110 - RESEARCH TRAINING FOR ELDERLY HYPERTENSIVE

RAFAEL MORO1
WILLIAM RODRIGUES TEBAR1,2
AIDE ANGÉLICA DE OLIVEIRA NESSI1,3
ANDRÉ LEONARDO DA SILVA NESSI1,4
Delegado da Federação internacional da Educação Física – FIEP
Programa de Pós Graduação em Ciência da Motricidade - UNESP
Universidade Paulista UNIP
Universidade Anhembi Morumbi
rafaelmoro23@gmail.com

doi:10.16887/88.a1.110

INTRODUCTION

The increase in life expectancy and the greater number of elderly people compared to the number of young people is a reality expressed by the advances in medicine with the evolution of pharmacological treatments and medical procedures. Brazil, for example, begins to present a new demographic pattern, with a significant increase in the number of elderly people. The age group of 60 years and older tends to double in the period from 2000 to 2020, from 13.90 to 28.3 million, rising to 64 million in 2050 (IBGE, 2009)

This demographic change interferes in many factors, among them health. The mortality profile became typical of a population of advanced age due to complex and more costly diseases. There was an increase in cardiovascular diseases: in 1950, they were responsible for 12% of deaths and currently represent more than 40% (IBGE, 2009).

In 2013, 29.9% of the Brazilian population reported having at least one chronic disease; among the elderly this figure reached 75.5% of the group, of which 69.3% were men and 80.2% among the women (IBGE, 2009).

Among the most common chronic diseases is hypertension.

At the beginning of the 21st century, hypertension is already considered a global public health problem. It contributes to heart disease, stroke, kidney failure, premature death and disability. Complications of hypertension account for 9.4 million deaths worldwide each year (WHO, 2013).

Mortality due to cardiovascular disease (CVD) progressively increases with an increase in BP from 115/75 mmHg in a linear, continuous and independent manner, accounting for more than 50% of deaths between 60 and 69 years and 75% over 70 years (SBC, SBH, SBN, 2010).

The arterial hypertension is set when the values are <139mmHg in systolic pressure (SBP) and <90 mmHg in diastolic (DBP) (WHO, 2013; Topol, 2005).

Also known as high or high blood pressure, it is a condition in which blood vessels persistently increase in blood pressure. This pressure is created by the force of blood against the walls of blood vessels (arteries) once it is pumped by the heart. The higher the pressure, the harder it becomes for the heart to pump. It is a multifactorial clinical condition, often associated with functional and / or structural alterations of target organs (heart, brain, kidneys and blood vessels) (WHO, 2013, SBC, SBH, SBN, 2010 and Topol, 2005).

Hypertension rarely causes symptoms in the early stages and many people are not diagnosed. If left unchecked, hypertension can lead to a heart attack, a heart enlargement and eventually heart and kidney failure, blindness, rupture of blood vessels. Blood vessels may develop weak spots and protuberances (aneurysms), making them more likely to clog and explode, causing blood leakage in the region (Topol, 2005, WHO, 2013).

They are causes of hypertension: first, consumption of foods that contain a lot of salt and fat, low fiber diet, fruits and vegetables, harmful levels of alcohol and smoking, physical inactivity and lack of exercise, psychosocial stress, age, overweight and obesity, as well as genetic factors (Aronow et al., 2011, WHO, 2013, SBC, SBH and SBN, 2010, Topol, 2005).

Systemic arterial hypertension (SAH) mainly affects elderly individuals (older than 60 years) and lifestyle modifications may be the only treatment necessary for mild hypertension. At present, its prevention in the elderly should be based primarily on the strategy of dietary salt restriction, weight control and mainly physical activity (Aronow et al., 2011).

The Physical Educator is one of the professionals to be asked for the control and prevention of hypertension and cardiovascular diseases, in order to establish a program of activities monitored and specific to each case.

Physical activity is one of the preventive factors of hypertension, the World Health Organization (2013) recommends regular practice for at least 30 minutes a day, 5 times a week.

According to Pontes Junior et al (2010) post-exercise hypotension can last most of the time for up to 24 hours after the practice of physical exercise.

Resistance training is a modality where in training exercises use resistance exercises with muscular contractions against graduated and progressive resistances. The most common resistance is weights, but it is also possible to use hydraulic, electromagnetic, spring, elastic and other resistance. The efficiency of RT in stimulating the integrity and functions of the locomotor apparatus has been demonstrated, and more recently, its cardiovascular health promoting effects and high degree of general safety. Muscle-skeletal safety and cardiovascular safety of resistance exercises have also been demonstrated, even in the face of comorbidities (Graves et al., 2001; Chodzko-Zajko et al., 1993 apud Santarém, 2014).

Several studies have suggested that resistance exercise, when appropriately prescribed and supervised, has favorable effects on different aspects of health (muscular strength, functional capacity, psychosocial well-being, and positive impact on cardiovascular risk factors (Umpierre, Stein , 2007).

Since physical activity is a factor in the prevention and control of hypertension, this study aims to verify and gather the effects of resistance training in hypertensive elderly people based on the scientific evidence present in the literature related to the topic.

METHODS

The research is a bibliographical survey of scientific works, consulted in the databases PubMed, Bireme, Lilacs, Scielo, during the months of November and December of 2015. The descriptors used were Hypertension, Elderly, Resisted

Exercises and combinations between them , with their respective correspondents in English. As a limit, the time period from 2005 to 2015 (10 years) was used. The articles that fit the proposed theme were included after reading titles and abstracts, written in English, Portuguese or Spanish, focusing primarily on experimental, in vitro or randomized clinical studies

RESULTS

In a systematic review of Umpierre and Stein (2007) it was concluded that regular physical exercise assists in the control of short and long term blood pressure (BP) and, therefore, is indicated as adjunctive intervention in the management of arterial hypertension. For a broader discussion of the effects of exercise on BP, it is worth emphasizing that this can be influenced not only by the adaptations arising from chronic physical training (chronic adaptations), but also by the influence of a single exercise session (sub-acute effects or post-exercise).

Terra et al. (2008), conducted TR for 12 weeks on alternate days, 3 times per week, in 3 sets of 12,10,8 repetitions. With 60% intensity of 1-RM in the first four weeks, 70% in the medium weeks and 80% in the last weeks, in 20 hypertensive women, with recovery intervals of 60 seconds comprising lower limbs, upper limbs, back and abdomen, which resulted in a mean decrease of 9.2% for SBP and 1.4% for DBP, after 20 minutes of rest compared to pre-training variables.

Rego et al. (2011) presented a mean reduction of 10 mmHg in SBP (135 to 125 mmHg) and 3 mmHg in DBP, after intervention with physical activity for 26 elderly women, where stretches were practiced, aerobic activity of 20 minutes and exercises with weights for 15 minutes with 2 sets and 10 repetitions, with 40 seconds of rest.

Janning et al. (2009) tested the influence of RT for post-exercise hypotension in 8 elderly (4 men and 4 women), the program performed lower and upper limb training in 3 series of 12-RM. Pressure was measured every 10 minutes, up to 60 minutes post exercise. Three training programs, P1 - lower and upper limbs (which did not obtain post-exercise hypotensive effect in any of the time variables), P2 - exercise for upper and lower limbs (with slight pressure change and P3 - alternating exercises The maximum decrease in relation to the rest period was 12 mmHg for SBP and 5 mmHg for DBP.

Canuto et al. (2011) evaluated the responses of 11 hypertensive elderly women after an 8-RMT, 8-RM transplantation, intercalating exercises of lower and upper limbs, 4 volunteers in light intensity and 7 in high intensity, but with equal load-repetition ratio (volume of training) for 3 sessions. There was a reduction in blood pressure levels, but the author classified it as not significant, despite pointing to a mean reduction of 10mmHg.

Costa et al. (2010) verified the behavior of SBP, DBP and mean pressure (PAM) with the auscultation method after 10 min of pre-exercise rest and post-exercise in 15 min cycles for 1 h after a single RT session in trained hypertensive elderly women (6) and untrained (9) with 7 exercises with weights performed in two sets of 10-15 maximum repetitions. There was a control session where the volunteers remained 40 mins at rest. SBP significantly reduced during 1h, especially in the 30th min without differences between groups but only in the training session. In the resting session there was an increase in SBP and MAP.

Cunha et al. (BAD), mean arterial pressure (MAP) and heart rate (HR) of 16 hypertensive women were investigated. These elderly women were subdivided into 2 groups: those with moderate RR (9 volunteers) and those with mild RT (7), 3 times a week, for 8 weeks on alternate days with exercises for upper limbs, lower limbs and abdomen. The moderate RR group had a reduction in both resting values of SBP, DBP and MAP. On the other hand, the light TR group had a decrease in MAP and a tendency to reduce PAD. However, both had very expressive reductions comparing the values before and after 8 weeks of rest training.

Group 1: PAS-9.1%; PAD -18.3%; PAM -13.8%; FC -0.9%

Group 2: SAP -11.8%; PAD -17.3%; PAM -14.7%; FC -2.5%

Vieira et al. 2012 analyzed the quality of life of elderly hypertensive patients by questionnaire after 8 weeks, 3 times a week, on alternate days of RT, with periodized intensity throughout the program. The questionnaires used were a generic questionnaire (SF-36) and the specific questionnaire (MINICHAL), in elderly hypertensive women submitted to a TR program. The SF-36 questionnaire showed a significant improvement in functional capacity, physical aspects, decreased pain perception, and it was possible to observe perception of improvement in general health status, vitality and improvement of emotional aspects. With the exception of social aspects and mental health there were declining markers. The MINICHAL questionnaire did not show a significant difference in the domains analyzed.

Krinski et al 2008, investigated the acute cardiovascular effects of resistance exercise in 24 elderly hypertensive patients submitted to a TR session, with 8 stations (3 sets, 12 repetitions, 50% 1 RM). Heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured before exercise (A), immediately after the fifth station (B) and 10 min. after the exercise session (C). The results presented were that SBP showed a significant increase during condition B, followed by a decrease in C. PAD values showed a significant increase in B, followed by a significant reduction in C. For HR, there was a significant increase in B, remaining high in condition C. In addition to both for SBP and DBP the pressure value was lower even than in A.

Póvoa et al. (2014) compared aerobic resistance training and evaluated the quality of life of 41 hypertensive elderly women, 21 for mild to moderate aerobic group (GA) and 20 for resisted group (GR) with up to 50-60 % of 1 RM. 2 sets with 12 to 15 repetitions. They were evaluated through questionnaires applied before and after the intervention. After the intervention there was significant improvement in all domains (Psychological, social relations, environment) GA and in GR there was improvement in the physical aspects domain. In SF-36, significant improvement was found in seven of eight domains in both GA and GR. Functional capacity: there was improvement in both groups,

Queiroz (2010) cited two systematic reviews, an initial meta-analysis, published in 2000, included 11 studies and observed a reduction of -2 and -4% in systolic and diastolic blood pressures, respectively. Similarly, another more recent investigation, published in 2005, included 9 randomized controlled trials, and found a drop of -3.2 mmHg and -3.5 mmHg in systolic and diastolic blood pressures, respectively, after resistance training.

DISCUSSION

There are studies that demonstrate a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP), other reduction only in SBP or reduction only in DBP, or in studies that did not find changes in SBP after RT.

Costa et al. (2010) suggests that the explanation for this fact of the conflicting results involving the subacute effect of weight exercises on BP may be due to the different characteristics of the samples studied (age group and initial BP values, for example), (a few minutes to 24 hours), and the differences between the variables that compose the exercise protocols with weights (series, exercises, repetitions and load)).

Queiroz reinforces this idea, because in his review that the reduction of the resting blood pressure after the resistance training was observed in 10 studies. In 4 there were no changes. These results suggest that resistance training may also have a hypotensive effect on the elderly. However, the magnitude of blood pressure change was different among the studies, suggesting

that factors related to the characteristics of the population studied and / or the training protocol performed may have influenced this magnitude.

It is noteworthy that in all the articles reviewed there was a decrease of at least one of the markers, which makes TR positive for elderly hypertensive people who want to control their hypertension or hypertensive elderly people who want to start a physical activity for other purposes.

Freitas et al. (2007) studied different reasons for the elderly adherence to EF programs, where the best ones were improving health, improving physical performance, adopting a healthy lifestyle, reducing stress, following medical guidance, recovering injuries, improve self-esteem and relax, concern with improving habits and healthy practices.

For many years weight training was considered to be inefficient and dangerous for the elderly and / or hypertensive, since it was thought that they could greatly increase blood pressure. In fact the resistance exercises had not been studied. Today some studies indicate that strength is an important factor for functional abilities and that the increase in blood pressure during weight exercises was considered discrete with submaximal loads (Santarém, 2000).

Umpierre; Stein (2007), after a systematic review of the hemodynamic and vascular effects of resistance training, stated that studies using hemodynamic evaluation verified cardiovascular stability in patients with coronary disease or heart failure during resistance exercise, with no apparent impairment of ventricular function or exacerbated increase on blood pressure to exercise. In addition, resting blood pressure also appears to be influenced by chronic resistance training, with a slight reduction in both systolic blood pressure (SBP) and diastolic blood pressure (DBP).

Cardiac hypertrophy induced by weight training (suggested by some authors as detrimental effect of TR) was considered physiological, presenting no type of pathological intercurrence. No causal association was found between hypertension and weight training. The increase in blood pressure during exercises with weights was considered discrete with submaximal loads (Santarém, 2000).

Hypertension during exercise is proven, as Krinski (2008) has pointed out, but shortly after the end of the training, a considerable reduction has already been obtained.

The TR provides increases in muscle strength and endurance, influencing increased ability to perform activities of daily living, attenuation of aging-related modifications, and cardiovascular responses to physical effort (Umpierre; Stein 2007).

Controversies still exist because of the lack of scientific material and many doubts regarding the subject. Queiroz (2010) also concluded with his review that although resistance training is being recommended for the elderly and there are some indications that it may have a chronic hypotensive effect, there is still a lack of scientific data and many controversies about the subject, it is still an open field for research.

Resistance exercises, formerly, were considered inefficient to enhance heart pump function and to increase tissue oxygenation; were considered to be dangerous due to greatly increasing blood pressure; It was imagined that pathological hypertrophy of the heart could occur; it was feared that practitioners might develop hypertension. These concepts were based on some concrete data and many speculations (Santarèm, 2000). Making some defend RT for hypertensive and others not.

Currently, weight training exercises are recommended.

The VI Brazilian Guidelines for Hypertension produced by the Brazilian Society of Cardiology, Brazilian Society of Nephrology and Brazilian Society of Hypertension in 2010, recommends in relation to resistance training:

- Exercises of localized muscular resistance can be performed with an overload that does not exceed 50% of the maximum voluntary contraction. These programs have been shown to be effective in reducing blood pressure levels;
- Workouts should be performed 2 to 3 times a week, using 1 to 3 sets of 8 to 15 repetitions, conducted to moderate fatigue (stop when the speed of movement decreases);
- The patient conducts a medical evaluation before the beginning of a structured training program;
- The training is interrupted in the presence of symptoms, such as when the subject is quietly panting, pain in the chest or cervical region;
- Measurement of pressure values before, during and after training, because in hypertensive patients, the training session should not be started or maintained if systolic and diastolic blood pressures are higher than 160 and / or 105 mmHg respectively.

The recommendations of the American College of Sports Medicine (ACSM) advocate the priority request of large muscle groups before small ones, alternating exercises of lower and upper limbs.

According to the IV Brazilian Guidelines for Arterial Hypertension (2002), the blood pressure should be checked by any trained health professional, and the indirect method, auscultatory technique, aneroid sphygmomanometer or column of mercury (more suitable) and stethoscope. The aneroid device should be periodically calibrated every six (6) months.

The need to gauge the pressure during training is strengthened by Viana et al (2002) cited by Kirinus (2009) where he states that exercises with dynamic static resistance compress the peripheral arterial system and cause dramatic and dramatic increases in resistance to flow blood, in addition, chronic resistance training exercises may cause higher blood pressure elevation compared to less intense dynamic movement, however, it does not appear that this form of training is capable of causing any long-term increase in blood pressure rest. However, the increase in BP in exercise depends on the type, intensity and duration of physical activity (Battagin et al, 2010).

Ferracioli, Ferracioli and Oliveira (2010) suggest after a systematic literature review for the application of resistance exercise in the treatment of arterial hypertension, an hourly load of training sessions around 45 to 50 minutes and that the exercises should be for three or four series at maximum with overloads that should be submaximal, with indication of 75% of 1RM, also suggests to work with the student exercises with free weights for each muscle group, since these will be more linked to day-to-day gestures (principle of the specificity of sports training).

Between one set and another one should maintain an interval of two minutes to 3 minutes, this interval being recuperative. The series may be from 6 to 10 repetitions, following the thought that the higher the number of repetitions the greater blood pressure change. It should be remembered that efforts should be avoided that lead the individual to apnea.

It is observed that in the studies on resistance training for hypertensive patients, the intensities used vary from mild to heavy, and there is no consensus about the ideal intensity for reducing blood pressure levels (Cornelissen et al., 2005).

As early as 2010, Battagin noted in her clinical study that both moderate and mild resistive exercise led to significant reductions in BP in elderly hypertensive women. And it considers these findings to be relevant since many elderly patients are fearful of performing resistance training with larger loads; thus, these patients may benefit from mild resistance training as a coadjuvant in the control of hypertension.

More recently, it could be said that resisted physical exercise associated with adequate nutritional orientation is a relevant and beneficial strategy for improving the health and quality of life of hypertensive elderly, both socially, metabolically, physiologically and functionally (Barreto and Rodriguez, 2013).

Regularly exercised physical activities are necessary to obtain the effects of training thus achieving maintenance of weight, inhibition of sedentary lifestyle and control of other types of chronic diseases in old age in addition to hypertension.

One problem for many is that many forms of continued exercise become dull, so it is very likely that the individual will establish

new habits and stick with them if you like what you are doing (Kirinus, Lins, Santos, 2009).

It should be counted in addition to the TR, with dynamic aerobic activities such as fast walks, light races, swimming and cycling (SBC, 2013).

CONCLUSION

It is possible to conclude that TR can be used as a non-drug intervention for hypertension in the elderly, because it reduces on average 10% of blood pressure levels, proving the hypotensive effect after this type of exercise.

Regular practice may be performed by hypertensives provided there is a medical evaluation prior to and during training, the Physical Educator monitors the behavior of the student's blood pressure.

Although they require more data and studies to determine safe protocols, the benefits are proven even at light intensity.

Resistance training is able to lower blood pressure, but it also minimizes functional losses of age, keeping mainly the integrity and aging of the musculoskeletal system (through mass gain, strength, resistance and maintenance of bone density), thus providing quality greater independence of the elderly in their daily activities.

More research is needed on the subject, for alignment of protocols and more stringent scientific evidence, because the ideas are still very conflicting in what is said heart health for example.

RESEARCH TRAINING FOR ELDERLY HYPERTENSIVE

The increase in life expectancy generates a greater number of elderly people, which increases the number of patients with several chronic diseases of old age, such as hypertension. Hypertension represents one of the most recognized risk factors for vascular morbidity and mortality. It is known that physical exercise is an important non-drug treatment, however, specifically resistance training was previously considered to be harmful for hypertensive patients by raising blood pressure levels during the final repetitions until fatigue. However, current research has shown that it may be beneficial for hypertensive elderly people not only to reduce post-workout blood pressure, but also for the already established effects of muscle mass gain and strength, which are necessary to maintain the independence of the elderly and to delay aging . So, this study is a bibliographical review with the objective of investigating in the literature the effects of resistance training in hypertensive elderly. Based on the studies found, it is possible to affirm that Resistive Training is a contributor to avoid and control hypertension and for the elderly to remain active. However, there are many controversies regarding the best training plan for hypertensive patients and it is suggested that it be associated with aerobic activity, since this improves the quality of life of the elderly because it is more dynamic, and facilitates the practice of exercise regularly, since TR is considered dull by the majority of this population.

Keywords: Hypertension; Seniors; Resistive Training

FORMATION EN RECHERCHE POUR L'HYPERTENSIF DES PERSONNES ÂGÉES

L'augmentation de l'espérance de vie génère un plus grand nombre de personnes âgées, ce qui augmente le nombre de patients atteints de plusieurs maladies chroniques de la vieillesse, telles que l'hypertension. L'hypertension représente l'un des facteurs de risque les plus reconnus de morbidité et de mortalité vasculaires. Il est connu que l'exercice physique est un traitement non médicamenteux important, cependant, spécifiquement l'entraînement en résistance était auparavant considéré comme nocif pour les patients hypertendus en augmentant les niveaux de pression sanguine pendant les répétitions finales jusqu'à la fatigue. Cependant, les recherches actuelles ont montré qu'il peut être bénéfique pour les personnes âgées hypertendues non seulement de réduire la pression artérielle après l'entraînement, mais aussi les effets déjà établis du gain et de la force musculaires nécessaires pour maintenir l'indépendance des personnes âgées et retarder le vieillissement. . Ainsi, cette étude est une revue bibliographique dans le but d'étudier dans la littérature les effets de l'entraînement en résistance chez les personnes âgées hypertendues. Sur la base des études trouvées, il est possible d'affirmer que la formation résistive contribue à éviter et contrôler l'hypertension et que les personnes âgées restent actives. Cependant, il existe de nombreuses controverses concernant le meilleur plan d'entraînement pour les patients hypertendus et il est suggéré qu'il soit associé à l'activité aérobique, car cela améliore la qualité de vie des personnes âgées car il est plus dynamique et facilite la pratique régulière d'exercices. TR est considéré comme terne par la majorité de cette population.

Mots-clés: Hypertension; Personnes âgées Entraînement résistif

ENTRENAMIENTO RESISTIDO PARA HOSTALES HIPERTENSOS

El aumento de la expectativa de vida genera un mayor número de personas mayores, lo que aumenta el número de pacientes con diversas enfermedades crónicas de edad avanzada, como la hipertensión. La hipertensión representa uno de los más reconocidos factores de riesgo para morbilidad y mortalidad vascular. Se sabe que el ejercicio físico es un importante tratamiento no-medicamentoso, sin embargo el entrenamiento resistido, específicamente, era considerado antiguamente como perjudicial para los hipertensos por elevar los niveles de presión durante las repeticiones finales hasta la fatiga. Sin embargo, investigaciones actuales comprobaron que puede ser beneficioso para los ancianos hipertensos no sólo por disminuir la presión arterial en el post-entrenamiento, sino también por los efectos ya consagrados de ganancia de masa muscular y fuerza, necesarios en el mantenimiento de la independencia del anciano y retardo del envejecimiento . Entonces, este estudio es una revisión bibliográfica con el objetivo de investigar en la literatura los efectos del entrenamiento resistido en ancianos hipertensos. Con base en los estudios encontrados es posible afirmar que el Entrenamiento Resistivo es un contribuyente para evitar y controlar la hipertensión arterial y para que el anciano se mantenga activo. Sin embargo, existen innumerables controversias en cuanto al mejor plan de entrenamiento para hipertensos y se sugiere que sea asociado a la actividad aeróbica, pues ésta mejora la calidad de vida del anciano por ser más dinámica, y facilita la práctica de ejercicio regularmente, una vez que el TR es considerado embotado por la mayoría de esta población.

Palabras clave: Hipertensión; Ancianos; Entrenamiento Resistido

TREINAMENTO RESISTIDO PARA IDOSOS HIPERTENSOS

O aumento da expectativa de vida gera um maior número de pessoas idosas, o que aumenta o número de pacientes com diversas doenças crônicas de idade avançada, como a hipertensão. A hipertensão representa um dos mais reconhecidos fatores de risco para morbidade e mortalidade vascular. Sabe-se que o exercício físico é um importante tratamento não-

medicamentoso, entretanto o treinamento resistido, especificamente, era considerado antigamente como prejudicial para hipertensos por elevar os níveis pressóricos durante as repetições finais até a fadiga. Entretanto, pesquisas atuais comprovaram que ele pode ser benéfico para idosos hipertensos não só por diminuir a pressão arterial no pós-treino, mas também pelos efeitos já consagrados de ganho de massa muscular e força, necessários na manutenção da independência do idoso e retardo do envelhecimento. Então, este estudo é uma revisão bibliográfica com o objetivo de investigar na literatura os efeitos do treinamento resistido em idosos hipertensos. Com base nos estudos encontrados é possível afirmar que o Treinamento Resistivo é um contribuinte para evitar e controlar a hipertensão arterial e para que o idoso mantenha-se ativo. Entretanto, existem inúmeras controvérsias quanto ao melhor plano de treinamento para hipertensos e sugere-se que ele seja associado a atividade aeróbica, pois esta melhora a qualidade de vida do idoso por ser mais dinâmica, e facilita a prática de exercício regularmente, uma vez que o TR é considerado maçante pela maioria desta população.

Palavras chave: Hipertensão; Idosos; Treinamento Resistido