ORIGINAL ARTICLE

Exercise program, Greek traditional music and mood profile of patients with dementia: a pilot study

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Introduction

Exercise is widely acknowledged as a therapeutic mean that can prevent or alleviate symptoms associated with chronic conditions especially for elderly individuals with chronic diseases who fail to exercise regularly (Chodzko-Zajko, Proctor, Fiatarone et al., 2009). Furthermore, there is a growing interest in adding

Abstract

The purpose of this pilot study was to examine the effect of a music-based exercise program on mood state of patients with dementia listening to Greek traditional music while exercising. The sample consisted of 18 patients, all residents of Arogi Rehabilitation Centre, randomly separated in two groups, that is, the exercise group (N=12) following the one-week music-based exercise program at a frequency of 4 training sessions, for 45 minutes each session, and the control group (N=6) with no exercise or music involved. The Profile of Mood States (POMS) was administered to all residents to examine the short term effect of the music-based exercise program in terms of patients' distinct mood states. Results revealed that although no statistically significant differences were noted between the two groups in all pre-measures, the experiment group exhibited significantly higher scores on vigor and lower scores on tension-anxiety, fatigue-inertia, depression-dejection, anger-hostility, confusion and total mood profile compared with the control group in post-measurements. The positive effect of the music-based exercise program on patients' mood state was discussed and recommendations were made to extent its use to all residents with chronic conditions, aiming to improve mood and quality of life during rehabilitation.

Keywords: exercise, Greek traditional music, mood profile, patients, dementia

music to exercise programs as a stimulant intervention for exercise reported to have many benefits for clinical and elderly populations (Ziv & Lidor, 2011).

Music as a fundamental element of human experience provides rich and enjoyable forms of social interaction and fun (Overy, 2012). Recent research has demonstrated that listening to music while exercise, helps to accomplish goals within therapeutic environments that lead to reorganize and integrate information processing with executive control and emotion (Fujioka, Ween, Jamali et al., 2012; Pantev, Lappe, Herholz & Trainor, 2009), divert attention from the sensation of fatigue and enhance acquisition of motor skills (Terry & Karageorghis, 2006).

Motivating elderly individuals who suffer from chronic conditions through music can promote adherence to an exercise rehabilitation program and by doing so improve relative symptoms and promote motor and emotional rehabilitation for individuals with pulmonary diseases (Bauldoli, Hoffman, Zullo & Sciurba, 2002), dementia (Mathews, Clair & Kosloski, 2001), stroke (Schneider, Munte, Rodriguez-Fornells et al., 2010) and Parkinson's disease (Pacchetti, Mancini, Aglieri et al., 2000).

Music therapy was also found to have a positive effect on mood state in patients with stroke in two studies (Särkämö, Tervaniemi, Laitinen et al., 2008; Jeong & Kim, 2007), whereas in the study of Van de Winckel, Feys, De Weerdt and Dom (2004), an improved cognitive function of hospital patients with dementia participating in sitting exercises with music was also noted. Indeed, music can generate emotion, lift spirits and increase work output as a stimulant to exercise through rhythmic movements (Terry & Karageorghis, 2006) improving in this way the psychological and cognitive states of elderly populations (Chodzko-Zajko et al., 2009).

One of the practical implications suggested by Ziv and Lidor (2011) was that the type of music should be individualized according to each patient's musical preferences,

since the connection a person has to music during exercise is individual and unique depending upon cultural factors, harmonic aspects and variety (Priest, Karageorghis & Sharp, 2004). In this regard, Greek traditional dances requiring that participants hold hands while formatting and moving in a circle, promotes skills such as dynamic balance, eye-hand and eye-foot coordination, along with enjoyment and a sense of companionship developed toward a common goal of emotional expression and fullfilment through music and movement (Tsimaras, Giamouridou, Kokaridas et al., 2012).

So far, apart from two studies examining the effect of Greek traditional dance on the dynamic balance of children with (Tsimaras et al., 2012) and without cognitive disability (Maurovouniotis, Argiriadou, Maurovouniotis & Zaggelidis, 2007) and the quality of life of Greek older people without disabilities (Mavrovouniotis, Argiriadou & Papaioannou, 2010), no other studies have been conducted to examine its effect on physical or psychological state of elderly clinical populations. Especially for individuals with dementia, although Greek traditional music constitutes an experience deeply imprinted in the long-term memory of the Greek elderly, no studies have been conducted so far to examine the effect of music-based exercises in patients with dementia.

The purpose of this pilot study was to examine the effect of a music-based exercise program on mood state of patients with dementia listening to Greek traditional music while exercising. The findings of this study were expected to indicate whether this music-based exercise program will extend its use to all residents with chronic conditions of the Arogi Centre, Karditsa, Greece, aiming to improve their mood and quality of life during rehabilitation.

Method

Participants

The sample consisted of 18 elderly individuals (5 men, 13 women, mean age: 70.39 ± 4.57 years) selected randomly, all patients with mild to moderate dementia receiving care at the Arogi Rehabilitation Centre. The diagnosis of mild to moderate dementia derived from patients' medical files as provided and previously assessed by the physiatrist of the rehabilitation Centre using Mini Mental State Examination (Folstein, Folstein & McHugh, 1975).

Through flipping a coin, all patients were randomly separated in two groups, that is, the exercise group (*N*=12) following the exercise program and the control group (*N*=6) sitting in the day room of the rehabilitation Centre. No music was played for control group individuals and patients were not asked to perform any movements or participate in the exercise program whatsoever.

Instrument

The Profile of Mood States (POMS; McNair et al., 1971) was administered to examine the short term effect of the exercise program in terms of patients' distinct mood states. The questionnaire consists of 72 mood-related adjectives, which form the basis of 6 mood states, that is, tension-anxiety, fatigue-inertia, depression - dejection, anger-hostility, vigour, and confusion. Five mood states are scored negatively (that is, high scores are associated with more negative feelings) whereas vigor provides a positive score (high scores correspond to high vitality). Sub-scores are connected together to form an overall mood profile of each individual, resulting from the addition of the five "*negative*" mood variables (tension, depression, anger , fatigue and confusion) and the subtraction of the "*positive*" vigor score (McNair et al., 1971), plus adding a constant of 100 to avoid negative

scoring. All participants were instructed to rate these adjectives on a 5-point scale ranging from "*not at all*" (0) to "*extremely*" (4).

Procedure

The Greek version of POMS (Maggouritsa, Kokaridas, Theodorakis, Patsiaouras et al., 2014) was administered to all participants of both groups prior and after the application of the music supported exercise program. The duration of the pilot study program for the exercise group was one week at a frequency of four training sessions per week, of 45 minutes each session. As regards to control group individuals, their task was solely to complete POMS questionnaire prior and after exercise intervention, without being present during the application of the program.

Patients in the exercise group followed a one-week music-based exercise program, at a frequency of four (4) training sessions per week, for 45 minutes each session. In each session, the residents sat in a circle, facing the main instructor, so they could follow the exercises through imitation. Simple and specific verbal instructions combined with continuous visual demonstration were used by the main instructor, whereas 12 undergraduate adapted PE students equal to the number of patients, served as assistants throughout each session to provide kinesthetic guidance on a one-to-one basis, whenever necessary. Individualized supervision was used to promote motivation and adherence to the exercise program that can be challenging for individuals with dementia (Mathews, Clair & Kosloski, 2001). To enhance interest and participation, the music chosen with consideration of their age was Greek traditional music that constitutes a youth experience deeply imprinted in the long-term memory of Greek elderly patients.

Each training session included group activities supported by Greek traditional music throughout each lesson, with a five (5) minutes warm-up period of breathing and flexibility exercises followed by the main part of upper and lower body strengthening,

balance and co-ordination exercises on sitting and standing position and trunk movements performed at a moderate intensity and a cool-down period of 5-10 minutes of patients holding hands while moving slowly in a circle listening to music. Moderate intensity of training was described as the physical effort that made exercise group participants breathe somewhat harder than normal (Faulkner et al., 2006).

Statistical analysis

Statistical analysis included the use of Statistical Package of Social Sciences (SPSS 17.0) with the level of significance set at $p<.05$. Normal distribution control of values was performed to check whether the values of POMS variables followed normal distribution, by taking into account that when z values of skewness and kurtosis in smalls samples (<50 participants) are less that 1.96, then the sample follows normal distribution (Kim, 2013). Results showed that z values of skewness and kurtosis of POMS variables were less that 1.96 (<1.96). Thus, repeated measures ANOVA was used for research purposes, to examine whether any differences were noted between pre- and post- measurements within group and between the control group and the exercise group participating in the music supported program.

Results

Repeated measures ANOVA revealed no statistically significant differences ($p>.05$) between experiment and control group in all examined variables at the pre-measures. On the other hand, significant time (pre, post) x group (experimental, control) interactions were noted regarding tension-anxiety ($F_{1,16}=82.663, p<.001$), fatigue-inertia ($F_{1,14}=71.895, p<.001$), depression-dejection ($F_{1,15}=135.786, p<.001$), anger-hostility ($F_{1,16}=48.756, p<.001$), vigour ($F_{1,16}=54.761, p<.001$) and confusion ($F_{1,16}=63.178, p<.001$), as well as total mood profile ($F_{1,16}=131.649, p<.001$). Moreover, there was a

statistically significant main effect of group (experimental, control) only in the second measurement (post) of tension-anxiety ($F_{1,16}$=114.036, p<.001), fatigue-inertia ($F_{1,14}$=94.202, p<.001), depression-dejection ($F_{1,15}$=142.987, p<.001), anger-hostility ($F_{1,16}$=106.469, p<.001), vigour ($F_{1,16}$=287.007, p<.001), confusion ($F_{1,16}$=61.035, p<.001) and total mood profile ($F_{1,16}$=222.491, p<.001). More specifically, experiment group exhibited significantly higher scores on vigor and lower scores on tension-anxiety, fatigue-inertia, depression-dejection, anger-hostility, confusion and total mood profile (Figure 1) compared with the control group in the second (post) measurement. Pre-test and post-test differences between experimental and control group in POMS variables are presented in Table 1.

Table 1. Pre-Test and Post-Test Differences Between Experimental and Control Group on POMS

Variables

Measurements	Experimental (*n*=12)	Control (*n*=6)	Df	Error	F value	*p*
	M ± SD	M ± SD				
Pre Measurement						
Tension-Anxiety	3.13 ± .26	3.06 ± .47	1	16	.169	.686
Depression-Dejection	3.23 ± .30	2.94 ± .47	1	15	2.423	.140
Vigor	1.15 ± .56	1.28 ± .39	1	16	.236	.633
Anger-Hostility	2.64 ± .44	2.81 ± .49	1	16	.537	.474
Confusion	3.03 ± .33	2.87 ± .59	1	15	.591	.454
Fatigue-Inertia	3.18 ± .20	3.30 ± .52	1	14	.446	.515
Total Mood Profile	113.57 ± 1.88	113.69 ± 1.82	1	16	.017	.897
Post Measurement						
Tension-Anxiety	.72 ± .38	3.06 ± .54	1	16	114.036	.001
Depression-Dejection	.73 ± .40	3.15 ± .40	1	15	142.987	.001
Vigor	3.24 ± .21	1.11 ± .33	1	16	287.007	.001
Anger-Hostility	.83 ± .29	2.67 ± .47	1	16	106.469	.001
Confusion	.95 ± .38	2.83 ± .63	1	15	61.035	.001
Fatigue-Inertia	.84 ± .52	3.20 ± .36	1	14	94.202	.001
Total Mood Profile	100.89 ± 1.72	113.79 ± 1.75	1	16	222.491	.001

M: Mean square; **SD:** Standard deviation; **Df:** degree of freedom; **F value:** pre-post Anova; *p*: level of significance at <.05

Discussion

In relation to the effect of the music-based exercise program on participants' mood state, results showed its positive influence that was evident throughout the intervention week, with individuals of the experiment group exhibiting more vigor and less tension-anxiety, fatigue-inertia, depression-dejection, anger-hostility, confusion and total mood profile compared to control group individuals.

The study focused on how music-based exercise improves mood profile of persons with dementia, considering the feelings that Greek traditional music generates and motivates each individual to take part in physical activity as an important part of rehabilitation treatment (Grant, 2000). In fact, traditional dance has always been important to the Greek people, especially for the elderly ones, as a means of celebrating important occasions in life, as a form of self-expression of the joy of the moment, and also as a part of a "*ritual*" performed in weddings, baptisms and name day celebrations in Greece (Raftis, 1995). Just as in the ancient Greek drama, emotions are expressed on important occasions through the "*catharsis*" of dance and music, and leave their mark in the lives and memory of the Greek people.

Since the long-term memory of persons with dementia in the early stages is often less affected (Dröes, Van Der Roest, Van Mierlo & Meiland, 2014), older and more firmly established memories of events involving Greek traditional music were easier to recall than newer memories. Recalling such memories from late adolescence and early adulthood events had also an obvious emotional influence on patients during exercise. Saying that higher scores on vigor and lower scores on tension-anxiety, fatigue-inertia, depression-dejection, anger-hostility, confusion and total mood profile were noted for experiment group participants at the end of the music - based program is indeed a statistically important

and positive finding in research terms. However, the finding itself cannot provide the whole picture of the tears of joy, happiness, laughter and singing of patients that were evident in each training session caused by the memories triggered by music.

A systematic review (Coelho, Santos-Galduroz, Gobbi & Stella, 2009) and a meta-analysis (Heyn, Abreu & Ottenbacher, 2004) showed that regular exercise such as walking, chair exercises, weight training and dancing positively affect physical, behavioral and cognitive factors of patients with dementia. In this music-based program, movement activities aimed to help participants experience some degree of success and confidence and stimulated self-expression and emotions through music.

Informal conversation between the residents with the assistants in each occasion patients wanted to share past experiences that emerged in memory by music prompting, provided cognitive stimulation (Cantegreil-Kallen, De Rotrou & Rigaud, 2009), emotional balance and expression and re-engagement of patients with the rehabilitation environment (Dröes, 2013) in which they have to live in for a certain period of time. Furthermore, individualized guidance by assistants whenever necessary, promoted motivation and commitment to the exercise program that can be challenging for patients with dementia (Mathews, Clair & Kosloski, 2001).

Following the rhythm during exercise even during the cool-down period of 5-10 minutes in each session with patients holding hands while moving slowly in a circle was not a prerequisite; the overall purpose for residents was to exercise while listening to Greek traditional music. All that was needed was singing and a sense of fellowship developed through music and movement.

Music based exercise can indeed benefit persons with dementia by serving as a means for social and memory stimulation, resulting to an overall improved mood profile. Surely, this is a pilot study that also appears to be the first of its kind, thus, limitations do

exist due to its small sample, short duration and its exploratory nature. Future researches using larger samples, longer duration and different combinations between exercise and music genres other than traditional music are needed to generalize results and examine additional psychological parameters related to quality of life aspects during the rehabilitation period.

Nevertheless, this pilot study served its particular purpose to show the positive effect of the music-based exercise program on mood profile of patients with dementia and due to its promising results, the particular exercise program has been extended to include all patients with chronic conditions reside to the Arogi Rehabilitation Centre.

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