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Greek Patients with Dementia: The Effect of Music Therapy and Its Role in Cognitive Rehabilitation

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Abstract

Introduction: Dementia produces high health related costs as a result of increased needs for treatment, patient care and caregiver support. Music therapy provides opportunities for the recollection of memories and creates a positive mood during the cognitive rehabilitation process.

Aims: To investigate whether music therapy has positive outcomes for person living with dementia.

Methodology: Quasi-experimental design was used. The quasi-experimental group was divided into three subgroups and underwent the experimental intervention of listening to music. Data collection was conducted using a questionnaire. The total sample included 74 individuals suffering from mild to moderate dementia.

Results: Patients with dementia like music while it creates memories generating a statistically significant difference between the control and experimental groups. All three types of music inspired the participants to recall memories, with traditional music being the most dominant, followed by folk and classical music.

Conclusion: Music therapy is an effective intervention for dementia in combination with medication that can slow the progression of the disease and offer a better quality of life to these patients.

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Introduction

In developed countries due to the rise of life expectancy, dementia has become a major medical, social and economic problem. Dementia creates high health costs as a result of the increased need for treatment and care of the patient and support of caregivers. Current standards in geriatric care recommend non-pharmacological approaches to these challenges, including safe approaches to managing pain and stress, enhancing symptom relief, and promoting independent lifestyles with the highest possible quality of life [1]. Music produces emotions that bring back memories. This is why many researchers believe that music enhances the activity of the brain [2], which is helpful even for people with dementia [3,4].

Dementia

According to Walton [5] dementia is a chronic neurodegenerative disease of the brain that impairs mental functions and cognitive abilities thus impeding the ability to perform daily functions. Problems occur mainly in memory, speech, orientation, behavioral disorders [6] and loss of functionality in the work and social environment [7]. Symptoms vary and for this reason defined stages of the disease have been developed [8,9] from stage 1 (absence of cognitive decline) to stage 7 (very severe cognitive decline).

Many risk factors are responsible for the development of dementia such as age over 65, gender (mainly women), genetic factors (the apolipoprotein -APOE E4 gene has been implicated) [10], craniocerebral injuries, vascular condition [11], toxic factors, psychosomatic factors and social behavioral factors [12].

According to the Greek National Observatory of Dementia and Alzheimer's [13], the aging population is a cause of the increasing incidence of the disease. In Europe, about 17 billion Euros are spent, while in Greece it is estimated at 341 Euros/month (at the stage of autonomy), 957 Euros

at the stage of dependence at home and 1,276 Euros are spent in an institution [14]. Also 24.2 million people worldwide have dementia and 4.6 million new cases of this disease occur each year [15]. The highest prevalence of dementia is observed in North America (6.4%) and Western Europe (5.4%) [16]. In the US, more than 5 million people suffer from Alzheimer's disease, a number that is expected to rise to over 13 million by 2050 [17].

The diagnosis of the disease is crucial for the treatment and decelerating its progression. The most common and fastest quantitative assessment of mental abilities is the Mini Mental State Examination (MMSE) [18]. If cognitive decline is found, diagnostic tests (blood and computed tomography or MRI) are performed [19-21].

There is no drug therapy that will prevent the disease. Drug therapy aims to control mental disorders, improve behavioral disorders and depression that often coexist with dementia and delay its development [22]. Second-generation drugs such as donepezil and rivastigmine are more effective and have fewer side effects [23]. It should be noted that non-pharmacological interventions are patient-centered, have no side effects and aim to enhance the therapeutic effect of drugs [24]. In Greece, non-pharmacological interventions are carried out mainly in day care centers for people with dementia [25].

The main goals of nursing care are to protect the patient from injury, to treat dysfunctional behaviors and to support the patient and caregiver during their daily life activities [26]. Also, the patient's nursing care is concerned with the improvement of sleep, the relief of symptoms of depression, aggression and the promotion of independence but also the prevention of accidents as well as their cognitive rehabilitation [27]. In cognitive rehabilitation, these principles are applied to enable people with dementia to maintain or optimize functioning. The term "cognitive" is uses as a goal-oriented approach to facilitate improved management of functional disability [28].

Regarding the inability to self-care, in collaboration with the patient, the nurse designs a realistic program to meet daily needs. In this way it encourages maximum independence, implements measures to maintain the best possible level of mobility and finally informs careers about the patient's ability to self-care [29]. Patients with dementia, especially in the early stages, should be referred to the appropriate support services as to gain support for both the patient as well as his family.

In Greece there are 57 Neurology Departments within General Hospitals [30]. In addition, there are Day Care Centers for people with dementia. These centers function as day care unit for patients with Alzheimer's and other related disorders [31]. Day care services are free; however they are limited and usually located in big cities. Many patients, who live in rural areas, do not have access to these services [30].

Music therapy

Music therapy is the methodical use of music in the context of a therapeutic relationship that aims to prevent, restore, improve or maintain physical and mental health [32]. As a science it focuses on the study of measurable effects of music on human physiology [33]. Music therapy is applied in many clinical fields, such as mental illnesses, anxiety disorders, developmental disorders, neurology, cardiology, pediatrics, gerontology, rehabilitation and pain clinics [34]. It should be emphasized that music therapy cannot replace traditional medicine including administration of appropriate drugs and mechanical interventions. It essentially aims to support the patient during an illness. Music therapy is classified internationally in the mind-body therapies [35].

Music in the early stages of dementia can enhance a person's mood and brain function [36]. Given the increasing frequency of dementia and the limited resources for patient care, it is important to find alternative ways of maintaining and stimulating the cognitive, emotional and social status of these individuals within the scope of their rehabilitation. Music therapy treatment is effective for older people who suffer from functional deficits namely physical, psychological, and cognitive [37,38].

The techniques mainly used in music therapy are remotivation [39] (stimulates thinking, dialogue, improves sociability), Reality Orientation (repetitive information that the patient does not have the ability to remember), Reminiscence (memories) and Sensory training (training of the senses) [40]. Although in Greece music therapy is not yet fully organized, it is beginning to evolve in recent years thanks to specialized music therapists who, having completed their studies abroad, have returned to Greece to work in the field of mental, physical and special education. Today most music therapists work with children and adults in special education (60%), and mental health (30% to 40%), while only 10% of music therapists work in hospitals [41].

According to the literature, similar studies have been conducted abroad that present positive results of the use of music therapy in elderly patients with dementia [3,34-38]. While in Greece no similar research has been conducted. Therefore, this research study was conducted to investigate both the effect of music therapy and the type of music (classical, folk, and traditional) preferred by patients with dementia.

Thus, the following research hypotheses were formed:

- Patients with dementia like traditional music more than the other two types of music (classical and folk music).
- Traditional music makes patients with dementia feel happier than folk and classical music.
- Folk and traditional music provoke memory recall in patients with dementia.

Method

A quasi- experimental research design was used in the present study. The participants were randomly divided into two groups (experimental and control). Taking into account the types of Greek music and the influences they have on this population, it was decided that there should be three (3) types of Greek music, with a historical influence and a strong emotional impact. Therefore, the quasi-experimental group was divided into three subgroups. The participants were divided into the three subgroups according to the alphabetical order of their names. The participants in each subgroup listened to one characteristic song of each type of music: Classical, traditional and folk music.

Regarding the analysis of music genres, the participation of a professor of musicology with studies in classical music, author of many music books and many years of experience teaching in conservatories and music schools was recruited. His contribution

was requested in the selection of the song as well as to illustrate the differences in the types of music regarding rhythm, harmony, melody, ways, and organic accompaniment.

Two questionnaires were used in the research - a control and an experimental questionnaire. The questionnaires contained questions from a study conducted by Tanaka & Nogawa 38 in Japan. The questionnaire was translated into Greek using the double-blind method. More specifically, the content was translated by two people, an English professor and one of the researchers (who know English at a very high level) so that the final translation was identical to the original.

There were four questions in the control questionnaire. Participants were asked if they like music and what type, while those who claimed they did not like music were asked about their emotional state at the time. In addition, participants were asked if they had memories from a young age, while listening to music. The experimental questionnaires consisted of six questions and were answered after listening to the song corresponding to the group (classical, traditional or folk).

Specifically the questions related to the song they listened to were, 1) if they like listening to music in general, 2) if they recognize the type of song (genre) they listened to, 3) if they enjoy listening to the specific type of music 4) if they feel that the melody of the music is happy or sad 5) how they feel when they listen to this type of music (happy, sad) and finally 6). If they recall memories from a younger age while listening to this type of music. The questions used were closed-ended, with specific answers ("I know", "I do not know", "yes", "no").

Finally, the questions were included regarding demographic information. It should be noted that the questionnaires were read to the participants and completed by the researcher due to pathological problems (vision impairment, Parkinson's) and limited abilities (low educational level - illiterate) of the target population (elderly).

Sample

In the present study, the sample consisted of elderly individuals suffering from mild to moderate dementia who were accommodated in permanent care units for the elderly in the regions of Western Greece. The total sample included 74 individuals suffering from mild to moderate dementia in order for the participants to be able to understand the process involved.

Procedure

Initially, letters were sent to the Directors of the Nursing Homes for the elderly asking for permission to approach the patients suffering from dementia (mild to moderate). After permission was granted, and in collaboration with the institutions staff, the best possible date and time was established as to come in contact with the patient's i.e. visiting hours. Meal times and rest time were not chosen so that those who wanted to participate would be available. The research process was explained and patients were asked if they wanted to participate. Issues of anonymity, confidentiality and to withdraw anytime they felt uncomfortable were also explained. Those who accepted to participate were listed in alphabetical order and divided into two groups: The control group (answering questions without listening to music) and the experimental group. Later the quasi-experimental group was again divided into three sub-groups based on the alphabetical order of the participant's names. A quiet area (dining room) was chosen for privacy and better acoustics.

In the first phase of the study, the questionnaire was given to the control group. The questions were asked by the researcher and the process took about 3 min. In the second phase, the 3 sub-groups separately listened to the song from the type of music each group belonged to (classical, traditional and folk music respectively). The duration of each song was 3 min to 4 min. For this part of the study, a small stereo and USB (containing the 3 songs) was used in order to provide the best possible acoustics. The selection of songs was made according to the characteristics of the population (age, experiences), but also based on the needs of the research. Each group listened to the song twice to be able to answer the questions. The completion of the questionnaire took 4 minutes - 5 min. No questions were asked by the participant within each group.

Data analysis

Data analysis was conducted with the use of the statistical program SPPS 25. Descriptive and inductive (one-way ANOVA) statistics were performed.

Results

Demographic characteristics

The majority of the samples were women (78.6%), diagnosed with Alzheimer's dementia (50.6%) and vascular dementia (20%) while the age of the participants ranged from 65 to 98 years, with a mean score of 78 years.

Control group

The vast majority (85%) of the control group answered that they like listening to music, while those who stated they did not like music claimed they were not in a good mood. In addition, participants like traditional music more (35%) than other types of music, followed by folk (25%) and classical music (10%). Finally, for those who claimed they like music, 40% mentioned they sometimes have memories from a younger age while 10% state they always do.

Quasi-experimental group

Almost all participants (92.6%) in the quasi-experimental group answered that they like listening to music and prefer traditional and folk music (33.3% and 29% respectively). All participants were familiar with all three types of music. Also, the majority (89.5%) of the participants from the quasi-experimental group answered that they liked the song they listened to regardless of whether they knew it. It is noteworthy that in the traditional and folk music groups, almost everyone considered the melody cheerful while in the classical music group there was a significant percentage (12.7%) that characterizes the melody as sad. Finally, all three types of music inspired the participants to recall memories despite the memory deficits created by the disease.

There is a statistically significant difference regarding the question if they like music between the control group and the (experimental) subgroup of traditional music ($F=6.450$, $p<0.05$). It appears that the experimental group likes traditional music more. There is also a statistically significant difference in how they feel when they listen to the three types of music. Both types of music (traditional and folk) bring more pleasant feelings than classical music. Finally, in the question regarding the recollection of memories there is a difference between the control group and the 3 experimental subgroups (sig <0.005). Folk and traditional music provoke memory recall in person living with dementia. Therefore, all three research hypotheses were verified.

Table 1: Multiple comparisons between groups (one-way Anova test).

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
DO YOU LIKE TO LISTEN TO MUSIC?	Between Groups	7,118	3	2.039	6,450	0.002
	Within Groups	29,228	71	0.388		
	Total	36,347	74			
HOW DO YOU FEEL WHEN LISTENING TO THIS MUSIC?	Between Groups	8,052	3	2.684	5,690	0.002
	Within Groups	33,494	71	0.472		
	Total	41,547	74			
DO YOU RECALL MEMORIES WHEN YOU LISTEN TO THIS MUSIC?	Between Groups	9,730	3	3.243	7,936	0.000
	Within Groups	29,016	71	0.409		
	Total	38,747	74			

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
DO YOU LIKE TO LISTEN TO MUSIC?	1,00	2,00	-0.050	0.097	0.956	-0.31	0.21
		3,00	0.000	0.099	1.000	-0.26	0.26
		4,00	-0.094	0.096	0.760	-0.35	0.16
	2,00	1,00	0.050	0.097	0.956	-0.21	0.31
		3,00	0.050	0.097	0.956	-0.21	0.31
		4,00	-0.045	0.095	0.965	-0.29	0.20
	3,00	1,00	0.000	0.099	1.000	-0.26	0.26
		2,00	-0.050	0.097	0.956	-0.31	0.21
		4,00	-0.094	0.096	0.760	-0.35	0.16
	4,00	1,00	0.094	0.096	0.760	-0.16	0.35
		2,00	0.045	0.095	0.965	-0.20	0.29
		3,00	0.094	0.096	0.760	-0.16	0.35
HOW DO YOU FEEL WHEN LISTENING TO THIS MUSIC?	1,00	2,00	-0.833*	0.226	0.002	-1.43	-0.24
		3,00	-0.278	0.229	0.621	-0.88	0.32
		4,00	-0.683*	0.223	0.016	-1.27	-0.10
	2,00	1,00	0.833*	0.226	0.002	0.24	1.43
		3,00	0.556	0.226	0.075	-0.04	1.15
		4,00	0.150	0.220	0.904	-0.43	0.73
	3,00	1,00	0.278	0.229	0.621	-0.32	0.88
		2,00	-0.556	0.226	0.075	-1.15	0.04
		4,00	-0.406	0.223	0.274	-0.99	0.18
	4,00	1,00	0.683*	0.223	0.016	0.10	1.27
		2,00	-0.150	0.220	0.904	-0.73	0.43
		3,00	0.406	0.223	0.274	-0.18	0.99
DO YOU RECALL MEMORIES WHEN YOU LISTEN TO THIS MUSIC?	1,00	2,00	-0.094	0.210	0.970	-0.65	0.46
		3,00	-0.111	0.213	0.954	-0.67	0.45
		4,00	-0.878*	0.208	0.000	-1.42	-0.33
	2,00	1,00	0.094	0.210	0.970	-0.46	0.65
		3,00	-0.018	0.210	1.000	-0.57	0.54
		4,00	-0.784*	0.205	0.002	-1.32	-0.25
	3,00	1,00	0.111	0.213	0.954	-0.45	0.67
		2,00	0.018	0.210	1.000	-0.54	0.57
		4,00	-0.767*	0.208	0.002	-1.31	-0.22
	4,00	1,00	0.878*	0.208	0.000	0.33	1.42
		2,00	0.784*	0.205	0.002	0.25	1.32
		3,00	0.767*	0.208	0.002	0.22	1.31

*The mean difference is significant at the 0.05 level

Discussion

This study found that person living with dementia likes music in general. As for their musical preferences traditional music prevails and the other genres follow, with folk being mostly preferred over classical music. Similar results were presented by Tanaka & Nogawa's [38] research stating that their participants preferred Japanese (traditional) music to classical music.

It is noteworthy that, both groups characterized the traditional melody as cheerful when they listen to this music and they claimed they felt happy. Similar results have been recorded in the literature [38,42]. It is true that traditional music in Greece is very popular as it is used in almost all social events (weddings, baptisms, etc.) and is intertwined with historical events (liberation from the Turks, resistance against the Germans). Therefore, this type of music is familiar from a young age and according to Zuniga and Yescas [43] facilitates the recollection of memories in patients with dementia.

Comparing the two groups, the findings show that person living with dementia likes traditional music more than the other two types of music (classical and folk music), causing positive feelings and an emotional uplift in general, while they claimed they liked the process even if they did not know the song and felt happy. It is also important that they were able to recall memories by listening to the music. The control group answered that they sometimes have memories while in the experimental group they claimed they had memories in a largest percentage (27.2%). As for the types of music, it seems that traditional music is mostly preferred by patients with dementia and frequently creates the recollection of memories. Folk music follows while classical music comes in third place probably because it is not as familiar as the other genres.

Popular music during the adult life can play a catalytic role in the expression of emotions and their motor activities [44]. Also, music related to historical events, which patients have experienced, can lead to the manifestation of various emotions such as joy, sadness, anger, etc., but also to recall important information. Music related to important happy past personal events, such as weddings, baptisms, festivals, etc. assists in memory recollection, emotional expression and motor activity thus enhancing their cognitive rehabilitation. The patients in this case, identified the songs with an event and recalled customs as well as their personal experiences related to the specific event. So, it appears that the traditional music of each country has better results in dementia because it is familiar from childhood and brings back past memories.

The present research demonstrates the benefits of music therapy in the cognitive rehabilitation of patients with dementia as highlighted by the literature. Music can act as a driving force for memory stimulation, since:

• Music it used to promote memory and self-awareness in the treatment of elderly people with dementia

• Music is closely related to the unconscious and the feelings that are developed and thus can be used as a tool in music therapy aiming to bring these feelings back to the surface on one's mind.

• Music can be used to stimulate patient's memories, individually or in group activities listening to live music and participating in the production of sound (e.g. singing, clapping or playing musical instruments). Since one of the main problems faced by the elderly is isolation, music therapy, can be incorporated in creative activities in which the elderly can participate in, with the music therapist as well as others within a group and at the same time strengthen their cognitive functions.

• The emotional arousal through music therapy can help patients express themselves verbally.

• Music stimulates cognitive function, minimizes stress and depression and thus significantly improves patient autonomy.

Importantly, music therapy is a non-pharmacological method that has no side effects, has low cost and therefore can be easily applied without restrictions. Music therapy facilitates in the recollection of memories, improves one's emotional and mental state and can thus contributes to patients' memory problems and enable the cognitive rehabilitation of these patients.

Recommendations

Music can be a fun pastime for any patient, but also a challenge - an invitation to play and create. However, music therapy uses music not only for entertainment but also to improve the quality of life, to enhance self-esteem and relationships with family, friends, doctors and nurses. When the patient participates in music therapy, the negative feelings of isolation can be overcome. In Greece, music therapy is not yet fully organized and faces the challenge of increasing the public's awareness of its benefits.

In several countries there are music therapy programs in nursing homes and institutions where people with dementia live. In Greece, in similar settings this method is not widely used. The authors propose the introduce of music therapy programs in institutions, nursing homes and day centers for the elderly. There is also a lack of public awareness about the disease. When a family member shows symptoms, they are not recognized in time, which is very important for the diagnosis and progression of the disease. Therefore, information should be provided by organization about dementia as well as the positive effect of music therapy to the general public throughout Greece.

Finally, caregivers have an important and difficult role. The use of effective non-pharmacological treatments helps both the patients and the caregiver physically and emotionally-psychologically, especially in the case where the caregiver is a member of the family. For this reason, the authors suggest the development of educational programs for caregivers including seminars in art therapies such as music therapy.

Limitations

The main limitation of this study was the small sample size due to lack of financial resources. Although the research provided important data on the effect of music therapy on person living with dementia, however in order to be able to generalize these finding, it is necessary to use a larger sample from several regions of Greece.

Conclusion

According the findings of this study and the available literature, music therapy has positive results and facilitates memory recall for patients with dementia. Given that music therapy has not developed much in Greece, it would be important to create services throughout the country incorporating music therapy programs enabling these patients's cognitive rehabilitation. In this way, patients in need of this service will be able to participate in such programs without having to

visit large urban centers.

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