



Exercise training and music therapy in elderly with depressive syndrome: A pilot study



W. Verrusio^{a,*}, P. Andreozzi^a, B. Marigliano^b, A. Renzi^c,
V. Gianturco^a, M.T. Pecci^d, E. Ettore^a, M. Cacciafesta^a,
N. Gueli^a

^a Department of Cardiovascular, Respiratory, Nephrological, and Geriatric Sciences, Sapienza University of Rome, Rome, Italy

^b Internal Medicine, Campus Bio-medico of Rome, Rome, Italy

^c Department of Dynamic and Clinical Psychology, "Sapienza" – University of Rome, Italy

^d "Science of Aging" Interdepartmental Research Center – Sapienza University of Rome, Italy

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KEYWORDS

Anxiety;
Depression;
Exercise;
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Rehabilitation

Summary

Objective: Recent studies have thrown doubt on the true effectiveness of anti-depressants in light and moderate depression. The aim of this study is to evaluate the impact of physical training and music therapy on a sample group of subjects affected by light to moderate depression versus subjects treated with pharmacological therapy only.

Design and setting: Randomized controlled study. Patients were randomized into two groups. Subjects in the pharmacotherapy group received a therapy with antidepressant drugs; the exercise/music therapy group was assigned to receive physical exercise training combined with listening to music. The effects of interventions were assessed by differences in changes in mood state between the two groups.

Main outcome measures: Medically eligible patients were screened with the Hamilton Anxiety Scale and with the Geriatric Depression Scale. We used plasmatic cytokine dosage as a stress marker.

Results: We recruited 24 subjects (mean age: 75.5 ± 7.4 , 11 M/13 F). In the pharmacotherapy group there was a significant improvement in anxiety only ($p < 0.05$) at 6-months. In the exercise/music therapy was a reduction in anxiety and in depression at 3-months and at 6-months ($p < 0.05$). We noted an average reduction of the level of TNF- α from $57.67 (\pm 39.37)$ pg/ml to $35.80 (\pm 26.18)$ pg/ml.

* Corresponding author at: Department of Cardiovascular, Respiratory, Nephrological, and Geriatric Sciences, Sapienza University of Rome, Viale del Policlinico 155, 00161 Roma, Italy. Tel.: +39 3490745274.

E-mail address: walter.verrusio@uniroma1.it (W. Verrusio).

Conclusions: Our training may potentially play a role in the treatment of subjects with mild to moderate depression. Further research should be carried out to obtain more evidence on effects of physical training and music therapy in depressed subjects.

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Introduction

Depression and anxiety are frequent disorders in the elderly. Beyond the age of 65, the risk of falling ill with depression increases threefold compared to the general population.¹ The Food and Drug Administration (FDA) recently released the data underlying the approval of six of the most widely sold anti-depressants: in 47 controlled clinical studies, only 10–20% showed benefits effectively attributable to the pharmacological action of the molecule employed, while the placebo effect was responsible for the improved mood of 80–90% of the subjects.² In confirmation of this finding, a recent study showed that drugs against depression proved partially effective only in subjects suffering from severe depression.³ In recent years, therefore, extensive scientific evidence has thrown doubt on the true effectiveness of anti-depressants, especially for patients affected by light or moderate depression. And we need, especially in the field of geriatrics, to look for new tools for the treatment of mood disturbances.

Experience has been gained, over the last few years, with cognitive therapy (CT). A study carried out on 240 patients suffering from moderate to severe depression showed that, although the percentage of response to treatment with CT overlapped, to a certain extent, with the response to pharmaceuticals, the long-term incidence of new episodes of depression in the group treated with Selective serotonin reuptake inhibitors (SSRIs) was 54%, compared to 17% among patients treated with CT.⁴ This suggests not only that the effect of CT lasts longer than that of pharmaceuticals, but that CT can produce changes which differ from those brought about by pharmaceutical therapy, making it a valid alternative to the use of anti-depressants. In the field of geriatrics, other works have highlighted the positive effect of music on treating cognitive disturbances⁵ and behavioral and psychological symptoms of dementia (BPSD)⁶ and on a whole series of unfavorable stress-induced circumstances, including anxiety and depression.⁷ Recent research efforts examining the effects of listening to music on the brain have discovered that music is able to increase cerebral synaptic plasticity.⁸ In other words, though they act through different mechanisms and have different effects, both depression and music work in a shared substrate of certain areas of the brain, giving rise to a series of changes.⁹ The fact is that exposure to sound leads to increased neurogenesis at the hippocampus, where neuron impoverishment due to loss and/or scarce regeneration is thought to be an underlying cause of a variety of mood disturbances, including depression.¹⁰ Therefore there is a very close link between depression and music.

Another therapeutic strategy recently proposed for the treatment of depressed subjects is physical activity. Physical training helps control mood disturbances, especially those

of light to moderate intensity, with a level of effectiveness comparable to that of psychological or pharmacological therapies, especially over the long term.¹¹

In the present study, we used plasmatic cytokine dosage as a stress marker. Recent research has pointed to an active role on the part of pro-inflammatory cytokines in the regulation of synaptic plasticity, demonstrating that hyperactivation of the immune system can be identified as part of the pathogenesis of depression.¹² Patients suffering from mood disturbances have been found to present increases in Interleukin 1 (IL1), Interleukin 6 (IL6) and Tumor Necrosis Factor alpha (TNF α), tied to a greater risk of cognitive disturbances and mood depression, plus a reduced response to therapy.¹³ The cytokine dosage, therefore, can be used as a parameter for evaluating the effectiveness of a proposed therapy.

The primary aim of this study is to determine whether exposure to music and physical training can have a positive effect on the mood of elderly subjects suffering from light to moderate depression, and whether the improvement in mood persists over time.

A secondary aim of the study is to evaluate the effective influence of aerobic physical training on the concurrent disturbances of the subjects examined.

Materials and methods

This was a randomized controlled trial. This study included a series of elderly subjects ($n=24$; mean age: 75.5 ± 7.4 ; 13 females) diagnosed according to the DSM-IV criteria with major depression with mild to moderate severity.^{14,15} Each participant received information about this study in writing and an individual verbal explanation of this study from the researcher. Participation was entirely voluntary. Individual participants in this study gave written informed consent and a signed declaration of consent. This study was conducted according to the principles expressed in the Declaration of Helsinki and was approved by the "Science of Aging" Interdepartmental Research Center of Sapienza University of Rome. We evaluated the concurrent conditions through the Cumulative Illness Rating Score (CIRS) and its Comorbidity Index (CInd).¹⁶ The main diseases found in the test group were: hypertension, obesity, diabetes mellitus, carbohydrate intolerance, dyslipidemia. Consistency with the following criteria of inclusion was assessed for each patient: diagnosis of light to moderate depression, with a Geriatric Depression Scale (GDS) score between 5 and 12; absence of pharmacological treatment. Patients suffering from severe depression, or for whom physical exercise was not recommended (blood pressure – SBP – >200 mmHg and/or diastolic blood pressure – DBP – >110 mmHg; diabetic subjects with fasting blood glucose – FBG – >250 mg/dl; unstable angina pectoris; arrhythmias; severe heart valves

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