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Original Article

RESISTENCE EXERCISE IMPROVES ANXIETY AND DEPRESSION IN MIDDLE-AGE WOMEN

EXERCÍCIO RESISTIDO MELHORA A ANSIEDADE E DEPRESSÃO DE MULHERES DE MEIA-IDADE

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RESUMO

O estudo comparou níveis de ansiedade e depressão de mulheres treinadas em exercício resistido e de sedentárias. Quarenta mulheres, 20 treinadas (GT) e 20 não treinadas (GC), (GT=56,9±6,6 anos; 27,3±4,8kg/m^2), (GC=51,5±5,0 anos; 27,0±7,7 kg/m^2) participaram do estudo. As participantes responderam a escala HAD com 14 questões relacionadas aos níveis de ansiedade e depressão. O GC apresentou escores mais elevados de depressão e ansiedade que o GT. Os resultados para ansiedade (GT=5,2±2,7; GC=9,5±4,0) e depressão (GT=4,1±2,6; GC=7,7±4,0) diferiram significativamente (P<0,05) entre os grupos. Pode-se concluir que mulheres de meia idade que participaram de programa de exercícios resistidos apresentaram melhor estado de saúde mental verificados por menores níveis de depressão e ansiedade do que mulheres sedentárias.
Palavras-chave: Exercício resistido. Envelhecimento. Ansiedade. Depressão.

ABSTRACT

This study aimed to compare levels of anxiety and depression of middle-aged women trained in resistance exercise and sedentary. Forty women, 20 exercised (GT) and 20 non-exercised (CG) (GT = 56.9 ± 6.6 years, 27.3 ± 4.8 kg/m^2), (CG = 51.5 ± 5.0 years, 27.0 ± 7.7 kg/m^2) underwent the study. The participants answered the HAD scale with 14 questions related to levels of anxiety and depression. The CG had higher scores of depression and anxiety than GT. The results for anxiety (GT = 5.2 ± 2.7, CG = 9.5 ± 4.0) and depression (GT = 4.1 ± 2.6, CG = 7.7 ± 4.0) differed significantly (P<0.05) between groups. Middle-Aged women who participated in a resistance exercise program presented a better mental health as evidenced by a lower levels of depression and anxiety in relation to sedentary counterpartners.
Keywords: Resistance exercise. Elderly. Anxiety. Depression.

Introduction

According to the Diagnostic and Statistical Manual of Mental Disorder criteria, edited by the American Psychiastric Association (APA)[1], depression is a disorder characterized by a depressed mood and a significant loss of interest or pleasure in doing activities which used to be source of satisfaction. Depression is the most common mental disorder, with prevalence of approximately 17% of the population. There is an early tendency for the onset of the illness, with estimated risk between 5-12% for men and 10-25% in women[2].

Within the aging process, mainly after the age of 50, significant changes can occur in the metabolism of men and women, such as decrease in growth hormone concentration (GH), insulin-like growth, in the quantity of bone mass[3,4] and muscle mass[5,6], among other alterations. The loss in muscle mass can reach 40%[7]. Together with the physiological alterations associated with the aging process, a reduction in the self-esteem can take place, as well as social isolation and depression, causing impact in the metabolism health[8]. Depression is more frequent among elderly people because of the further physical limitation, diseases

incidence and worse socioeconomic status, once these factors have been associated with depression symptoms[9]. Such factors contribute to decrease the quality of life and autonomy, occurrence of chronic illnesses and dementia processes[10].

Besides hormone replacement and a diet with particular attention to protein content, the regular practice of physical exercises has been recommended in order to preserve muscle mass[7,11]. The effects of resistance training, aiming hypertrophy, promotes better results than the effect of endurance training[12]. Studies report that resistance training induces hypertrophy and increases muscular strength in Elder individuals[13-16]. That way, the evidences suggest that in menopausal women, resistance exercise increases muscle and bone mass, contributes to reduce the fat mass and fights against inflammatory conditions which are typical of this population[11,17].

On the whole, the regular practice of aerobic physical exercise can help fight against anxiety and depression and also promote health[18]. These benefits can occur through several molecular mechanisms revealed by studies with animal models, indicating that the exercise can act via similar ways to the ones activated by drugs[19,20]. However, metabolic and energetic demands of aerobic exercises are, to some extent, different from the resistance exercise[21]. There are evidences that resistance training can act over some depressive symptoms in elderly people, besides improving quality of life, physical function and vitality[22], but studies with deeper investigations of aspects related to anxiety and depression are still needed.

The regular practice of physical exercise is recommended to middle-aged women as a strategy to treat anxiety and depression[23]. Nevertheless, most of the studies report improvements concerning aerobic exercise and there is very little discussion about the effects of resistance exercises with weight to improve symptoms of anxiety and depression[24] in this segment of population. Therefore, the objective of the present study was to compare the levels of anxiety and depression among middle-aged women who practice resistance exercise with weight and sedentary women.

Methods

Subjects

Data collection was done with the approval of the Research Ethics Committee on Human Beings and the signature on the Informed Consent Form.

The study was carried out in cross section and had observational characteristics, done with 40 women apparently health. Twenty practioners of resistance exercise with weight formed the training group (TG) and twenty sedentary women formed the control group (CG). As the inclusion criteria, the volunteers were not allowed to use any kind of medicine that could affect humor.

Resistance Training

The protocol of resistance training with weight prescribed by qualified professionals from the gym where the volunteers went to had the following characteristics: it was done three times a week, lasting between 20 and 30 minutes and it was performed as a circuit in three series. The circuit was composed by exercises for upper and lower limbs, done alternately in segments, and in the following order – hip abduction, pull down, knee flexion, vertical bench press, knee extension, calf raise, hip adduction, shoulder abduction, forward shoulder elevation, shoulder elevation and elbow flexion and extension. The intensity of the resistance exercises was approximately 40% of 1MR, done in three circuit series with 20 repetitions and one-minute interval between them (adapted from the guidelines *ACSM's Guidelines for Exercise Testing and Prescription* [25]).

Anxiety and depression evaluation

The evaluation of the level of anxiety and depression was done through HAD scale – Hospital Anxiety and Depression Scale, developed by Zigmond and Snaith, translated to Portuguese by Botega et al.[27].

Statistical Treatment

Data is expressed in average ± standard deviation. To compare the variables depression and anxiety between the groups (TG and CG) the Mann Whitney test was applied, as data failed the Shapiro-Wilk normality test. The significance level adopted was $P<0,05$.

Results

The results showed there is a significant difference in the levels of anxiety and depression between the TG and the CG, having the highest values assigned to the CG.

The characteristics of the volunteers in both groups are shown in Table 1.

Table 1. Characteristics of the volunteers (mean ± standard deviation)

	GT (n=20)	GC (n=20)
Age (years)	56,9 ± 6,6	51,5 ± 5,0
Body Mass (Kg)	68,0 ± 13,2	67,6 ± 20,9
Height (cm)	157,7 ± 4,6	158,3 ± 6,6
BMI ($Kg.m^{2(-1)}$)	27,3 ± 4,8	27,0 ± 7,7
Practice Time (meses)	7,6 ± 5,3	-

Source: The authors.

The mean and standard deviation related to anxiety and depression are shown in Table 2. It was observed that the mean value of anxiety and depression of the CG is higher than the ones in the TG, as Table 2 demonstrates.

Table 2. Mean ± standard deviation of anxiety and depression

	TG	CG
Anxiety	5,2 ± 2,7*	9,5 ± 4,0
Depression	4,1 ±2,6*	7,7 ± 4,0

* $P<0,05$ in relation to the CG

Source: The authors.

Still, analysing the relative frequency of anxiety and depression in both groups, we can observe a high percentage in the CG scores for anxiety and depression when comparing to the TG, according to what Table 3 shows.

Table 3. Relative frequency (%) of anxiety and depression

Classification (score)	TG		CG	
	Anxiety	Depression	Anxiety	Depression
Unlikely (0 – 7)	80	85	35	40
Possible (8 – 11)	20	0	40	35
Likely (12 – 21)	0	0	25	15

Source: The authors.

Discussion

The present study compared anxiety and depression scores in middle-aged women using HAD scale. The main result showed that women who practice resistance exercise with weight had lower punctuation in the anxiety and depression scores than sedentary women. This result shows that resistance exercises play a positive role in the improvement of symptoms of anxiety and depression in middle-aged women as preventive approach, and possibly also therapeutic. It also implies that it is important to evaluate the levels of anxiety and depression in apparently healthy women, considering that both symptoms can arise independently of the factor of disease and are becoming current in our daily lives. Moreover, it is possible to infer that the resistance training with weight can benefit mental health and contribute positively to the improvement of the quality of life of this population.[28].

The positive effect of resistance exercise in the improvement of anxiety and depression symptoms in middle-aged women has been reported by other researchers. A study found improvements in depressive symptoms in a sample of men and women after 16 weeks of resistance exercise program, done three times a week, with progressive intensity[22]. However, in the present study we verified a better mental state in middle-aged women who exercised with lower intensity (approximately 40% of the MRI) when compared to participants of the group mentioned above and, yet, one study did intra-group analyses while the other one did analyses between groups. Besides that, these results rise interest about the ideal dose-response of exercises with the same purpose. Other researchers have demonstrated that the practice of resistance exercises for 24 weeks is effective to improve mood, anxiety and serum concentration of IGF-1 in elderly individuals[29]. Another study observed that both resistance and aerobic training have improved functional capacity in elderly people with osteoarthritis as well as any level of depressive symptoms[30]. Nevertheless, throughout 18 months monitoring this study, the aerobic exercise proved to be the most efficient in both application and decrease of depressive symptoms. Therefore, the efficiency of the kind of exercise related to the elderly mental state should be further investigated.

In the present study the mechanisms by which resistance exercise with weight results in lower scores of anxiety and depression were not investigated. However, it is possible that, together, the alterations which come from the practice of resistance exercise, such as increase or preservation of lean mass, decrease of body fat and inflammatory state, improvements in the metabolic and cardiovascular function associated with a better functional capacity and sociability are the possible causal factors[11,13,16,31]. Considering the central nervous system, it has been demonstrated that the exercise is associated with structural changes in limbic brain areas related to emotions and cognition[20,30,32]. Moreover, the physical exercise favours the neurogenesis in the hippocampal toothed ring, the effect of which is observed after a treatment with anti-depressants[20,32]. Moreover, it has been reported that the exercise can help in recovering the self-esteem and self-confidence, improve mood and induce release of endorphins[33]. However, further investigations on the mechanisms through which resistance exercise reduces the symptoms of depression and anxiety still should be done.

One of the limitations the present study has faced was not having investigated the social support of the participants. In a review that assessed a series of psychosocial interventions potentially preventive regarding depression, the social support in the form of activities and strengthening of social net was identified as the most important preventive resource[9]. The prophylactic benefits related to social support were more effective than the practice of physical exercise in groups or individually, not detailed. Besides that, we did not obtain information about the socioeconomic conditions or the mental health of the two groups before the evaluations. This way, it was not possible to refute the possibility of women with

better mental state would have been more receptive and interested in the practice of resistance exercises. Another limitation concerning the study is its transversal and observational characteristic, which did not allow us to obtain time data and to establish a causal relation.

Finally, the instrument adopted to evaluate the depressive and anxiety symptoms reflects the intensity of certain symptoms and recommend potential diagnoses. It does not replace, as diagnoses definition, the clinic interview done by the specialist. Concerning elderly who are not depressed, it is suggested to determine, measure and control depression risk factors, such as bad quality of life, isolation, low functional capacity, which could be more effective than treating depressive symptoms[9]. Therefore, the motivation for physical exercise practice in groups, including resistance exercises with weight, baring in mind the individual needs and capacities, is advisable as a strategy to prevent anxiety and depression.

Conclusion

Middle-aged women who take part in resistance exercise programs, three times a week, show better mental health state, demonstrated by lower levels of depression and anxiety than sedentary women.

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