

## Level of physical activity of hypertensive elderly citizens and its association with sociodemographic data and health conditions

### Nível de atividade física de idosos hipertensos e sua associação com dados sociodemográficos e condições de saúde


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**ABSTRACT | INTRODUCTION:** Understanding sociodemographic and health characteristics, and their associations with physical activity in the hypertensive elderly population, is relevant for the development of health policies aimed at preventing and reducing the problems caused by the disease. **OBJECTIVE:** to evaluate the level of physical activity of hypertensive elderly and its association with sociodemographic data and health conditions. **METHODOLOGY:** a cross-sectional study was carried out with 200 hypertensive elderly of both sexes. Data were collected in two Basic Health Units during the HiperDia groups. Sociodemographic and health information were evaluated using an instrument developed by the authors. The level of physical activity, through the International Physical Activity Questionnaire (IPAQ – short version). Body Mass Index (BMI) and vital data (blood pressure, heart rate, oxygen saturation, and respiratory rate) were measured while the elderly were seated at rest. Data were analyzed using the chi-square test, adopting a significance level of 5% ( $p < 0.05$ ). **RESULTS:** in relation to the level of physical activity, 35.5% of the elderly were classified as irregularly active. Elderly people with a lower age group ( $p = 0.0007$ ), higher income ( $p = 0.0120$ ), and married people ( $p = 0.0285$ ) had a higher level of physical activity. There was a statistically significant association between activity level and health perception ( $p = 0.0274$ ). **CONCLUSION:** a higher level of physical activity was observed in elderly people with a lower age group, higher income, and married people and there was an association between the level of physical activity and the perception of health.

**Keywords:** Motor activity. Seniors. Hypertension. Health.

**RESUMO | INTRODUÇÃO:** Compreender as características sociodemográficas e de saúde, e suas associações com a atividade física na população idosa hipertensa. É pertinente para o desenvolvimento de políticas de saúde voltadas para a prevenção e redução dos problemas causados pela doença. **OBJETIVO:** avaliar o nível de atividade física de idosos hipertensos e sua associação com dados sociodemográficos e condições de saúde. **METODOLOGIA:** estudo transversal, realizado com 200 idosos hipertensos de ambos os sexos. Os dados foram coletados em duas Unidades Básicas de Saúde durante a realização dos grupos HiperDia. Foram avaliadas informações sociodemográficas e de saúde por meio de um instrumento elaborado pelos autores. O nível de atividade física, por meio do Questionário Internacional de Atividade Física (IPAQ – versão curta). O Índice de Massa Corporal (IMC) e os dados vitais (pressão arterial, frequência cardíaca, saturação de oxigênio e frequência respiratória) foram aferidos estando os idosos sentados, em repouso. Os dados foram analisados por meio do teste Qui-quadrado, adotando o nível de significância de 5% ( $p < 0,05$ ). **RESULTADOS:** em relação ao nível de atividade física, 35,5% dos idosos foram classificados como irregularmente ativos. Idosos com menor faixa etária ( $p = 0,0007$ ), maior renda ( $p = 0,0120$ ) e casados ( $p = 0,0285$ ) apresentaram maior nível de atividade física. Ficou evidenciada associação estatisticamente significativa entre nível de atividade e a percepção de saúde ( $p = 0,0274$ ). **CONCLUSÃO:** um maior nível de atividade física foi verificado em idosos com menor faixa etária, maior renda, casados e houve associação entre o nível de atividade física e a percepção de saúde.

**Palavras-chave:** Atividade motora. Idosos. Hipertensão. Saúde.

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## Introduction

Systemic arterial hypertension (SAH) represents an important cardiovascular risk factor, influencing a series of pathologies as consequences and, if not controlled with adequate treatment, it can lead to death.<sup>1</sup> The prevalence of SAH in elderly people occurs mainly from the fifth decade of life onwards<sup>2</sup>, and aging causes structural and functional changes in the cardiovascular system, where the blood pressure (BP) control mechanisms become more ineffective, thus contributing to this prevalence.<sup>1</sup>

This disease is considered a public health problem due to the great risk of complications and difficulties in its control.<sup>3</sup> In Brazil, it is the most prevalent disease in the elderly population in several regions, being the 1st cause of deaths.<sup>4</sup> The National Health Survey pointed out a prevalence of 44.4% of SAH from 60 to 64 years; 52.7% from 65 to 74 years; and 55.5% for those aged 75 or older.<sup>5</sup>

Regardless of drug treatment, therapeutic success is related to lifestyle changes, reducing risk factors such as smoking, excessive alcohol consumption, inadequate diet, and sedentarism<sup>6</sup>, with regular physical activity being fundamental as a non-pharmacological resource for controlling blood pressure levels. Physical activity induces sinus bradycardia, decreasing BP, improving oxygen consumption, decreasing blood viscosity, and decreasing platelet activity.<sup>7</sup> In addition, the development of collateral circulation affects the reduction of total vascular resistance by the consequent vasodilation.<sup>8</sup>

The new guidelines for SAH<sup>9,10</sup> suggest that patients with SAH should be treated with at least non-pharmacological measures. Although BP can usually be better regulated by lifestyle modifications before it reaches the stage of hypertension, there are several treatment options.<sup>2</sup> Lifestyle adjustments, including physical activity, are the standard first-line treatments for hypertension.<sup>10</sup>

Physical activity has great significance in reducing BP and improving the quality of life of the elderly population.<sup>1</sup> Accordingly, it is important to evaluate SAH, intending to establish the patient's BP condition,

guiding individual or collective therapeutic measures, identifying risk factors associated with the pathology and monitoring the individual's pressure control.<sup>11</sup>

Understanding the sociodemographic characteristics and health conditions and their associations with physical activity in the hypertensive elderly population is pertinent to the development of health policies aimed at preventing and reducing the problems caused by this disease.

The health conditions of the elderly population can be determined through their morbidity and mortality profiles, the presence of physical and cognitive deficits, as well as the use of health services, among other more specific indicators.<sup>11</sup> In the coming years, Brazil will experience rapid growth in the elderly population, a group at higher risk of morbidities and disabilities related to degenerative diseases.<sup>12</sup>

In view of the above, the current study had the objective of evaluating the level of physical activity of hypertensive elderly people in the city of Maringá-PR and its association with sociodemographic data and health conditions.

## Methods

### Study design

This is an analytical, quantitative, and observational study with a cross-sectional design, developed using the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). The current study was approved by the Ethics Committee on Research with Human Beings under Opinion number 3.179.421, and all participants signed the Free and Informed Consent Form (FICF).

### Participants and data collection

The non-probability sample, chosen intentionally and for convenience, was composed of 200 elderly hypertensive individuals of both genders. The study excluded elderly individuals with disabling neurological diseases and individuals with comprehension difficulties (both conditions self-

perceived by the evaluators), as well as elderly individuals with possible cognitive deficits, as evaluated by the Mini Mental State Examination (MMSE).<sup>13</sup>

Initially, contact was made with the Health Department of the Municipality of Maringa, PR, to request authorization to collect data from patients in the Primary Health Care Units (PHCU).

Data were collected in two PHCU, during the accomplishment of the HiperDia groups in the municipality, between the months of March and July 2019. Data collection was performed individually and lasted approximately 30 minutes per participant. Considering possible difficulties in reading, memory, and comprehension that the individuals could present, it was chosen to have the questionnaires administered by the researchers.

## Instruments

Sociodemographic and health information, level of physical activity, symptoms related to SAH, living habits, comorbidities, and vital data were collected.

The International Physical Activity Questionnaire (IPAQ), a short version, was used to evaluate the level of physical activity. It is composed of seven open questions and its information allows an estimate of the time spent per week in different dimensions of physical activity (walking and moderate and vigorous physical efforts) and physical inactivity (sitting position). The level of physical activity was classified as sedentary, irregularly active (A or B), active, or highly active. The irregularly active A was the subject who met at least one of the recommendation criteria regarding frequency (five days a week) or duration of activity (150 minutes a week). In turn, the irregularly active was considered the subject who did not meet any of the recommendation criteria regarding frequency or duration.<sup>14</sup>

The vital data were measured with the individuals seated for a minimum period of 10 minutes of rest in a quiet environment with a low noise level. The evaluated data were: BP (mmHg), heart rate (HR) (bpm), oxygen saturation (SpO<sub>2</sub>) (%), and respiratory rate (RR) (iprm). A stethoscope (Littmann®) and a sphygmomanometer (BIC®) were used to measure BP. Three measurements were performed in the left upper limb, with an interval of two minutes each, and the average of the three measurements was used. The elderly individuals were evaluated in the sitting position; to measure SpO<sub>2</sub> and HR, an oximeter (eBai®) was used, which was applied to the right upper limb. In order to determine the body mass index (BMI), a digital scale (Electronic Lcd®) was used to measure weight (kg), and a Pocket Stadiometer (Cescorf®) to verify height (cm).

## Data analysis

The obtained data were entered into a Microsoft Excel 2010 spreadsheet and statistically analyzed with the help of the software Statistica Single User, version 13.2. Age and number of children (only quantitative variables) were presented in the results by means of average, standard deviation, minimum and maximum. Qualitative variables were presented in frequency tables, followed by the chi-square test, to verify possible associations between the variables. The significance level adopted in the tests was 5%.

## Results

A total of 200 elderly people were interviewed, with an average age of 71.2±7.8 years (minimum of 60 and maximum of 102 years), 51.0% were male, 63.5% were white, 42.0% were aged from 60 to 69 years, 56.0% were married and 85.5% reported having children.

**Table 1.** Sociodemographic characteristics of hypertensive individuals

Variables	n	%
<b>Gender</b>		
Male	102	51.0
Female	98	49.0
<b>Ethnicity</b>		
White	127	63.5
Brown	32	16.0
Black	40	20.0
Indigenous	1	0.5
<b>Age group</b>		
From 60 to 69 years	84	42.0
From 70 to 79 years	81	40.5
From 80 to 89 years	32	16.0
90 years or older	3	1.5
<b>Marital status</b>		
Widowed	46	23.0
Married	112	56.0
Single	18	9.0
Divorced	24	12.0
<b>Children</b>		
Yes	171	85.5
No	29	14.5
<b>Education</b>		
Illiterate	33	16.5
Elementary school	118	59.0
High school	32	16.0
Incomplete higher education	3	1.5
Complete higher education	12	6.0
Graduate studies	2	1.0
<b>Income</b>		
No income	9	4.5
Up to 1 minimum wage	74	37.0
From 1 to 2 minimum wages	81	40.5
More than 2 minimum wages	36	18.0
<b>Family composition</b>		
I live with my spouse	67	33.5
I live with my spouse and children	39	19.5
I live with my spouse, children, and grandchildren	12	6.0
I live alone	59	29.5
Others	23	11.5

Most respondents (59.5%) reported having good health perception, 43.5% had a diagnosis of SAH between 5 and 10 years. Based on family history regarding the presence of SAH, 59.0% (N=118) answered positively; 20.0% (N=40) were drinkers, 8.5% (N=17) were smokers, 32.0% (N=64) added salt to foods, 45.5% (N=78) reported associated diabetes, 12.0% (N=24) hypothyroidism, 3.0% (N=6) cancer, 11.0% cardiovascular diseases, 5.5% (N=11) respiratory problems and 3.0% (N=6) other diseases. The majority, 97.0% (N=194), took medication for SAH.

Regarding the level of physical activity, 35.5% (N=71) were classified as irregularly active. The measured vital data were within the normal range for most of the evaluated elderly citizens, with 60.0% (n=120) presenting normal blood pressure, 87.0% (n=174) normal RR, 95.5% (n=191) normal SpO<sub>2</sub>, 86.5% (n=173) normal HR and 36.0% (n=72) with normal BMI (Table 2).

**Table 2.** Frequency on vital data, BMI, IPAQ and health status of hypertensive individuals

Variables	n	%
<b>Health perception</b>		
Regular	54	27.0
Good	119	59.5
Bad or very bad	11	5.5
Great	16	8.0
<b>Time of SAH</b>		
Less than 1 year	12	6.0
Between 10 and 5 years	87	43.5
Between 30 and 20 years	85	42.5
Between 50 and 40 years	11	5.5
More than 50 years	5	2.5
Unknown	5	2.5
<b>Level of physical activity</b>		
Irregularly active	118	57.0
Highly active	35	17.5
Sedentary	47	23.5
<b>Blood pressure</b>		
High	57	28.5
Normal	120	60.0
Low	23	11.5
<b>RR</b>		
High – tachypnea	24	12.0
Normal	174	87.0
Low – bradypnea	2	1.0
<b>SpO<sub>2</sub></b>		
Normal	191	95.5
Low – desaturation	9	4.5
<b>HR</b>		
Normal	173	86.5
High – tachycardia	19	9.5
Low – bradycardia	8	4.0
<b>BMI</b>		
No information	11	5.5
Underweight	9	4.5
Overweight	65	32.5
Obesity	43	21.5
Normal	72	36.0

SAH: systemic arterial hypertension; RR: respiratory rate; SpO<sub>2</sub>: oxygen saturation; HR: heart rate; BMI: body mass index.

When analyzing the association between the level of physical activity and the sociodemographic characteristics, a significant association was observed, where individuals with lower age ( $p=0.0007$ ), higher income ( $p=0.0120$ ) and married ( $p=0.0285$ ) presented a higher level of physical activity.

**Table 3.** Distribution of the evaluated variables according to the IPAQ categories for the variables evaluated in the interviewees (to be continued)

VARIABLES	Level of physical activity				P
	Irreg. Active A	Irreg. Active B	Highly active	Sedentary	
	n (%)	n (%)	n (%)	n (%)	
<b>Age group</b>					
From 70 to 79 years	20 (10.0)	35 (17.5)	9 (4.5)	17 (8.5)	0.0007*
From 60 to 69 years	17 (8.5)	30 (15.0)	24 (12.0)	13 (6.5)	
From 80 to 89 years	9 (4.5)	6 (3.0)	2 (1.0)	15 (7.5)	
90 years or older	1 (0.5)	0 (0.0)	0 (0.0)	2 (1.0)	
<b>Marital status</b>					
Widowed	8 (4.0)	22 (11.0)	3 (1.5)	13 (6.5)	0.0428*
Married	28 (14.0)	33 (16.5)	23 (11.5)	28 (14.0)	
Single	7 (3.5)	3 (1.5)	5 (2.5)	3 (1.5)	
Divorced	4 (2.0)	13 (6.5)	4 (2.0)	3 (1.5)	

**Table 3.** Distribution of the evaluated variables according to the IPAQ categories for the variables evaluated in the interviewees (conclusion)

VARIABLES	Level of physical activity				P
	Irreg. Active A n (%)	Irreg. Active B n (%)	Highly active n (%)	Sedentary n (%)	
<b>Income</b>					
Up to 1 minimum wage	9 (4.5)	28 (14.0)	14 (7.0)	23 (11.5)	0.0120*
More than 2 minimum wages	11 (5.5)	7 (3.5)	12 (6.0)	6 (3.0)	
From 1 to 2 minimum wages	25 (12.5)	32 (16.0)	8 (4.0)	16 (8.0)	
No income	2 (1.0)	4 (2.0)	1 (0.5)	2 (1.0)	
<b>Family composition</b>					
I live with my spouse	17 (8.5)	19 (9.5)	9 (4.5)	22 (11.0)	0.0285*
I live with my spouse and children	10 (5.0)	13 (6.5)	13 (6.5)	3 (1.5)	
I live alone	14 (7.0)	25 (12.5)	4 (2.0)	16 (8.0)	
I live with my spouse, children, and grandchildren	1 (0.5)	6 (3.0)	3 (1.5)	2 (1.0)	
Others	5 (2.5)	8 (4.0)	6 (3.0)	4 (2.0)	

\*Significant chi-square test considering a significance level of 5%.

A statistically significant association was evidenced between the activity level and the health perception ( $p=0.0274$ ) (Table 4).

**Table 4.** Distribution of the evaluated variables according to the IPAQ categories for the variables evaluated in the interviewees (to be continued)

VARIABLES	Level of physical activity				P
	Irreg. Active A n (%)	Irreg. Active B n (%)	Highly active n (%)	Sedentary n (%)	
<b>Health perception</b>					
Regular	13 (6.5)	21 (10.5)	7 (3.5)	13 (6.5)	0.0274*
Good	29 (14.5)	43 (21.5)	17 (8.5)	30 (15.0)	
Bad or very bad	1 (0.5)	2 (1.0)	7 (3.5)	1 (0.5)	
Great	4 (2.0)	5 (2.5)	4 (2.0)	3 (1.5)	
<b>History of SAH</b>					
No	20 (10.0)	27 (13.5)	9 (4.5)	26 (13.0)	0.5333
Yes	27 (13.5)	44 (22.0)	26 (13.0)	21 (10.5)	
<b>Drinker</b>					
No	35 (17.5)	54 (27.0)	29 (14.5)	42 (21.0)	0.2268
Yes	12 (6.0)	17 (8.5)	6 (3.0)	5 (2.5)	
<b>Smoker</b>					
No	44 (22.0)	61 (30.5)	34 (17.0)	44 (22.0)	0.1853
Yes	3 (1.5)	10 (5.0)	1 (0.5)	3 (1.5)	
<b>Addition of salt to foods</b>					
No	30 (15.0)	44 (22.0)	25 (12.5)	37 (18.5)	0.2373
Yes	17 (8.5)	27 (13.5)	10 (5.0)	10 (5.0)	
<b>Diabetes</b>					
No	33 (16.5)	42 (21.0)	21 (10.5)	26 (13.0)	0.4880
Yes	14 (7.0)	29 (14.5)	14 (7.0)	21 (10.5)	
<b>Hypothyroidism</b>					
No	42 (21.0)	62 (31.0)	30 (15.0)	42 (21.0)	0.9466
Yes	5 (2.5)	9 (4.5)	5 (2.5)	5 (2.5)	
<b>Cancer</b>					
No	47 (23.5)	68 (34.0)	34 (17.0)	45 (22.5)	0.5566
Yes	0 (0.0)	3 (1.5)	1 (0.5)	2 (1.0)	
<b>Cardiovascular diseases</b>					
Yes	5 (2.5)	9 (4.5)	4 (2.0)	4 (2.0)	0.9158
No	42 (21.0)	62 (31.0)	31 (15.5)	43 (21.5)	
<b>Respiratory problems</b>					
No	45 (22.5)	63 (31.5)	35 (17.5)	46 (23.0)	0.0515
Yes	2 (1.0)	8 (4.0)	0 (0.0)	1 (0.5)	

**Table 4.** Distribution of the evaluated variables according to the IPAQ categories for the variables evaluated in the interviewees (conclusion)

VARIABLES	Level of physical activity				P
	Irreg. Active A n (%)	Irreg. Active B n (%)	Highly active n (%)	Sedentary n (%)	
<b>Blood Pressure</b>					
High	12 (6.0)	21 (10.5)	8 (4.0)	16 (8.0)	0.1054
Normal	24 (12.0)	46 (23.0)	23 (11.5)	27 (13.5)	
Low	11 (5.5)	4 (2.0)	4 (2.0)	4 (2.0)	
<b>RR</b>					
High – tachypnea	4 (2.0)	9 (4.5)	4 (2.0)	7 (3.5)	0.6925
Normal	42 (21.0)	6 (31.0)	30 (15.0)	40 (20.0)	
Low – bradypnea	1 (0.5)	0 (0.0)	1 (0.5)	0 (0.0)	
<b>SpO<sub>2</sub></b>					
Normal	43 (21.5)	70 (35.0)	34 (17.0)	44 (22.0)	0.2674
Low – desaturation	4 (2.0)	1 (0.5)	1 (0.5)	3 (1.5)	
<b>HR</b>					
Normal	41 (20.5)	58 (29.0)	31 (15.5)	43 (21.5)	0.7123
High – tachycardia	5 (2.5)	8 (4.0)	3 (1.5)	3 (1.5)	
Low – bradycardia	1 (0.5)	5 (2.5)	1 (0.5)	1 (0.5)	
<b>BMI</b>					
No information	2 (1.0)	3 (1.5)	4 (2.0)	2 (1.0)	0.2396
Underweight	0 (0.0)	4 (2.0)	1 (0.5)	4 (2.0)	
Overweight	18 (9.0)	18 (9.0)	13 (6.5)	16 (8.0)	
Obesity	12 (6.0)	12 (6.0)	9 (4.5)	10 (5.0)	
Normal	15 (7.5)	34 (17.0)	8 (4.0)	15 (7.5)	

\*Significant chi-square test considering a significance level of 5%.

SAH: systemic arterial hypertension; RR: respiratory rate; SpO<sub>2</sub>: oxygen saturation; HR: heart rate; BMI: body mass index.

## Discussion

The current study had the objective of evaluating the level of physical activity of hypertensive elderly individuals and its association with sociodemographic data and health conditions. The main findings revealed that individuals with younger age, higher income and married presented a higher level of physical activity, and an association was observed between the level of physical activity and the health perception.

In general, the elderly citizens assisted by the HiperDia program were mostly men, white, aged between 60 and 79 years, married, with children, low education level, low income and living with a spouse. In addition, they reported having a family history of hypertension and having been diagnosed with the disease between 5 and 10 years. Such characteristics are similar to those observed in elderly people attending a Health Care Unit in João Pessoa-PB, except with regard to gender, since the female gender was predominant in the study conducted by Dourado et al.<sup>15</sup>, where the authors reported that women sought more services in HiperDia and requested medication both for themselves and for their partners. A higher female predominance has also been reported in other studies conducted in different regions of Brazil.<sup>16-19</sup>

Regarding marital status, a study conducted in Southern Brazil showed that married individuals are twice as likely to control blood pressure levels compared to single individuals, thus suggesting that a partner may facilitate adherence to therapy<sup>19</sup>, thus providing emotional support and motivation.<sup>18</sup> The association between the variables related to marital status and physical activity is a research theme that has been poorly investigated in Brazil, according to surveys in the literature. In the study conducted by Gonçalves et al.<sup>20</sup> with elderly users of the public health system, there was no significant result regarding marital status, but there was a negative association between the fact of living alone and the level of physical activity. The lack of a companion is a barrier commonly reported in other studies<sup>21</sup> and, in this sense, it seems that marriage can favor the practice of physical activity because, when people closer to them are present and value the change in behavior, they end up feeling more secure and confident.<sup>22</sup> In addition, a systematic review indicated a positive relationship between social support (including family members) and the practice of physical activity by older adults.<sup>23</sup>

Scientific evidence indicates that adequate levels of physical activity can reduce the occurrence of hypertension and the new guidelines suggest that hypertensive patients should also be treated with non-pharmacological measures.<sup>24</sup> In addition, it is known that failure to comply with physical activity recommendations is associated with obesity, diabetes, hypertension and metabolic syndrome, which are important cardiovascular risk factors.<sup>25</sup> Among the numerous benefits of the practice of physical activity, pain relief and weight reduction were highlighted by elderly hypertensive individuals enrolled in a Family Health Strategy (FHS) program in Minas Gerais. Positive effects on mood, such as feeling happy and a better motivation, were also evidenced, showing that physical activity may be able to facilitate social interactions and contribute in terms of improving physical health and conditions that affect mental health.<sup>17</sup>

Although most of the people who attend HiperDia are aware of healthy habits, following the recommendations of health professionals is still a major challenge.<sup>18</sup> Older adults with hypertension understand the importance of quitting smoking, reducing alcohol intake, and performing physical activities; however, they may feel unmotivated, especially to practice physical exercises, which may interfere with adherence to programs<sup>16</sup> and, consequently, reflect a low level of daily physical activity. In the current study, only 17.5% of the sample was considered very physically active, showing that there is a need to investigate the relationship between physical activity and factors associated with aging. Another study conducted with elderly women identified that 61.9% were considered insufficiently active, according to the IPAQ evaluation, and the domains with the lowest level of physical activity were "at work" and "recreation, sport, exercise, leisure".<sup>26</sup>

It was possible to verify that the elderly citizens of a lower age presented a higher level of physical activity in the current study, thus corroborating other findings.<sup>27,28</sup> Rocha et al.<sup>28</sup> verified that the older the age, the lower the level of physical activity, justifying that the lower participation in activities may be directly associated with the difficulties encountered due to the gradual functional decline that affects the elderly person.

In this sense, it is worth underlining that, besides acting as a preventive measure and as a complementary treatment for chronic diseases, the regular practice of a physical activity is primordial for maintaining the functional capacity of the elderly person, giving him/her autonomy in performing his/her daily activities, besides being related to a better perception of quality of life.<sup>29</sup> Still, with regard to age group, a study found that advancing age proved to be a major barrier to activity in senility, thus suggesting that engaging older adults in physical activity practices are a great challenge for public policies to promote active aging.<sup>27</sup>

There is a hypothesis that low income hinders access to treatment and improvement in lifestyle<sup>30</sup>; for this reason, some studies identify an association between social class and socioeconomic factors in hypertensive individuals<sup>30</sup>, thus indicating that low income is an important barrier to physical activity.<sup>27</sup> In the current study, the elderly citizens with higher income presented a higher level of physical activity, similar to what was found in a multicenter study conducted with 2,344 elderly people from different regions in Brazil, which verified that elderly people with higher income were considered more active in the indicators of the global level of physical activity, leisure time, work and commuting.<sup>27</sup> This association can be explained by the fact that elderly individuals with higher incomes have greater access to gyms and clubs, for example, thus increasing the opportunity to practice exercise, besides living close to places that provide such practices, such as squares and parks.<sup>31</sup> For this reason, it is noteworthy that the projects developed by public institutions, whether in the Brazilian Unified Health System (SUS, as per its Portuguese acronym) or Higher Education Institutions, have great social relevance since most individuals who participate in these activities are from lower social classes and do not enjoy financial conditions to attend sports centers or private gyms, often representing that participation in social projects involving physical activity may be the only way to remain active.<sup>32</sup>

As for health perception, 67.5% of the surveyed elderly citizens reported being good or great, similar to what was found in previously published studies.<sup>33,34</sup> More than 60% of the users participating in programs to promote physical activity in primary health care in



Pernambuco perceived their own health as good and 99.2% considered that the activities carried out in the programs contribute to health.<sup>34</sup> It was verified that there was an association between the level of physical activity and the health perception among the elderly individuals, and other variables such as literacy, level of education, diagnosis of some chronic disease, physical or mental, and difficulty in performing activities of daily living, for example, are also strongly related to the health perception among Brazilian elderly citizens.<sup>35</sup>

The current study is subject to some limitations. One of them is related to the sample having been selected intentionally and for convenience, making it impossible to extrapolate the results found here. Another limitation is that the diagnosis of the elderly hypertensive individuals was self-reported.

## Conclusion

A higher level of physical activity was verified in hypertensive elderly individuals with younger age, higher income, and married. There was an association between the level of physical activity and the health perception of these elderly individuals. Thus, it is highlighted the importance of guidance on the practice of physical activity, especially regular physical exercises, to preserve or increase the health perception of hypertensive elderly people.

## Authors' contributions

Tosi MM, Silva BP, and Peres PN participated in the design of the research question, methodological design, search for research data, data collection, interpretation of results, and writing of the scientific article. Santos ND, Oliveira DV, Fidélis YL and Nascimento Júnior JRA participated in data interpretation and statistical analysis. Silva Santos AB participated in the writing of the scientific article. All authors have reviewed and approved the final version and are in agreement with its publication.

## Conflicts of interests

No financial, legal, or political conflicts involving third parties (government, companies and private foundations, etc.) have been declared for any aspect of the submitted work (including, but not limited to, grants and funding, advisory board participation, study design, manuscript preparation, statistical analysis, etc.).

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