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Original Article

PHYSICAL FITNESS OF THIRD-AGE-GYM GOERS WITH SYSTEMIC ARTERIAL HYPERTENSION IN MARINGÁ, BRAZIL

APTIDÃO FÍSICA DE IDOSOS COM HIPERTENSÃO ARTERIAL SISTÊMICA USUÁRIOS DAS ACADEMIAS DA TERCEIRA IDADE DE MARINGÁ-PR

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RESUMO

Este estudo investigou a aptidão física de idosos com Hipertensão Arterial Sistêmica (HAS) usuários das academias da terceira idade (ATI) do município de Maringá-PR. Foram inclusos 79 idosos de ambos os sexos, usuários de 13 ATI localizadas no município de Maringá-PR, com diagnóstico de HAS. Para identificação do perfil sociodemográfico e de saúde foi utilizado um questionário semiestruturado. Foi aferida a pressão arterial em repouso e o Índice de Massa Corporal (IMC). Para avaliar a força muscular foram utilizados os testes de flexão de cotovelo e o levantar e sentar na cadeira. O nível de atividade física dos idosos foi avaliado pelo Questionário Internacional de Atividade Física (IPAQ). Os achados demonstraram idosos ativos/muito ativos, com pressão arterial controlada, baixo índice de comportamento sedentário e alta força de membros superiores, porém com IMC representando sobrepeso e baixa força de membros inferiores. Em função do sexo, os homens apresentaram maior valor de massa corporal ($p = 0,020$), porém outros fatores relacionados à aptidão física não demonstraram diferença estatisticamente significativa entre os idosos do sexo masculino e feminino. Concluiu-se que os idosos com HAS frequentadores das ATIs, ambos os sexos, apresentam excelentes níveis de atividade física, associados a boas condutas de saúde, baixos índices de comportamento sedentário e pressão arterial controlada.

Palavras-chave: Envelhecimento. Hipertensão. Atividade física. Aptidão física. Promoção da Saúde.

ABSTRACT

This study investigated the physical fitness of elderly individuals with Systemic Arterial Hypertension (SAH) who use third-age gyms (TAGs) in the municipality of Maringá, Paraná, Brazil. It included 79 senior citizens, of both sexes, users of 13 TAGs located in the city and diagnosed with SAH. For identification of their sociodemographic and health profile, a semi-structured questionnaire was used. Resting blood pressure and Body Mass Index (BMI) were measured. Muscle strength was assessed through elbow flexion and sit-to-stand tests. The participants' physical fitness level was assessed by the International Physical Activity Questionnaire (IPAQ). The findings reveal active/very active seniors, with controlled blood pressure, low index of sedentary behavior and high upper limb strength, but with BMI representing overweight, and low lower limb strength. When it comes to sex, men presented greater values for body mass ($p = 0.020$), but other factors related to physical fitness showed no statistically significant difference between elderly males and females. It is possible to conclude that the senior TAG goers with SAH, both men and women, presented excellent physical activity levels, associated with good health behaviors, low indexes of sedentary behavior, and controlled blood pressure.

Keywords: Aging. Hypertension. Physical activity. Physical fitness. Health promotion.

Introduction

Due to the population's greater life expectation to the detriment of lower birth rates, there is a known tendency of increase in the elderly population and a relative decrease in the number of youths in Brazil[1]. The aging phenomenon brings along some worrisome factors, such as the onset of non-communicable chronic disease (NCCDs), with Systemic Arterial Hypertension (SAH) being the most prevalent NCCD among Brazilian senior citizens[2].

A meta-analysis of studies in Brazil has shown that cases of SAH diagnoses affects around 68% of the elderly population[3,4]. Thus, this great SAH prevalence brings great concerns, since this morbidity is characterized by a sustained elevation in blood pressure

levels ≥ 140 or 90 mmHg[5]. Therefore, failure to keep blood pressure conditions within normal limits can lead to cardiac, cerebrovascular and renal consequences[2]. Bearing this in mind, it of utmost importance that public authorities create policies aimed at raising the population's awareness, besides preventing and fighting SAH and other illnesses[4]. SAH is a major public health issue, since the morbimortality and the costs derived from treating it are high[5,6].

In the case of Maringá, Paraná state, Brazil, just over 10 years ago, the municipal government founded the Third-Age Gym (TAG) as a means to encourage physical activity, especially for the elderly population[7]. The TAGs count with 10 pieces of equipment for stretching, muscle strengthening and development, and aerobic capacity workout, in addition to being outdoors, available to anyone who wants to use them[5]. This initiative gradually spread throughout Brazil, and nowadays they are estimated to be present in several Brazilian cities[6,7].

Engaging in physical activity, at either the TAGs or any other environment, brings numerous benefits to seniors. Specially about those with SAH, many studies have shown that the adoption of healthy habits associated with regular exercises lowers blood pressure (BP), an extremely relevant factor for controlling SAH[8,9], besides significantly improving body composition[10], muscle strength[11], and other important aspects that contribute to this population's autonomy and quality of life[10].

Although there are studies addressing this theme, there is a scarcity of research analyzing the profile and physical activity level of hypertensive elderly TAG goers, which is a gap that the present study aims to fill. Thus, this investigation becomes relevant to the extent that it can contribute to the work of professionals involved in promoting the health of seniors, in addition to reinforcing the importance of creating policies on SAH prevention and control.

In light of the foregoing, the present study intended to investigate the physical fitness of senior TAG goers in the city of Maringá, PR.

Methods

Participants

This quantitative, cross-sectional research had the participation of senior citizens (60 years old or over), of both sexes, users of 13 TAGs located in Maringá, PR, and with medical diagnosis of systemic arterial hypertension. Those with possible cognitive deficit, assessed by the Mini-Mental State Examination (MMSE), were excluded. The MMSE consists of questions grouped into seven categories: orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language, and visual construction capability[12]. The cutoff points used for exclusion by the MMSE were: 17 for illiterates; 22 for seniors with schooling between one and four years; 24 for those with schooling between five and eight years; and 26 for those with nine or more schooling years. These cutoff points were based on criteria proposed by Brucki et al.[12]. They correspond to the average obtained by these authors for each schooling range, minus one standard deviation. Seniors classified below the cutoff point referring to their schooling were excluded. Thus, the sample was composed of 79 elderly individuals, chosen intentionally and by convenience.

Instruments

To identify the seniors' sociodemographic profile, a semi-structured questionnaire was used; designed by the authors, it contained questions referring to sex (male; female), age (60 to 69 years old; 70 to 79 years old, or over), color (white; black; yellow), education (no education; incomplete elementary education; complete elementary education; complete high school; higher education), tobacco smoking (never smoked; has smoked; smokes), retirement

(yes; no), occupational status (active; inactive), monthly income in minimum wages (MWs), with 2017 as reference (< 1MW; 1-2 MWs; +2 MWs), marital status (with partner; no partner).

To identify the participants' health profile, another semi-structured questionnaire designed by the authors was applied, with questions covering the presence of associated diseases (no other disease; 1 disease; 2 or more diseases), history of falls in the last six months (yes; no), health self-perception (excellent; very good; good; regular; bad); body self-perception (very fat; fat; normal; thin; very thin), approximately when they have become hypertensive (1-5 years ago; 6-10 years ago; over 10 years ago); for how long they have been using the TAGs (< 6 months; 6 months to 2 years; 2 to 5 years; > 5 years), how many times a week they go to a TAG (1x; 2x; 3x; 4x; or +), for how long they have been using blood pressure medication (less than 1 year; 1 to 5 years; 5 to 10 years; over 10 years), whether being hypertensive makes something difficult in their daily routine (yes; no), visit to the cardiologist twice a year (yes; no), the last time they saw the doctor treating their disease (less than 3 months ago; between 3 and 6 months ago; between 6 months and 1 year ago; more than 1 year ago), whether the doctor treating their arterial hypertension has recommended some type of physical exercise apart from the TAG (no; yes), whether the doctor treating their arterial hypertension has recommended them to seek a physical education professional (yes; no).

To measure resting blood pressure (BP), a TechLine® arm blood pressure monitor was used. The participant remained seated, legs uncrossed, feet resting on the floor, back against the chair, and relaxed. The left arm should be at the height of the heart, supported, with the palm of the hand facing up, and with clothes not compressing the limb. Measures were taken three times, with a 1-minute interval in between. The seniors' height was taken with the aid of a regular, 1.5m-long sewing measuring tape, and body mass was measured on a Solecasa® electronic scale with maximum capacity for 180 kg. Body Mass Index (BMI) was calculated by the ratio between body mass (kg) and squared height (m) (kg/m2), using the cutoff points recommended by the World Health Organization (WHO)[13] for assessment of the adult and elderly population; severe thinness (BMI < 16.0), moderate thinness ($16.0 \leq BMI < 17.0$), mild thinness ($17.0 \leq BMI < 18.5$), normal ($18.5 \leq BMI < 25.0$), overweight ($25.0 \leq BMI < 30.0$), class I obesity ($30.0 \leq BMI < 40.0$), and class II obesity ($BMI \geq 40.0$)[13].

To assess their muscle strength, two tests from Rikli and Jones's protocol[14] were applied – elbow flexion and sit-to-stand. This protocol consists of tests that assess strength in the upper limbs (elbow flexion) and lower limbs (sit-to-stand). For the elbow flexion test, the individual should be seated on a chair without arm support, with their back against the back of the chair, legs uncrossed and resting on the floor, right arm extended to the side, hand grabbing a dumbbell – two kilos for women, and four kilos for men –; they were supposed to flex their elbow as fast as possible within 30 seconds, and the number of repeats was noted. For the sit-to-stand test, the individual should be seated on a chair with no arm support, legs uncrossed and resting on the floor, gluteus near the edge of the chair seat. To start the test, they should cross their arms over their chest and lift their feet from the floor, performing the standing and sitting movements within 30 seconds; the number of repeats was noted15.

The seniors' physical activity level was assessed using the short version of the International Physical Activity Questionnaire (IPAQ). This instrument assesses physical activities performed during leisure time, such as displacement from one place to another, house chores and occupational activities. It considers the time of 150 weekly minutes of physical activity for the subject to be classified as physically active; for less than 10 minutes, they are deemed sedentary; and those who perform physical activities for at least 10 minutes but do not reach 150 minutes are considered insufficiently active[16].

Procedures

The first research phase consisted of contacting Maringá's city hall for the conduction of the research to be authorized. The second phase comprehended accessing the map of the 54 TAGs and dividing them into four regions (North, South, East and West). Afterwards, 13 TAGs were randomly selected, three from the North, East and South, and four from the West, because it is where the largest number of TAGs can be found.

Data were collected on certain days of the week – when more seniors go to the TAGs. The elderly individuals were approached, and those with medical diagnosis of SAH were selected. The ones who accepted to join the research signed an informed and free consent form; the ones who could not sign it fingerprinted the document. This study was approved by the Research Ethics Committee of the Metropolitan University Center of Maringá by means of legal opinion No 2.190.425/2017.

Statistical Analysis

For data analysis, frequencies and percentages were applied to categorical variables. For numerical variables, initially, data normality was verified using the Kolmogorov-Smirnov test. Because the data did not present normal distribution, Median (Md) and Quartiles (Q1;Q3) were used for characterizing the results. To compare variables as to sex, age group and physical activity level, the Mann-Whitney "U" test was employed. The correlation between variables was checked by Spearman's coefficient ($p < 0.05$).

Results

Table 1 displays a prevalence of seniors who are female, have partners, are aged between 60 and 69 years old, have a monthly income of 1 to 2 minimum wages, have never smoked, and are white, retired, and inactive as to occupational status. It is also possible to notice that most of them have not completed elementary school.

Table 1. Sociodemographic profile of senior TAG goers with SAH in Maringá, PR, Brazil

	VARIABLES	*F*	%
Sex	Male	12	15.2
	Female	67	84.8
Marital status	With partner	44	55.7
	Without partner	35	44.3
Age group	60 to 69 years old	51	64.6
	70 years old or over	28	35.4
Monthly income	Less than 1 MW	8	10.1
	1 to 2 MWs	55	69.6
	More than 2 MWs	16	20.3
Schooling	Illiterate	6	7.6
	Incomplete Elementary Education	39	49.4
	Complete Elementary Education	18	22.8
	Complete High School	16	20.3
Color	White	62	78.5
	Black	12	15.2
	Yellow	5	6.3
Retirement	No	31	39.2
	Yes	48	60.8
Occupational status	Active	17	21.5
	Inactive	62	78.5

Source: The authors
Note: MW: minimum wage

As for the seniors' health profile (Table 2), most of them have a good self-perceived health, perceive their body as normal or fat, have been hypertensive for more than 10 years, have no history of falls, and have at least one associated morbidity. Additionally, the majority reports no limitation caused by the disease, has been on medication for more than 10 years, goes to the cardiologist twice a year, and has seen their doctor less than three months ago. Most of them also said that their doctors prescribed other exercises but did not tell them to seek a Physical Education professional.

Table 2. Health profile of senior TAG goers with SAH in Maringá, PR, Brazil

VARIABLES	*F*	%
Health perception		
Good	58	73.4
Regular	21	26.6
Body perception		
Fat	36	45.6
Normal	37	46.8
Thin	6	7.6
Time with hypertension		
1 to 5 years	31	39.2
5.1 to 10 years	13	16.5
More than 10 years	35	44.3
Falls in the last six months		
Yes	10	12.7
No	69	87.3
Associated morbidities		
None	31	39.2
1	37	46.8
2 or more	11	13.9
Hypertension-caused limitation		
Yes	13	16.5
No	66	83.5
Time on medication		
Less than 1 year	3	3.8
1 to 5 years	26	32.9
5.1 to 10 years	14	17.7
More than 10 years	36	45.6
Visits to the cardiologist twice a year		
Yes	61	77.2
No	18	22.8
Last visit to the cardiologist		
Less than 3 months ago	27	34.2
3 to 6 months ago	14	17.7
6 months to 1 year ago	21	26.6
More than 1 year ago	17	21.5
Doctor recommended another physical exerc		
No	32	40.5
Yes	47	59.5
Doctor recommended a Physical Ed. Professi		
Yes	11	13.9
No	68	86.1

Source: The authors
Note: Ed: Education

Analyzing the elderly participants' physical fitness (Table 3), it is possible to verify the prevalence of seniors who have been exercising at the TAGs for longer than 2 years, at least three times a week, and who are overweight/obese. Most of them are physically active but have weak muscle strength in the lower limbs. On the upper limb muscle strength test, there was a prevalence of seniors with good/very good levels.

Table 3. Physical fitness of senior TAG goers with SAH in Maringá, PR, Brazil

VARIABLES	*F*	%
Practice time		
Less than 6 months	11	13.9
6 months to 2 years	24	30.4
More than 2 years	44	55.7
Weekly frequency		
1 to 2 times	22	27.8
3 times or more	57	72.2
BMI		
Normal weight	21	26.6
Overweight	35	44.3
Obesity	23	29.1
Physical activity level		
Very active/active	65	82.3
Irregularly active	14	17.7
Sit-to-stand test		
Very weak/weak	36	45.6
Regular	18	22.8
Good/very good	25	31.6
Elbow flexion test		
Very weak/weak	30	38.0
Regular	16	20.3
Good/very good	33	41.8

Source: The authors
Note: BMI: Body Mass Index

Concerning physical activity level (Table 4), the participants do not perform vigorous activities during the week. As for walking and moderate activities, the total values for weekly physical activities stood above the recommended (>150 minutes). And about sedentary behavior, the seniors stayed approximately 2h to 4h seated during the week and weekends, respectively.

Table 4. Physical activity length and frequency and sedentary behavior in senior TAG goers with SAH in Maringá, PR, Brazil

VARIABLES	Md	Q1-Q3
Walking days	5.0	3.0-5.0
Min. of walking/day	60.0	30.0-120.0
Min. of walking/week	210.0	60.0-540.0
Min. of moderate activity/day	40.0	30.0-120.0
Min. of moderate activity/week	150.0	80.0-360.0
Vigorous activity days	0.0	0.0-2.0
Min. of vigorous activity/day	0.0	0.0-60.0
Min. of vigorous activity/week	0.0	0.0-140.0
Sitting time during the week	160.0	120.0-240.0
Sitting time during the weekend	240.0	180.0-480.0

Source: The authors
Note: Min.: minutes

Comparing body composition, blood pressure, muscle strength and physical activity engagement in seniors with SAH as a function of age (Table 5), significant difference was found between groups only for body mass (p = 0.020), indicating that the men presented greater body mass.

Table 5 – Comparing body composition, blood pressure, muscle strength and physical activity engagement in senior TAG goers in Maringá, PR, Brazil, by sex

VARIABLES	Sex		*P*
	Male	Female	
	Md (Q1;Q3)	Md (Q1;Q3)	
Body mass	79.2 (75.7; 84.9)	66.3 (61.5; 76.7)	**0.020***
BMI	27.0 (26.0; 28.5)	27.0 (24.0; 31.0)	0.784
Systolic blood pressure	144.5 (129.5; 161.8)	137.0 (123.0; 157.0)	0.322
Diastolic blood pressure	76.5 (75.0; 81.5)	75.0 (70.0; 83.0)	0.647
Sit-to-stand test	17.0 (12.5; 19.5)	15.0 (13.0; 17.0)	0.240
Elbow flexion test	16.0 (15.0; 21.5)	16.0 (14.0; 19.0)	0.527
Walking days	5.0 (3.3; 5.0)	4.0 (2.0; 5.0)	0.421
Min. of walking/day	50.0 (30.0; 120.0)	60.0 (30.0; 150.0)	0.956
Min. of walking/week	255.0 (108.0; 750.0)	200.0 (60.0; 450.0)	0.603
Moderate activity days	5.0 (3.5; 5.0)	4.0 (2.0; 5.0)	0.961
Min. of moderate activity/day	45.0 (30.0; 120.0)	40.0 (30.0; 120.0)	0.726
Min. of moderate activity/week	120.0 (90.0; 315.0)	150.0 (60.0; 420.0)	0.843
Vigorous activity days	0.0 (0.0; 1.8)	0.0 (0.0; 2.0)	0.722
Min. of vigorous activity/day	0.0 (0.0; 60.0)	0.0 (0.0; 60.0)	0.987
Min. of vigorous activity/week	0.0 (0.0; 120.0)	0.0 (0.0; 180.0)	0.821
Sitting time during the week	120.0 (97.5; 210.0)	180.0 (120.0; 240.0)	0.168
Sitting time during the weekend	180.0 (120.0; 330.0)	240.0 (180.0; 480.0)	0.072

Note: * Significant difference: $p < 0.05$ – Mann-Whitney "U" test. BMI: Body Mass Index
Source: The authors

Discussion

The objective of the present study was to investigate the physical fitness of seniors with SAH who use the TAGs in the city of Maringá, PR, Brazil. The findings reveal active/very active seniors, with controlled blood pressure, low index of sedentary behavior and high upper limb strength, but with BMI representing overweight, and low lower limb strength. When it comes to sex, men presented greater values for body mass, but other factors related to physical fitness showed no statistically significant difference between elderly males and females.

An important result was the high physical fitness index of the participants, who, in their majority, have been exercising for more than two years, performing physical activities three times or more per week, with more than 150 minutes of weekly physical activity. This profile, classified as very active/active, fits the recommendations for the general population[16] and can explain the small number of reports of other associated diseases and controlled blood pressure shown in this study. Moreover, their sitting time can be deemed adequate, since it ranged from 2h on weekdays and 4h during the weekends, and the literature shows a prevalence of health risks for individuals exposed to times longer than 4h a day in the sitting position[17].

A finding worth noting is the prevalence of BMIs above 25, representing overweight/obesity. This is due to the fact that aging changes the physiological state of seniors, reducing their fat-free mass and increasing their fat mass. These findings corroborate with a study[18] in which elderly users of Maringá's TAGs were classified as overweight as to

their BMI, showing no changes in morphofunctional aspects between two assessments, with a population similar to that of the present study. This factor reinforces the importance of nutritional guidance actions, since physical activity alone is little effective in reducing body mass[19]. Furthermore, the activities performed at the TAGs are light to moderate in intensity, indicating that the seniors do not perform vigorous exercises, which suggests a low caloric expenditure.

The elderly participants' upper limb strength was assessed as being at excellent levels, while the prevalence of strength in the lower limbs was a little lower, being similar to data reported in a study by Oliveira et al., in which senior TAG goers presented a very weak or weak muscle strength in their lower limbs[20]. This low muscle strength in the lower limbs influence functional capabilities, such as walking, climbing stairs, sitting, standing, and other daily activities, which can impact the functionality and quality of life of this population[21]. Such results are curious and call for new studies involving the elderly population that uses the TAGs in order to allow a closer look of the possible causes of these findings.

Additionally, when it comes to their sociodemographic profile, some results corroborate with the literature, such as the predominance of the disease in elderly women and seniors with low educational level[2]. The prevalence of women can be explained by hormonal changes as a consequence of menopause (decreased ovarian function), which causes gain weight and a greater risk of cardiovascular diseases due to low estrogen[22]. The prevalence among seniors with low educational level, in its turn, may be related to their poor instruction for understanding the factors aimed at preventing and fighting diseases such as SAH[2,23].

In the health profile analysis, it is worth highlighting their good and normal health and body perceptions, respectively, and the fact that they claim having no limitations caused by the disease. None of the seniors presented bad or terrible results as to health perception, corroborating with Oliveira et al.[7], who defended the contribution of physical activity at TAGs to the quality of life of these subjects, considering that the WHO defines quality of life as one's perception of their own position in life, within the culture context and system of values they live in relation to their goals, expectations, standards and concerns[24].

Some other findings show a prevalence of healthy behavior in the studied population, such as the habit of not smoking, of seeing their cardiologist from time to time, and the fact that they received their diagnosis more than 10 years ago and have been on medication for more than 10 years. The last factor must be underscored, since, in addition to lifestyle changes, compliance with the medication treatment for SAH is of extreme importance for controlling the disease, preventing the occurrence of cardiovascular events[25].

Comparing anthropometric factors between sexes, men showed greater body mass than women did. This finding is already considered an evidence, because men have a greater volume of each muscle fiber, be it of the I or II type, leading to a greater muscle mass in absolute and relative terms, whereas women have a higher fat percentage[26]. However, other factors such as time spent on physical activity were not statistically different as a function of age.

These results reinforce the need for physical education professionals prescribing exercises at the TAGs, for they are the professionals capable of recommending and monitoring people with diseases such as SAH within the physical exercise context. This scenario calls for a dialogue between doctors and physical education professionals so that this paradigm is broken with, since a joint effort would further strengthen their patients' health, which must be the central goal of all those working in the health field. Besides, the population should be better instructed and be more aware of the roles of each professional.

Some limitations of this investigation include the insufficient number of studies involving seniors with SAH to support and discuss its results, the absence of elderly individuals who engage in other types of exercise, and the absence of normotensive subjects.

Despite said limitations, the present research is believed to be able to provide Physical Education and health professionals with important information on the value of encouraging physical activities as an important and decisive element to promote the elderly population's health.

Conclusions

It is possible to conclude that senior TAG goers in the city of Maringá, of both sexes, present excellent physical activity levels, associated with good health behaviors, low indexes of sedentary lifestyle, and controlled blood pressure. Therefore, it is evident that the TAGs help improve the physical and mental health of the elderly population.

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