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Research Article

Effectiveness of physical activity orientation for hypertensive patients by physical educator or doctor – randomized

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Abstract

Physical activity (PA) decreases blood pressure in hypertensive patients (PT). Objective: evaluate PA oriented by physical educator (PE) against physician-oriented PA. Methods: 59 pt aged ≥ 50 y.o. were randomized and PE oriented (31, GEF) or physician oriented (GC, 28). Re-evaluated at 3 and 6 m. Results: 21 (36%) male, age 64.4±9.5 y.o, weight 79.1±18.7 kg, abdominal circumference (CAbd) 103±12 cm, total body fat (GCT) 32±6%, 6 minutes treadmill test (TE) 317±115m, systolic blood pressure (PAS) 134±15 mmHg. At 3 and 6 m there were decrease in CAbd and GCT in the total sample, increase in the TE distance in the total sample and GEF, as well a decrease in the PAS in the total sample. Despite both groups showed a numeric increase in the TE distance, the paired analysis favored GEF. The self-related PA, through IPAQ, revealed an increase in the energy expenditure and a decrease in the seated time in the total sample, as well a increase in the intensity of PA and weekly energy expenditure in the GEF. Conclusion: EF oriented PA has better performance in hypertensive patients.

Keywords: Adherenc; Physical Activit; Hypertension

Introduction

The practice of physical activity (PA) is associated with greater longevity, welfare, prevention, and disease treatment, among them systemic arterial hypertension (SAH) [1]. The realization of exercise reduces blood pressure (BP) in hypertension [2]. In Brazil, there are approximately 30 million people with SAH, most of them are unaware of the disease and **most** of them do not know and have not been treated for their disease [3]. Promoting PA consistently and lasting in these patients is a challenge. Several techniques and strategies have been adopted, seeking to increase membership, from motivational lectures to public academies5 and programs such as the National Program for the Promotion of Physical

Activity "Agita Brasil [16] However, the involvement of professionals, such as physical educators (PE) and the effectiveness of these programs is unclear.

For hypertensive patients, exercise guidance is almost exclusive to the medical professional, approximately, 92% of advice related to the practice of exercises [8]. The PE is trained for guidance with less risk of injury, seeks to minimize barriers, observe the intensity, duration and frequency of exercises, avoiding possible muscle and joint injuries, being able to make a PA program more effective and facilitate adherence. There are no studies evaluating the role of PE in improving adherence to PA compared to traditional medical advice. The present study aims to compare, in a randomized way, the efficiency of PE or physician guidance in aerobic performance and in reported PA.

Methods

For this cohort, randomized and prospective study, lasting 6 months, hypertensive patients were invited hypertensive patients, without contraindication for the performance of PA, of both genders, aged 50 years or more, treated at the nephrology clinic at Univille, Joinville - SC. Randomization resulted in an oriented group - PE (GPE) and a control group (CG), guided by doctors.

Exclusion criteria were: inability to carry out the proposed activities, inability to understand the free and informed consent term or the guidelines provided, physical or clinical conditions that prevent or have contraindications to performing PA, such as decompensated heart failure or unstable angina pectoris, age < 50 years and absence of SAH. In the initial pre-randomization phase all patients underwent the assessment of weight, height, waist circumference (ACbd), blood pressure, heart rate, 6-minute treadmill test (TE), body composition analysis by bio impedance and submitted to the international physical activity questionnaire, long format (IPAQ) [44]. The TE measures the distance covered in six minutes and is considered safe and with minimal execution risks [41]. The analysis of body composition allows quantifying total body fat (TBF) in individuals with mass index body mass (BMI) below 35 kg/m2 and was performed using the Biodynamic Body Composition Analyzer, model 310 (Biodynamics Corporation, Seattle, EUA). The IPAQ is used as a measure of self-reported PA and contains questions related to the time spent during a usual week in activities performed at work, locomotion, leisure, sport, exercise or as part of activities at home or in the garden and, finally, time spent sitting. The results are converted into the task's metabolic equivalent (MET), computed by multiplying the MET score of an activity by the minutes practiced. MET-minute scores are equivalent to kilocalories for a 60 kg person [44].The most common form of presentation is in MET-minutes/week, grouped into sitting, walking, moderate activities, vigorous activities, and weekly physical activity.

For further analysis, the activity level was categorized into three intensity strata: low, moderate or high, according to the value of MET-minutes/week –[45].

Briefly, the combination of any walking activity, of moderate intensity or vigorous, with values above 600 and below 3000 MET-minutes / week was classified as moderate, and values above 3000 MET-minutes/week were classified as vigorous [45].Low intensity was defined when it did not reach the values for the other categories. Randomization was performed using an electronic spreadsheet, with a random function. The PEG was guided by the PE (P.S.S), received explanatory material printed with photos of exercises that could be performed in the residence or in public squares with outdoor gym equipment in Joinville-SC; these are called best age gyms (BAG), still a video of the same exercises, in compact disc format.

Guidance included which exercises to perform, the correct mode of execution, intensity and frequency. Based on the research subject's address, the PE suggested which BAG would be the closest to their home, using the home distance - BAG as a walk.

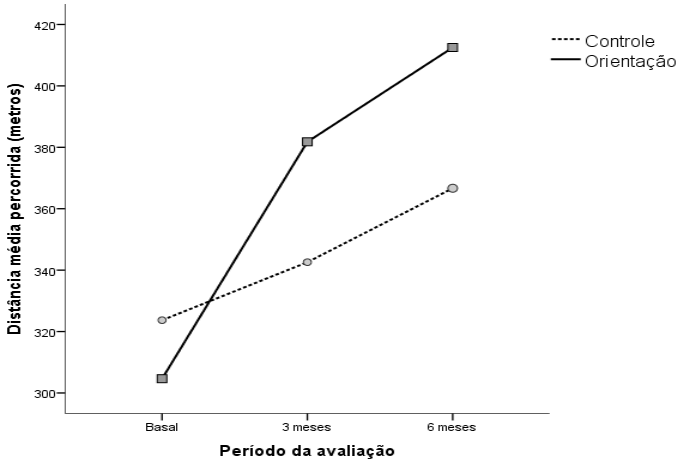
The exercises followed an order from the upper limb to the lower limb, seeking to avoid fatigue. For each of the exercises, fifteen repetitions were suggested in a sequence of 3 sets and a minimum frequency of 3 times a week, with a maximum of 5 times a week. At the end of the daily activities, a light stretching was recommended. For the performance at home, functional exercises were chosen using the body's own weight or, at most, 1 kg (suggested use of bagged foods of 1 kg) to provide light resistance. The use of simple features from the structure of the house was suggested, such as steps, chair and door. The CG was guided by the physicians (A.R.R.G.; H.N.L.), based on the PA guidelines recommended by the VI Brazilian guidelines on hypertension, which basically indicate 30 minutes of moderate PA continuously or accumulated, at least five times a week[11]. The main activities stimulated were walking and the use of BAG equipment, available in various parts of the city. The initial assessment was repeated at the 3rd and 6th month, except for the IPAQ, which was repeated only at the end of the study.

This project was approved by the Research Ethics Committee of Univille, University of the Region of Joinville, opinion 094/2012.

The total sample was evaluated in evolution, and the groups were compared to each other at baseline, 3 months and 6 months. For categorical variables, the chi-square method and the marginal homogeneity test for paired data (baseline, 3 and 6 months, in the same group) were used. Data with normal distribution were analyzed by Student's t test, while data with non-normal distribution were analyzed by Mann-Whitney test and Wilcoxon test when samples were paired (baseline, 3 and 6 months, in the same group). the comparison evolution between groups for variables weight, BMI, CAbd, TCG, distance covered in the TE, blood pressure (for analysis, only systolic blood pressure, SBP was used) and PA scores (IPAQ), were compared using the general linear model of repeated measures. All tests were performed using SPSS software version 17.0 (Chicago, Ill). For the analysis of the TCG, individuals with a BMI above 35 kg/m2 were excluded. In the tables, the results will be expressed as "p paired" when compared evolutionarily in the same group and "p paired between groups" to compare the evolution between groups. P values less than 0.05 were considered significant.

Results

From a total of 69 patients invited, 63 agreed to participate and were randomized into 34 PGE and 29 CG. Not appearing for the final analysis, and 1 patient from the CG who suffered a stroke during the study and 3 patients from the PGE (1 death and 2 dropouts) were excluded from the study. In the resulting total sample, 21 were male (36%), with mean age 64.4±9.5 years, weight 79.1±18.7 kg, BMI 31.3±7.1 kg/ m2, CAbd 103±12 cm TCG 32±6%, TE 317±115m, SBP 134±15 mmHg. When separated into groups after randomization, there were no significant differences between the studied variables, as shown in table 1. Within a period of 3 months, 55 patients were re-evaluated (4 did not appear for this evaluation, 3 from the PGE and 1 from the CG). It was possible to observe a reduction in the CAbd in the PGE, a reduction in the TCG in the total sample and in both groups, with no evolutionary difference between them; increase in distance covered in TE in the total sample and both groups, with a greater difference in the PGE compared to the CG, as shown in the evolutionary graph and reduction in SBP in the total sample and in both groups, with no evolutionary difference between groups (Table 1).



Evolutionary chart Test treadmill OS and C group (baseline, 3 and 6 months)

Variables	Total Sample			Control Group			Orietnation Group		
	Basal	3 meses	6 meses	Basal	3 meses	6 meses	Basal	3 meses	6 meses
Number, n	59	55	59	28	27	28	31	28	31
Male, n (%)	21 (36)	19 (35)	21 (36)	12 (43)	12 (44)	12 (43)	9 (29)	7 (25)	9 (29)
Age (year)	64,4±9,5	64,3±9,6	64,4±9,5	64,7±8,8	64,4±8,9	64,7±8,8	64,0±10,1	64,2±10,1	64,0±10,1
Weight (kg)	79,1±18,7	79±18,9	78,6±18,9	80,9±19,3	81,7±18,8	80,0±19,4	77,5±18,1	76,4±18,6	77,3±18,4
BMI (kg/m^2)	31,3±7,1	31,4±7,2	31,1±7,2	32,0±8,1	32,3±8,1	29,7± 7	30,7±6,0	30,5±9	31,9±6
Abdominal circunference **(cm)**	102,9±12,4	102,1±12,3	101,8±12,2 [b]	103,4±125,5	103,6±12,5	102±12,9 [b]	102,4±12,3	100,6±12,0 [a]	101,6±11,5 [b]
% body Fat	32±6	31±6 [a]	31±6 [b]	33 ± 7	30±8 [a]	30±7 [b]	32±5	31±5 [a]	31±6 [b]
Treamidill test six minute	317±115	363±94 [a]	391±108 [b]	328±109	343±93 [a]	373±114 [b]	308±120	382±91 [a,c]	407±100 [b,c]
BP systolic (mmHg)	134,4±15,0	128,7±12,1 [a]	130,3±15,1 [b]	134,3±15,7	130,0±14,1 [a]	130,7±14,3 [b]	134,5±14,3	127,5±9,9 [a]	130,0±15,1 [b]

[a] p evolutionary pair of 0 and 3 months < 0,05; [b] p evolutionary pair of 0, 3 e 6 months < 0,05; [c] p evolutionary pair OG vs CG< 0,05

Table 1: *Epidemiological and parametric variables by period and by group.*

At the end of 6 months, 59 patients were re-evaluated. An evolutionary analysis of 0, 3 and 6 months showed results similar to those of 3 months, such as a reduction in CAbd of the total sample and of both groups, reduction in TCG in the total sample and in both groups, increase in the distance covered in the TE in the total sample and in both groups, and reduction in SBP in the total sample and both groups. Although both groups increased the distance walked in the ET at 3 and 6 months, this was the only evolutionary difference between them, favoring the PGE (Table 1).

A significant number of patients reported performing activities of moderate or high intensity in the baseline period (78% of the sample), a value that increased even more after 6 months in the total sample (83%, p<0.05) and in the PGE (baseline 74% vs 87% at 6 months, p<0.05) . The reported time of sitting was reduced in the total sample (p < 0.02), but there was no difference between the groups. In the total sample and in the PGE there was an increase in energy expenditure, estimated in MET-minutes per week, in walking, vigorous activities, as well as in the weekly activity score. Evolutionarily, there was no difference between groups. On the other hand, the GEF had a significant increase in vigorous activities compared to the CG (Table 2).

	Total Sample		C Group		O Group	
Activity	**Basal**	**6 meses**	**Basal**	**6 meses**	**Basal**	**6 meses**
Sitting time, minutes/week	**1260 (840-2520)**	**1260 (840-1680) [a]**	**1260 (840-1995)**	**1260 (840-1995)**	**1680 (720-2520)**	**1260 (420-2340)**
walk*	**198 (0-495)**	**396 (99-693) [a]**	**248 (107-656)**	**446 (153-693)**	**66 (0-396)**	**330 (0-990) [a]**

Moderate activities *	**1458 (570-2670)**	**1500 (840-3130)**	**1152 (743-2516)**	**1384 (744-2790)**	**1755 (450-2940)**	**1650 (840-3330)**
Vigorous activities*	**0 (0-120)**	**0 (0-960) [a]**	**0 (0-90)**	**0 (0-420)**	**0 (0-240)**	**720 (0-1440) [a]**
Weekly Physical activity*	**1931 (966-1958)**	**2720 (1350-4449) [a]**	**1880 (1098-2918)**	**2294 (1241-3781)**	**1959 (779-3633)**	**3090 (1640-4818) [a]**
Physical activity intensity#		**a**				**a**
Low	**13 (22,0)**	**10 (16,9)**	**5 (17,9)**	**6 (21,4)**	**8 (25,8)**	**4 (12,9)**
moderate	**32 (54,2)**	**24 (40,7)**	**27 (60,7)**	**13 (46,4)**	**15 (48,4)**	**11 (35,5)**
high	**14 (23,7)**	**25 (42,4)**	**6 (21,4)**	**9 (32,1)**	**8 (25,8)**	**16 (51,6)**

Results presented as median and interquartile range, in MET-minutes/week. # Result in n (%) [a.] p pair evolutionary baseline and 6 months < 0,05; [b] p pair evolutionary OG vs CG < 0,05.

Table 2: *Physical Activity scores grouped by domain, period and by group and categorized into IPAQ physical activity intensity*

Discussion

Promoting consistent PA in hypertensive patients is possible, as demonstrated in the present study. Even after 6 months, the evaluated parameters indicated a consistent increase in PA. When the activity orientation is carried out by PE, the effectiveness is greater. These results are relevant, as it is possible to imagine that the adoption of a similar approach in public health services could have an impact on the reduction of cardiovascular events, by promoting a reduction in blood pressure. In Brazil, it is estimated that about 52% of individuals with SAH are aware of the diagnosis of the disease. Of these, about 35% are treated and only 13.7% achieve adequate control of BP levels[11]. The reasons for low adherence are not clear, but it seems to involve factors such as gender, age, ethnicity, education, socioeconomic level, among others.[22] From what we were able to obtain, there are no data on adherence to PA in hypertensive patients in Brazil. It is plausible that adherence is not greater than adherence to treatment as a whole. Physical inactivity is responsible for 6 to 10% of deaths from non-communicable diseases worldwide[46]. This value is even higher in middle-income countries, such as Brazil, and in specific diseases, such as ischemic heart disease, with up to 30% of deaths[47]. Even reduced levels of physical activity represent a determining factor in reducing mortality in populations with cardiovascular risk factors[48-50]. To promote PA, numerous strategies have been tried, from the doctor's education, who guides in his office[49], even community walking programs or leisure centers[51], but the effectiveness is variable. A systematic review and meta-analysis of randomized studies on physical activity promotion in primary health care units showed a mild to moderate increase in the level of PA, which was maintained for up to 12 months [52]. The present study shows positive results after 6 months in a specialized outpatient clinic for hypertensive patients.

Little is known about the best individual approach and the effect of the guidance methodology adopted. The guidelines for performing PA in people with any disease are the domain of the physician and strongly recommended in guidelines from several medical societies [2,11]. On the other hand, activities guided by other professionals can be more efficient [40,51].To our knowledge, the present study is the first to compare the promotion of PA PE versus physician in a randomized manner, The results favor the role of the PE. The promotion of PA was measured directly (PA questionnaire, IPAQ) and indirectly (ET, reduction of TCG and CAbd), which strengthens the findings. It was possible to verify a reduction in parameters associated with physical inactivity, such as weight, CAbd and TCG, as well as SBP. However, as there is no adequate control over diet and other interventions, which could influence some of these results, it cannot be categorically stated that these variations are exclusively due to PA. However, self-reported PA increased consistently in both groups, in parallel with ET. The increase was greater in the GPE, reinforcing the role of the PA. The difference between medical guidance and PE guidance may be related to the type of PA prescribed or suggested. In general, medical guidelines recommend walking for 30 minutes a day, at least 3 times a week [11]. The PE approach in the present study included isotonic neuromuscular exercises, in addition to aerobic activity. This combination may account for the best results, similar to other studies [53-54]

The study has limitations: it was carried out in a selected sample of hypertensive patients in a specialized outpatient clinic. Most of these had controlled BP levels, which may suggest greater adherence to medical prescriptions, including those related to PA. The improvement observed in the ET may be due, at least in part, to the individuals' adaptation to the method of walking on a treadmill. The TCG results must be observed with restrictions, since the specific guidelines related to fasting were not followed, but they are consistent with the CAbd variations. The short observation period of 6 months does not allow extrapolations on the effectiveness of AF in reducing CVR.

Conclusion

The results of this study allow us to conclude that it is possible to promote physical activity with a lasting effect in hypertensive patients. Both methods had positive results, but the results are better when the orientations are carried out in a systematic way by a physical educator, especially regarding aerobic capacity. Additional, long-term studies using cardiovascular events as endpoints are needed.

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