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# Implications of an 8-week strength and flexibility training program on depressive symptoms in individuals aged 60 - 65 years

# Implicações de um programa de 8 semanas de treinamento da força e da flexibilidade sobre os sintomas depressivos em indivíduos com idade entre 60 - 65 anos

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## ABSTRACT

Psychological aspects are areas of study with broad importance for the elderly, and just as significant improvements in the biological dimensions are reported, studies point to positive effects on the psychological dimensions. Studies suggest that the elderly are distressed by health problems. From the moment health is achieved, concerns begin with regard to individuals becoming incapable, turning into unmotivated and uninterested individuals, and thus affecting them both in the psychological and physical aspects. Methods: This is a cross-sectional analytical study. The sample consisted of 23 healthy sedentary women and 7 men, who underwent a program of lower and upper limb strength and flexibility training (emphasis on trunk flexibility). A questionnaire described by FIATARONE (1996) was used to assess depression. This instrument consists of 30 questions related to the individual's satisfaction with life and mood. The total number of negative points was considered, i.e., all those responses that are associated with feelings of depression. The statistical analysis used to measure the level of significance between the pre- and post-test of the depression assessment was the McNemar test, which tests data arranged in a 2x2 contingency table, in order to compare proportions of two paired groups, where concordant and discordant pairs are observed in relation to two treatments. Results: The use of the McNemar test to compare the data collected in the pre-test and post-test physical activity program, assessing depression, showed no significant difference in any of the thirty variables that make up the test applied. This result was observed in both sexes. Conclusions: The study showed that it did not contribute to the psychological state in question, assuring that it was unsatisfactory to the point of presenting a level of insignificance for both men and women.

**Keywords:** Training, Strength, Flexibility, Depression, Elderly.

## INTRODUCTION

Decreased flexibility and strength are factors that limit the practice of activities in daily life. The importance of muscle work and flexibility for the elderly is not restricted only to the improvement of the physiological aspect, through an improvement in their physical aspect. This

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makes the elderly feel more confident, improving their body image, self-concept and self-esteem (BERGER 1989, PETRUZELLO *et al.,* 1991). The objectives of this research were to verify the effects of an 8-week program of resistance exercises and flexibility in untrained individuals aged 60 to 65 and to quantify the changes that occurred in the psychological variable "depression" through the proposed test.

## METHODOLOGY

This is a cross-sectional analytical study. The research participants consisted of a convenience sample. Thus, the sample consisted of 30 elderly people, with a mean age of 62.8 years, of which 23 were women (76.66%) and 7 men (23.34%), who participated in 3 weekly sessions of resistance exercises, for 8 uninterrupted weeks. The prescription of the training program followed the alternating order by segment and the 7 proposed exercises were performed in the following order: horizontal leg-press, barbell curl (biceps), flexor chair, triceps in the *pulley*, calf in the apparatus itself, wrist flexion with barbell, wrist extension with barbell. Before the beginning of the program itself, it was demonstrated how each exercise should be performed on the respective machines, also informing the proper care, the muscles that would be worked on each machine and the possible injuries that could occur if they were not performed correctly. All exercises were performed in two sets of 10 maximum repetitions (RM) in the first 2 weeks (anatomical adaptation period), according to RODRIGUES (1998). After the adaptation period, during the following 6 weeks the participants started to perform 3 sets of 10 repetitions, and at the beginning of all training sessions the participants performed a 15-minute walk seeking a general warm-up and performed a series of 15 repetitions with approximately 50% of the load on all prescribed machines. in order to increase the specific heating in order to favor the physiological and neural responses to the subsequent efforts. The recovery interval established between sets was 60-90 seconds, reaching a maximum interval of 120 seconds between exercises. Both the initial loads and the periodic readjustments in the loads used in the different exercises were established based on the results obtained through the application of weight tests for maximum repetitions according to the recommendations of RODRIGUES (1998). Flexibility training always occurred at the end of the weight training sessions, where each participant seated on a mat was individually helped to perform hip flexion and extension maneuvers and trunk flexion and extension, aiming to stretch the muscles involving the hamstrings and back muscles, for which the passive method (or static flexion) was used, the way of performing this method was followed according to the suggestion of DANTAS (1995), where the researcher's assistants

who were previously trained for this slowly reached the normal limit of the joint arch of the individual being stretched (threshold between stretching and flexion), gently forced beyond this limit for six seconds and performed a new soft forcing, striving to achieve the widest range of motion possible. At this point, the joint arch obtained was maintained for 15 seconds. The routine was repeated three times, with a relaxation interval between them. The application of the depression test, as well as its evaluation, was carried out with the help of psychologist Wilson Plaster, CRP 01/8114. **Material:** a questionnaire described by FIATARONE (1996) was used in the general evaluation battery. This instrument consists of 30 questions related to the individual's satisfaction with life and mood. **Procedures:** the questionnaire was delivered in a quiet place where the subject was able to remain concentrated and answer calmly. **Result**: the total number of negative points was considered, i.e., all those answers that are associated with feelings of depression, as follows: "No" answers: *items 1, 5, 9, 15, 19, 21, 29 and 30* - "Yes" answers: the rest of the alternatives. (see Tables 1 and 2). The greater the number of negative points, the greater the likelihood of depression. The present study was approved by the Research Ethics Committee (REC) of the Faculty of Biomedical Sciences of Cacoal - FACIMED and considered to be in accordance with the ethical aspects that should govern research involving human beings. The request for approval complied with the recommendations of the current regulations, as recommended by its Resolutions 196/96 and 251/97.

## RESULTS

The use of the McNemar test to compare the data collected in the pre-test and post-test physical activity program, assessing depression, showed no significant difference in any of the thirty variables that make up the applied test. This result was observed in both sexes.

Table 1. Statistical representation of the comparison of pre-test and post-test responses in the physical activity program to assess depression in the group of female individuals.

| Questions that make up the test | p-value | Degree of significance |
|---|---|---|
| **1.** Are you satisfied with your life? | 1,0000 | No |
| **2.** Have you left many of your interests and activities? | 0,3750 | No |
| **3.** Do you feel like your life is empty? | 1,0000 | No |
| **4.** Do you often feel bored? | 0,0625 | No |
| **5.** Are you full of hope for the future? | 1,0000 | No |
| **6.** Are you annoyed by thoughts you can't get out of your head? | 1,0000 | No |
| **7.** Are you excited most of the time? | 1,0000 | No |
| **8.** Do you fear that something bad will happen to you? | 1,0000 | No |
| **9.** Do you feel happy most of the time? | 1,0000 | No |
| **10.** Do you often feel helpless? | 1,0000 | No |
| **11.** Do you frequently get restless and nervous? | 1,0000 | No |

| | | |
|---|---|---|
| **12.** Would you rather stay at home instead of going out and doing new things? | 0,6875 | No |
| **13.** Do you often worry about the future? | 0,3877 | No |
| **14.** Do you feel like you have more problems with memory than others? | 0,6875 | No |
| **15.** Do you think it's wonderful to be alive now? | 1,0000 | No |
| **16.** Do you often feel depressed or melancholy? | 0,4531 | No |
| **17.** Do you feel worthless the way you are now? | 1,0000 | No |
| **18.** Do you worry a lot about the past? | 1,0000 | No |
| **19.** Do you find life quite exciting? | 1,0000 | No |
| **20.** Is it difficult for you to get involved with new projects? | 1,0000 | No |
| **21.** Do you feel full of energy? | 1,0000 | No |
| **22.** Do you feel that your situation is hopeless? | 0,6875 | No |
| **23.** Do you think most people are better than you? | 1,0000 | No |
| **24.** Do you get upset about little things? | 1,0000 | No |
| **25.** Do you often feel like crying? | 1,0000 | No |
| **26.** Do you have trouble concentrating? | 1,0000 | No |
| **27.** Do you like to get up in the morning? | 0,3750 | No |
| **28.** Do you prefer to avoid social gatherings? | 0,5078 | No |
| **29.** Is it easy for you to make decisions? | 1,0000 | No |
| **30.** Is your mind as clear as it used to be? | 1,0000 | No |

Source: Author's own (2023)

Table 2. Statistical representation of the comparison of responses before and after the physical activity program to assess depression in the group of males.

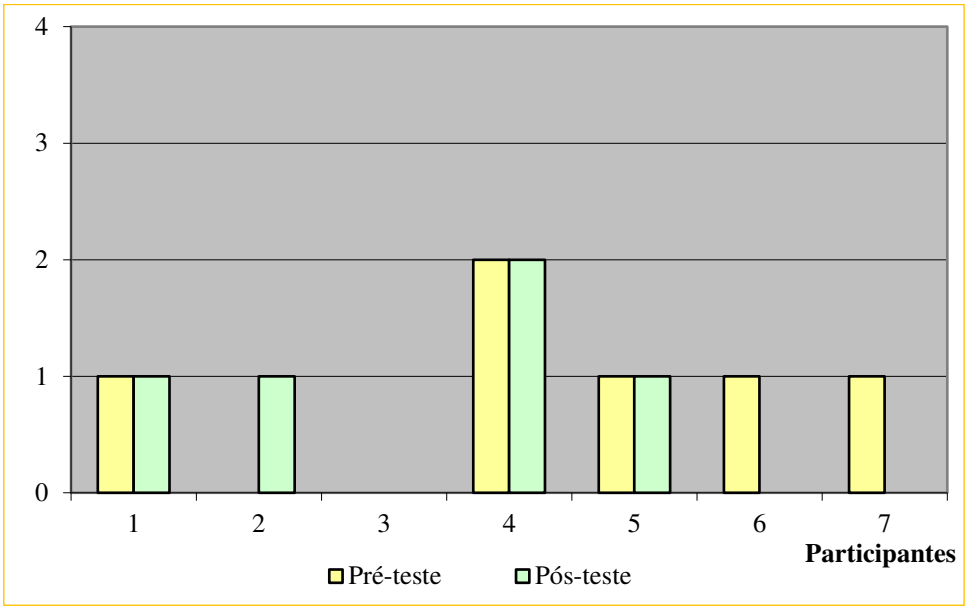
| **Questions that make up the test** | **p-value** | **Degree of Significance** |
|---|---|---|
| **1**. Are you satisfied with your life? | 1,0000 | No |
| **2.** Have you left many of your interests and activities? | 0,1250 | No |
| **3.** Do you feel like your life is empty? | 0,5000 | No |
| **4.** Do you often feel bored? | 1,0000 | No |
| **5.** Are you full of hope for the future? | 1,0000 | No |
| **6.** Are you annoyed by thoughts you can't get out of your head? | 0,5000 | No |
| **7.** Are you excited most of the time? | 1,0000 | No |
| **8.** Do you fear that something bad will happen to you? | 1,0000 | No |
| **9.** Do you feel happy most of the time? | 1,0000 | No |
| **Do** you often feel helpless? | 0,2500 | No |
| **Do** you frequently get restless and nervous? | 0,2500 | No |
| **Do** you prefer to stay at home instead of going out and doing new things? | 1,0000 | No |
| **13.** Do you often worry about the future? | 0,5000 | No |
| **Do** you feel like you have more problems with memory than others? | 1,0000 | No |
| **15.** Do you think it's wonderful to be alive now? | 1,0000 | No |
| **Do** you often feel depressed or melancholy? | 1,0000 | No |
| **17.** Do you feel worthless the way you are now? | 1,0000 | No |
| **18.** Do you worry a lot about the past? | 1,0000 | No |
| **19.** Do you find life quite exciting? | 1,0000 | No |
| **20.** Is it difficult for you to get involved with new projects? | 1,0000 | No |
| **21.** Do you feel full of energy? | 1,0000 | No |
| **22. Do** you feel that your situation is hopeless? | 0,2500 | No |
| **23.** Do you think most people are better than you? | 0,0625 | No |
| **24.** Do you get upset about little things? | 0,1250 | No |
| **25.** Do you often feel like crying? | 0,2500 | No |
| **26.** Do you have trouble concentrating? | 0,2500 | No |
| **27.** Do you like to get up in the morning? | 1,0000 | No |
| **28.** Do you prefer to avoid social gatherings? | 1,0000 | No |

| | | |
|---|---|---|
| **29.** Is it easy for you to make decisions? | 0,2500 | No |
| **30.** Is your mind as clear as it used to be? | 1,0000 | No |

Source: Author's own (2023)

The following graphs refer to the results of the psychological test, the values mentioned in them refer to the total of negative points obtained in the pre- and post-test, that is, all those responses that are associated with feelings of depression. The greater the number of negative points, the greater the likelihood of depression.

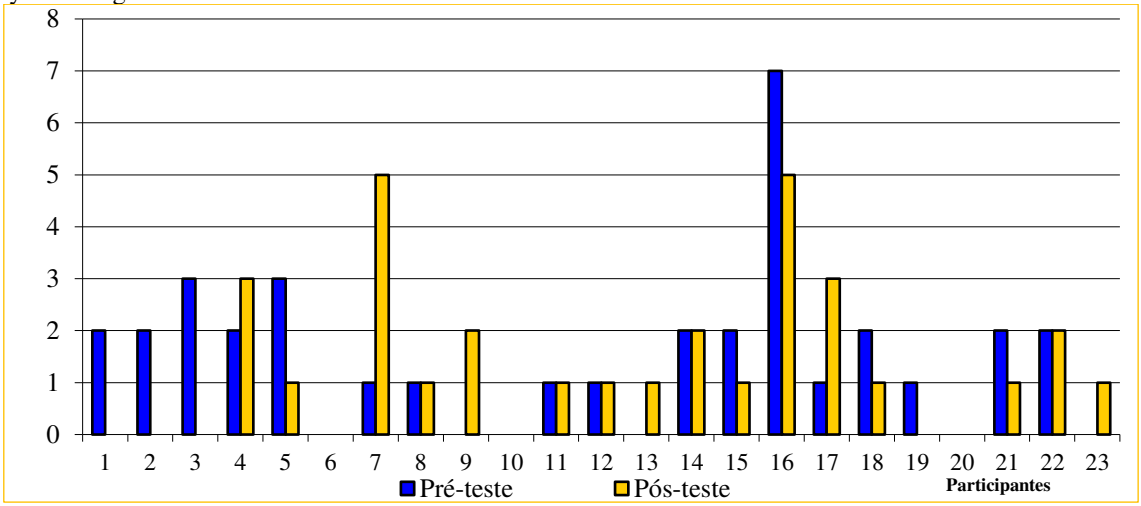
Graph 1: Description of performance on the psychological test (depression) among male individuals aged 60 to 65 years.




Source: Author's own (2023)

Graph 1 shows the total number of negative points obtained among the male participants, in this case there is a low rate of depression in the pre-test and an even lower rate in the post-test.

Graph 2: Description of performance in the psychological test (depression) among individuals in the age group of 60 to 65 years of age.




Source: Author's own (2023)

Among female participants, even if moderate, the rates of depression in the pre-test were higher than in the male participants, being decreased at the end of the exercise program, as observed in the post-test results. It is also important to note that in some cases, individuals in the age group of 60 to 65 years had fewer points in the pre-test evaluation and increased their negative score in the post-test evaluation, as was the case of subject (2) male and (4,7,9,13,17,23) female. In general, there was a considerable recovery in the depression index of all individuals studied, due to the physical activity program. The differences found were not statistically significant, but they were sufficient to minimize the state of depression in these individuals in the age group of 65 years of age, a fact that is common in this phase of life.60 a

Table 3: Description of the results of the questions related to the state of depression of individuals in the age group of 60 to 65 years of age.

| Issues related to the state of depression. | Pretest | | Test | | D % | |
|---|---|---|---|---|---|---|
| | Yes (%) | No (%) | Yes (%) | No (%) | Yes (%) | No (%) |
| Are you satisfied with your life? | 93,3 | 6,7 | 100,0 | 0,0 | 6,7 | -6,7 |
| Are you full of hope for the future? | 93,3 | 6,7 | 93,3 | 6,7 | 0,0 | 0,0 |
| Are you excited most of the time? | 86,7 | 13,3 | 93,3 | 6,7 | 6,6 | -6,6 |
| Do you feel happy most of the time? | 90,0 | 10,0 | 90,0 | 10,0 | 0,0 | 0,0 |
| Do you think it's wonderful to be alive now? | 100,0 | 0,0 | 96,7 | 3,3 | -3,3 | 3,3 |
| Do you find life quite exciting? | 93,3 | 6,7 | 83,3 | 16,7 | -10,0 | 10,0 |
| Do you feel full of energy? | 93,3 | 6,7 | 93,3 | 6,7 | 0,0 | 0,0 |
| Is it easy for you to make decisions? | 60,0 | 40,0 | 73,3 | 26,7 | 13,3 | -13,3 |
| Is your mind as clear as it used to be? | 56,7 | 43,3 | 56,7 | 43,3 | 0,0 | 0,0 |

Source: Author's own (2023)

## DISCUSSION

The study did not show a significant difference between the pre-test and post-test for the assessment of the depressive state in any of the 30 questions that made up the study. This occurrence occurred in both males and females. Analyzing other studies, we can say that the results of the present study are contravenous in relation to what the literature deliberates about physical activity as a suppressive or minimizing agent of depressive symptoms. Although there is a need for greater clarity regarding the neurobiological and psychological mechanisms involved in the patient's recovery, it is assumed that regular physical activity contributes to the minimization of the psychological distress caused by depression (MATHER *et al*., 2002). However, studies cite aerobic physical activity as having positive results on the depressive state. In a study conducted by MIRANDA *et al*. (1996), found that 27 elderly people with a mean age of 70 years reduced tension and depression in 27 elderly individuals with a mean age of 70 years. Another 4-month study by BLUMENTAL *et al.* (1999), in 156 elderly people with major depressive disorder (greater than or equal to 13 on the Hamilton scale), were divided into three groups: Drug Group (GM) – sertraline hydrochloride (selective serotonin reuptake inhibitor); Exercise Group (EG) – at an intensity of 70 to 80% of the reserve heart rate, lasting 45 minutes pedaling or walking forcefully or jogging lightly; 5 minutes back to calm), with 3 weekly sessions, and Combined Group – medication associated with exercise. At the end of 16 weeks, the three groups showed similar results, with reduced levels of depression, although patients on medication showed a faster initial response. The authors conclude that regular physical activity should be considered as a non-pharmacological alternative to the treatment of depressive disorder. These same subjects were followed up during the following six months, concluding, at the end, that the EG subjects had lower relapse rates than the GM subjects, showing that physical activity is feasible and is associated with therapeutic benefit, especially if the exercise is

maintained over time. According to COOPER (1982), physical exercise, particularly the so-called aerobic, performed with moderate intensity and long duration (from 30 minutes) provides relief from stress or tension, due to an increase in the rate of a set of hormones called endorphins that act on the nervous system, reducing the stressful impact of the environment and thus can prevent or reduce depressive disorders.

A study conducted by KING *et al* (1993), investigating 197 men and 160 women, showed that subjects who participated in the aerobic walking/running program with an intensity of 60 to 73% of maximum heart rate (30 minutes duration, 5 times a week) significantly decreased their stress levels and improved self-esteem and mood.  compared to the control group. Based on the statements provided in the literature, we can suggest that the result obtained in the present investigation about the depressive state of the elderly was not satisfactory, due to the total duration of the program (8 weeks) and the activities developed have physiological characteristics of alactic anaerobic predominance.3 a

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