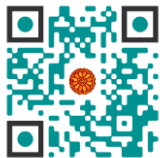
EFFECTS OF IRANIAN MUSIC ON THE IMPROVEMENT AND TREATMENT OF ALZHEIMER DISEASE AND ITS SPEECH-RELATED DISORDERS IN THE ELDERLY

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A B S T R A C T

Alzheimer`s disease and dementia had been of the most serious humanitarian crises in industrial societies over the past decades, where many elderly people are affected. However, despite the young population pyramid in Iran over the past few decades, predictions are indicative of an increase in the elderly population in the decades to come. Thus, the increase in Alzheimer`s disease is a natural and inevitable event and the level of knowledge and ability of care and treatment centers for the elderly should be at an acceptable level regarding prevention and treatment. One of the recommended therapies for this disease and its disorders, especially speech disorders, is music therapy. Despite many studies concerning the effects of music therapy on patients with Alzheimer`s, no studies have been done on the effect of Iranian music on Alzheimer`s patients. The present paper examined the effect of this treatment on 22 elderly patients with moderate and severe Alzheimer`s disease admitted to one of the elderly care centers for 14 days. The effectiveness evaluation method was performed using the short-term test of mental status (MMSE Test) at two stages -before the start of the treatment and after the end of the second week of the treatment. The results of recording data showed the positive effect of Iranian music on the progression of the cognitive ability of the patients, and the speaking ability increased in all cases, except in one sample, well showing the effect of this type of music on the treatment and improvement of the patients with Alzheimer`s and its speech-related disorders.

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1. INTRODUCTION

Alzheimer`s disease is one of the commonest types of dementia, accounting for two-thirds of all patients with dementia (Helmer et al., 2001; Aronson et al., 1991). In 2009, Alzheimer`s Disease

International estimated that by 2010, 35 million people worldwide will have developed Alzheimer's disease and AD-Related Dementias (ADRD) (dementia). Moreover, this organization predicted that the prevalence of dementia would be roughly doubled every 20 years, for which, a total of 65.7 million people by 2030 and 11.45 million people by 2050 is expected to have this disease (Gerdner, 2012: 26). In industrialized countries, dementia is one of the major causes of death and disability in people over 65. Dementia greatly affects the life quality of the patients and their families (Aguero-Torres, 2002). As the young population pyramid tends to age in the coming decades in Iran (Noroozian, 2012), the increasing prevalence of Alzheimer's disease is becoming inevitable (Sheykhi, 2017). Thus, the importance of studying Alzheimer's therapies and low-cost therapies in the country can be understood. One of these therapies, whose effectiveness has been investigated and verified in many pieces of research, is music therapy.

Considering the increase in people with Alzheimer's as well as the benefits of non-aggressive treatments, paying attention to these treatments can have a role in alleviating disorders in patients with Alzheimer's disease. Given this, the study sought to evaluate the role of one of the most tangible types of music, Iranian music, for the population in reducing and improving these disorders with a combination of library resources and field method to introduce one of the most accessible Alzheimer's treatments that can be used in all circumstances.

1.1   ALZHEIMER'S DISEASE

Alzheimer's disease is a complex disease derived from a combination of age, genetics, and environmental factors (Duthey, 2013). Alzheimer's is a degenerative disease, i.e., it gets worse over time. It is assumed that the disease emerges up to 20 years or more, before the start of symptoms, and with small changes in the brain, which is not recognizable to the affected person. Only after years of brain changes, people experience significant symptoms, like memory impairment and language problems. The symptoms of the disease are caused by the damage or destruction of neurons in some parts of the brain involved in thinking, learning, and memory (cognitive process). People usually live with symptoms of Alzheimer's for many years. Over time, the symptoms tend to increase and disrupt the ability of individuals in doing daily activities. At this point, the person suffers from dementia due to Alzheimer's disease, or ADRD. As the disease progresses, the neurons in other parts of the brain are damaged or destroyed. Activities related to the person's identity, like family event planning or participating in sports, may no longer be possible. Finally, the neurons are affected in parts of the brain that enable the person to perform basic body functions like walking and swallowing. People at the final stages of Alzheimer's are in need of admission and care from those around. Alzheimer's disease ultimately leads to death (Alzheimer's Association, 2019).

1.2   SPEECH DISORDERS OF ALZHEIMER'S PATIENTS

Clinical evaluations of people with Alzheimer's show impairments in memory, judgment, decision-making, navigation, and speech (Khanahmadi et al., 2015). Although memory-related problems are the commonest symptoms of Alzheimer's disease and dementia, many people having Alzheimer`s, experience progressive problems in the power of verbal communication (Egan, et al., 2010). In these patients, speech problems appear as speech impairment, correct expression of the intended meaning, failure in the segments and phonetic suprasegmental, problems with grammatical and lexical simplification and speech impairment during dialogue (Pistono et al. , 2016; Szatloczki et al. 2015; Silag, et al. 2015; Mesulman et al. 2014; Ahmed et al., 2012). These symptoms sometimes

create serious problems in connecting with those around, which can be a great risk to their health and well-being due to the reduction of the physical capacity of the elderly and the need for others.

1.3 MUSIC THERAPY

Among the recommended therapies for psychological diseases is music therapy. Music therapy is the clinical and evidence-based use of musical interventions to reach individual goals in a therapeutic relationship with a prominent specialist who has taken an approved music therapy program (American Music Therapy Association (AMTA)). Music therapy is the potential for non-pharmaceutical therapy regarding the behavioral and psychological symptoms of dementia. Although some studies have considered it useful, in most cases, studies have been done on a small and sometimes uncontrolled scale (Svansdottir & Snaedal, 2006).

The role of music in therapy has undergone changes since 1990, which was affected by modern attitudes from the studies on the interaction of mind and music performance. The studies on the human brain in relation to music have shown that music has a distinct effect on the brain by stimulating the natural processes of cognitive senses. Moreover, biomedical scholars have found that not only music is highly effective in organizing listening language, including sophisticated understanding, cognition, and motor control of the brain, but also this sensory language can significantly affect the retraining of the damaged brain (Thaut & Hoemberg, 2014). The modern music therapy started in the mid-20th century which was traditionally rooted in the concepts of social sciences. The therapeutic value of music was paid attention given its emotional and social role in human life and community culture. Music has functioned throughout the whole life in expressing feelings, shaping societies, solidarity and organizing the public, and supporting educational goals by sharing ideas and beliefs (Thaut and Hoemberg, 2014). Thus, one can expect that the cognitive process may have an important role in the treatment process.

Musical speech stimulation (MUSTIM) is a neurological musical therapy (NMT) method for people who have a mental problem in speaking. This technique uses music-related items like songs, rhythms, hymns and musical phrases to simulate the body state of speech and automatic speech (Thaut, 2005). Among those who can benefit from this type of treatment are those suffering from Alzheimer's disease and dementia (Thaut and Hoemberg, 2014).

1.4 IRANIAN MUSIC

Farsi music is a very old kind of oriental music with significant effects on eastern music cultures such as Central Asia, North Africa, southern Europe and the Gulf States (Abdoli, 2011). The music of Iran has 24 quintals of tone in each octave (Vaziri, 1913) and 7 Dasgahs.

1.5 MUSIC AND ARCHITECTURE

In fact, our country is one of the richest territories in terms of enjoyment of heritage and cultural achievements and one of its manifestations is special and globally-known urban planning and architecture. Iran is one of the richest native architectural examples with form and structure achievements notable in the world, in the course of the Islamic era, it has changed into one of the successful examples of conceptual, meaning-oriented and mystical architecture while the impact of physical and architectural form as the spatial container which is the effect of social culture, is effective in the representation of these concepts and meaning (Mahdinejad et al, 2015, 2017, 2019).

All the arts are cross-linked with each other because the origin of all of them is a beautiful expression (Khaki et al., 2015). Art is one of the most mysterious aspects of human culture and civilization that always pervades human life (Zomorshidi et al., 2018).

Iranian traditional architecture is one of the most dramatic and the most supreme examples of architecture in the world that unconsciously attracts any viewer and its subtleties and secrets make everyone admire (Mahdinejad et al, 2016). Undoubtedly, Iran is one of the trustees of the art and of course owes its beauty to ancient monuments that are the legacy of love and passion and glory of the Iranian people in the ups and downs of the history of this nation; buildings which are the description of "elegance" and "glory" of Iranian Muslim artists and evidence of the meaning manifestation in the form of matter. As any art, during its progress, affects the time and space conditions of the society and other factors, the arts are directly or indirectly affected in relation to each other and show its reflection from each side in its own territory and add their capacity and performance. The meaning of Architecture today is that at the same time, which it is measuring and limiting the space it also tries to reach through a large space that people shall move inside and around it, and meanwhile music is a feeling of a mechanical rhythm in the space. When such a feeling awakes a motional motive in human it will have an influence on human sole and on his sensitive hidden space inside him which will prevent him against the noise waves on Human body. The Sufis dance which derivers from spiritual believes stage making that its natural secret and essential character relates to the musical motions (Falamaki et al, 2008).

2. BACKGROUND

Many studies have been conducted on the relationship between music therapy and the improvement of Alzheimer's disorders. Most of these studies considered two types of neurological research as well as psychological research through cognitive tests to study the effects of listening to music based on a specific treatment plan for Alzheimer's patients in reducing the underlying disorder. However, no coherent studies have been done on the therapeutic effect of Iranian music on patients with Alzheimer's and related speech disorders. Table 1 gives a summary of the research records.

3. HYPOTHESIS

It seems that using music therapy - by Iranian music – can be effective in improving and treating elderly patients with Alzheimer's and its speech-related disorders.

4. METHODOLOGY

In the current study, the desirable method for studying according to the purpose and the conditions were the cognitive measurement method. This method was performed using MMSE.

MMSE is the most widely used cognitive measurement tool. In 1975, MMSE was developed throughout the world as a means of assessing cognitive conditions (Gluhm et al., 2013). This test was used to visualize cognitive impairment, track changes in cognitive function over time and assess the effects of therapeutic factors on cognitive function among the patients (O'Bryant, et al., 2008). Although this test cannot be considered as an official diagnosis, it is considered as the first step in identifying cognitive impairments, and many studies have confirmed its validity and reliability

(Pezzotti et al., 2008; Baek, et al. 2016).

Table 1. Research records and research methodology

Researcher(s)	Title	Methodology	Sample	Results
King and Others (2018)	Increased Functional Connectivity after Listening to Favored Music in Adults with Alzheimer Dementia	Field by MRI image	17	Listening to music in patients with Alzheimer's disease activates the attention network in the brain and has a significant role in coordinating the functions of the brain network.
Guess (2017)	Alzheimer's Disease and the Impact of Music Therapy: A Systematic Literature Review	Review by library resources	-	Music therapy has a clear effect on memory and the ability to recognize the elderly with Alzheimer's.
Gallego and Garcia (2015)	Music therapy and Alzheimer's disease: Cognitive, psychological, and behavioral effects	Field by NMT test, psychiatric nursing questionnaire, anxiety and depression scale, and Bartlett index	42	Music therapy improves some cognitive, psychological and behavioral disorders in Alzheimer's patients.
Dassa and Amir (2014)	The Role of Singing Familiar Songs in Encouraging Conversation Among People with Middle to Late-Stage Alzheimer's Disease	Field by content analysis s	6	Listening and reading music related to the past of the elderly with Alzheimer's helps them in conversation.
Fukui, Arai, and Toyoshima (2012)	Efficacy of Music Therapy in Treatment for Patients with Alzheimer's Disease	Field by measuring hormones	6	Suspicious behaviors such as Poornima (Fugue) are reduced by music therapy. Music therapy is a potential alternative therapeutic alternative to hormone replacement therapy.
Zare and Others (2009)	The Effect of Music Therapy on Reducing Agitation in Patients with Alzheimer's disease in Shahryar City Nursing Home	Field by DSM-5 and MMSE	26	Listening to music reduces the restlessness of patients with Alzheimer's.
Raglio and Others (2008)	Efficacy of Music Therapy in the Treatment of Behavioral and Psychiatric Symptoms of Dementia	Field by MMSE, Barthel's index and neurology questionnaire	59	Music therapy is effective in reducing moderate to severe disease severity in patients with moderate to severe mental and behavioral symptoms.
Svansdottir and Snaedal (2006)	Music Therapy in Moderate and Severe Dementia of Alzheimer's Type: A Case-Control Study	Field by BEHAVE-AD test	38	Music therapy is a very effective and safe way to treat anxiety in Alzheimer's. This is in line with the results of some uncontrolled studies on music therapy and dementia.
Gerdner (2000)	The Effects of Individualized Versus Classical "Relaxation" Music on the Frequency of Agitation in Elderly Persons With Alzheimer's Disease and Related Disorders	Field by Bonferroni post hoc	39	The impact of listening to personalized music is far more important than classical music to stimulate elderly people with Alzheimer's disorders.
Brotons & Koger (2000)	The Impact of Music Therapy on Language Functioning in Dementia	WAB Field by MMSE	20	Music therapy has a positive effect on the power and mental state of people with dementia.

In MMSE, the six points - orientation, registration, attention and calculation, recall, language, and copying - are examined using short questions. The total score is 30: 10 points in the orientation, 3 points in the registration, 5 points in attention and calculation, 3 points in the recall section, 8 points in the language section, and 1 point in the copy section. The total score determines the level of cognitive

impairment so that the acquisition of grades 24 to 30 shows a lack of cognitive impairment, 18 to 23 a moderate cognitive impairment, and scores 0 to 17 determine acute cognitive impairment.

In the present study, 22 elderly (65 years and over) patients with severe and moderate Alzheimer's disease received treatment based on a plan by a music specialist in a controlled area. The duration of music therapy was controlled every day for 15 minutes that was music playing in the controlled space in the morning as group therapy and music quality were adjusted according to the auditory conditions of all the subjects. The time to give MMSE was before the start of the treatment and after the end of the second week of the treatment. Samples were selected from patients admitted to a residential care center in Tehran and randomly selected from among the patients in this center.

5. DISCUSSION

Among the studied samples, 12 were male and 10 female. Of the 22 samples examined, 10 had moderate Alzheimer's disease and 12 acute. Moreover, 9 samples were over 75 years old, 5 were between 70 and 74 years old, and the rest were 65-69 years old.

Table 2 result showed that the mean score of the collected samples before the treatment period was 17.00 with an SD 3.364, which increased to 20.82 with an SD 3.850 after the end of the treatment period. The paired t-test was used to verify the validity of the results. Tables 3 and 4, according to the significance level <0.001 and the negative value of t, the positive effect of treatment with Iranian music on the improvement of patients with severe and moderate Alzheimer's could be confirmed.

Table 2. Paired Samples Statistics

		Mean	N	SD	Std. Error Mean
Pair 1	MMSE Scoring(Before)	17.00	22	3.364	0.930
	MMSE scoring(After)	20.82	22	3.850	0.821

Table 3. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	MMSE Scoring (Before) & MMS Scoring (After)	22	0.833	<0.001

Table 4. Paired Samples Test

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
| | | Mean | SD | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
					Lower	Upper			
Pair 1	MMSE Scoring (Before)– MMSEscoring (After)	-3.818	2.423	0.517	-4.892	-2.744	-7.392	21	<0.001

Concerning language and speech ability, 17 patients had a score of 4 or less in the pre-treatment test, which reached 5 on completion of the treatment. Moreover, out of 22 samples, only one subject did not improve the language and speaking score. Table 5, the mean score in this section before the treatment was 3.36 with a standard deviation of 1.529, which reached 5.55 with an SD 1.535. Tables 6 and 7, the significance level of paired t-test was <0.001 and t value was negative, where like the overall score of the test, one can state the positive and direct effect of Iranian music therapy in improving the speech of Alzheimer's patients.

Table 5: Paired Samples Statistics

		Mean	N	SD	Std. Error Mean
Pair 1	Language (Before)	3.36	22	1.529	0.326
	Language (After)	5.55	22	1.535	0.327

Table 6: Paired Samples Correlation

		N	Correlation	Sig.
Pair 1	Language(Before) & Language(After)	22	0.764	<0.001

Table 7: Paired Samples Test

		Paired Differences						t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Language(Before) - Language(After)	-2.182	1.053	0.224	-2.649	-1.715		-9.721	21	<0.001

6. CONCLUSION

The study examined the role of music therapy by Iranian music in improving and treating elderly people with Alzheimer's and related speech disorders. Although music therapy has been stated to be an effective treatment in many pieces of research, few field studies have been conducted in Iran to investigate its effectiveness among Alzheimer's patients in Iran. On the other hand, the gradual movement of the Iranian aging Pyramid into old age, Alzheimer's and dementia have become a serious threat to the health of the Iranian community. Thus, the focus of the study was to examine one of the most tangible and well-known types of music for Iranians, Iranian music, in improving these patients. The test was carried out on 22 patients with Alzheimer's disease in one of the elderly care centers of Tehran. The treatment period was 14 days and 15 minutes per day, done by a music therapist and in a controlled environment. The validated MMSE test was used before and after the treatment as a tool for measuring the variables. The results showed that using Iranian music in the musical therapy of Alzheimer's patients is helpful in improving cognitive impairment and increasing the linguistic and speaking power of patients with Alzheimer's, and this kind of music can be used as a suitable source in the therapeutic process.

7. MATERIAL AND DATA AVAILABILITY

Information regarding this study is available from the corresponding author.

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