

## PHYSICAL ACTIVITY LEVEL IN PEOPLE WITH HIGH BLOOD PRESSURE

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*This study aimed to analyze the level of physical activity for people with high blood pressure cared for in a health center. This cross-sectional study was conducted with 310 individuals between 18 and 69 years of age through the International Physical Activity Questionnaire (IPAQ). The majority (80%) of participants presented low or moderate levels of physical activity. The analysis of association between sociodemographic variables and physical activity level revealed that older men from the interior of the state with higher educational levels have a greater chance of exhibiting lower levels of physical activity. The logistic regression model revealed that origin, schooling and diabetes are predictors of low physical activity level. The conclusion is that part of the sample does not match the desirable profile to practice regular physical activity.*

**DESCRIPTORS:** motor activity; hypertension, exercise

## NIVEL DE ACTIVIDAD FÍSICA EN PORTADORES DE HIPERTENSIÓN ARTERIAL

*El objetivo de este estudio fue analizar el nivel de actividad física de personas portadoras de hipertensión arterial, acompañadas en un centro de atención ambulatorial. Se trata de un estudio transversal desarrollado con 310 individuos de 18 a 69 años. Se utilizó como base el International Physical Activity Questionnaire (IPAQ). La mayor parte del grupo (80%) fue encuadrada en los niveles de baja y moderada actividad física. En el análisis de asociación entre las variables sociodemográficas y el nivel de actividad física, se verificó que personas del sexo masculino, procedentes del interior del Estado, con más edad y con mayor nivel de escolaridad son más propensas a desarrollar un nivel de actividad física bajo. En el modelo de regresión logística, la procedencia, tiempo de escolaridad y de diabetes fueron indicadores obtenidos como factores de predicción significativos para el nivel bajo de actividad física. Se concluye que parte de la muestra no posee un perfil deseable en relación a la práctica regular de actividad física.*

**DESCRIPTORES:** actividad motora; hipertensión, ejercicio

## NÍVEL DE ATIVIDADE FÍSICA EM PORTADORES DE HIPERTENSÃO ARTERIAL

*O objetivo desse estudo foi analisar o nível de atividade física de pessoas portadoras de hipertensão arterial, acompanhadas em centro de atendimento ambulatorial. É um estudo transversal desenvolvido com 310 indivíduos de 18 a 69 anos. Utilizou-se como base o International Physical Activity Questionnaire (IPAQ). A maior parcela do grupo (80%) foi enquadrada nos níveis de baixa e moderada atividade física. Na análise de associação entre as variáveis sociodemográficas e o nível de atividade física, verificou-se que pessoas do sexo masculino, procedentes do interior do Estado, mais velhas e com maior nível de escolaridade são mais propensas para desenvolver nível de atividade física baixo. No modelo de regressão logística, a procedência, tempo de escolaridade e de diabetes foram indicadores obtidos como preditores significantes para o nível baixo de atividade física. Concluiu-se que parte da amostra não possui perfil desejável em relação à prática regular de atividade física.*

**DESCRIPTORES:** atividade motora; hipertensão, exercício

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## INTRODUCTION

Sedentariness has been identified as a risk factor for cardiovascular diseases. A previous study found that 76.9% of people who had suffered a heart attack and 81.2% of people with arterial hypertension did not perform any kind of physical activity<sup>(1-2)</sup>. However, the evaluation of physical activity is hindered by the lack of standardized instruments and a precision so that it can be used in population studies and in different social contexts<sup>(3)</sup>.

It is currently well established that a daily routine of physical exercise helps to prevent and recover from cardiovascular diseases because of its beneficial effects on the cardiovascular system and on the control of the remaining risk indicators<sup>(4)</sup>.

Due to the global concern with the high levels of physical inactivity and harm this lack of activity causes, some researchers have focused on the evaluation of psychometric characteristics (validity, reproducibility and objectivity) of questionnaires that aim to measure levels of physical activity. Among the several types of questionnaires, the International Physical Activity Questionnaire – IPAQ has reasonable measurement proprieties to monitor levels of physical activity of adult populations between 15 and 69 years of age<sup>(5)</sup>.

Considering the association between a sedentary lifestyle and the development of chronic diseases, this study focused on hypertensive people aiming to accurately characterize the levels of physical activity of this population. Hence, this study is justified by the beneficial and proven effects of physical activity on the prevention and treatment of high blood pressure<sup>(6)</sup>. It is a means through which professionals can intervene, providing education in health and, thus, sensitize this group regarding the need for a physically active life.

## METHOD

This cross-sectional and exploratory study aimed to analyze the level of physical activity of hypertensive people. It was carried out in an outpatients' reference center that provides care for individuals with high blood pressure and diabetes. The population was composed of hypertensive people tended in this care center. The following inclusion criteria were considered: diagnosis of arterial hypertension, being cared for by the program and being

18 to 69 years old. The exclusion criterion was medical counter indication to exercise reported by participants.

The study sample was calculated based on the formula recommended for sample estimation in cross-sectional studies of finite populations. The following parameters were considered: 95% significance level ( $Z_{\alpha}=1.96$ ); 5% sampling error; size of population: 6,042 hypertensive people registered in the system; a prevalence of an estimated 70% according to a study focusing on epidemiology of risk factors for arterial hypertension<sup>(7)</sup>. Based on these parameters, the researcher selected a convenience sample composed of 310 hypertensive people.

Primary data were collected through interviews between November 2007 and January 2008. The used instrument presented the final classification according to the *International Physical Activity Questionnaire* – IPAQ, which is divided in three levels, low, moderate and high. The IPAQ short and long versions contain data on moderate to vigorous physical activity in different contexts (work environment, house tasks, transportation and leisure) regarding the last seven days or a regular week. The long version was chosen because it allows collecting more detailed information in a regular week through interviews<sup>(5)</sup>.

The variable city was coded as capital and interior, whereas metropolitan regions were coded as capital as well. Marital status noted if the patient was living with or without a partner at the time. Schooling was quantified according to years concluded. Data related to weight, height and duration of hypertension and diabetes mellitus were obtained through patients' reports. The weight and height variables were used to compute Body Mass Index (BMI) ( $\text{weight}/\text{height}^2$ ). BMI was classified according to the World Health Organization standards<sup>(8)</sup>. The income *per capita* variable was derived from the sum of all sources of family income.

Data are presented in tables indicating absolute frequency and percentage, tendency and dispersion measures. To evaluate association between categorical variables, the Chi-square test was applied. The Kolmogorov-Smirnov test was used in the data symmetry analysis. The Mann-Whitney test was applied to check median differences between groups.

Based on variables that presented statistical significance below 0.2, a stepwise logistic regression was developed to identify predictor factors of levels of physical activity that influence the development of high levels of physical activity. For that, levels of physical activity were grouped in two categories: the first included moderate and high levels of physical

activity and the second only included individuals with low levels of physical activity. The Wald test was used to verify the significance of coefficients that integrated the logistic equation; the Omnibus test was used to verify the significance of the model; the Hosmer–Lemeshow test evaluated the difference between observed and expected frequencies; Nagelkerke R<sup>2</sup> was used to measure the model's goodness of fit. In addition to these statistics, the final definition of predictors considered the reduction of the log likelihood ratio (-2log).

All recommendations regarding research developed with human beings provided by Resolution 196/96 of the National Health Council were followed. Permission to carry out the research was obtained from the institution's Research Ethics Committee (Protocol nº 212/2007).

## RESULTS

The study revealed that the majority of participants were female (65.5%), originally from the capital (86.1%) and Catholic (74.5%). The majority (64.5%) reported a domestic partner; the type of existing marital relationship was irrelevant. The occupation variable varied, though retired people (25.5%) predominated followed by housewives (22.2%). Only 5.6% of the sample reported being unemployed. Half the sample was up to 56 years old, had nine years of schooling and a *per capita* income of R\$ 433.33 (Brazilian currency).

Table 1 – Clinical data of specialized center patients with arterial hypertension

Variables	No.	%		
<b>BMI classification</b>				
Underweight	3	1.1		
Normal weight	52	19		
Overweight	107	39.1		
Obese	112	40.9		
Total	274	100		
<b>Diabetes</b>				
Yes	218	70.3		
No	92	29.7		
Total	310	100		
	P value	Average	Standard Error	Median
Weight	0.069	73.81	13.25	73
Height	0.171	1.59	0.08	1.600
BMI	0.691	29.12	4.61	28.81
Time of arterial hypertension	0	11.16	7.94	10

Individuals with high levels of body fat predominate: 80% were classified as overweight or obese. This fact was evidenced by the high BMI average (29.12). Additionally, 70% of the studied individuals had diabetes mellitus. Another noteworthy fact is the time of the diagnosis of arterial hypertension. Half of the group knew about their condition for more than ten years.

Regarding the IPAQ classification, we highlight that the majority (44.2%) had moderate levels of physical activity followed by low levels of physical activity (40%) and only 15.8% of the sample presented high levels of physical activity.

When analyzing potential association between the variables of gender, origin and domestic partner with the variable level of physical activity, a significant statistical association between the variables gender and origin ( $p=0.043$  and  $0.039$ , respectively) was found when low and moderate levels of physical activity were compared. Men presented 69% more chance of presenting low level of physical activity compared to women (OR=1.691; CI 95%=0.015 – 2.818). We also observed that the percentage of people from the interior who presented a low level of physical activity increased two-fold when compared to people from the capital (OR=2.09; CI95%=0.98 – 4.52). The average length of schooling was significantly higher among individuals with a low level of physical activity compared to those with a high level of physical activity ( $p=0.041$ ).

Table 3 shows that the variables identified as predictors of a low level of physical activity include people from the interior of the state with a higher educational level and a shorter time since the diagnosis of diabetes. Despite the statistical significance of the estimated coefficients, the logistic model presented a low coefficient of determination ( $R^2=0.067$ ).

## DISCUSSION

The predominance of females (65.5%) found in this study differs from a study conducted with hypertensive people in which the prevalence of males was significantly higher<sup>(9)</sup>. However, women in Brazil know more about their high blood pressure condition than men, thus they seek more health services<sup>(10)</sup>, which may explain their predominance in the studied care service.

Table 2 – Bivariate analysis of levels of physical activity according to sociodemographic data

Variables	Level of physical activity		Total	Statistics
	Low	Moderate		
<b>1. Gender</b>				
Male	52	41	93	p=0.043
Female	72	96	168	OR=1.691
Total	124	137	261	CI95%: 1,015 - 2.818
<b>2. Origin</b>				
Interior	24	14	38	p=0.039
Capital	100	122	222	OR=2.090
Total	124	136	260	CI95%: 0.980 - 4.520
<b>3. Domestic Partner</b>				
Yes	85	82	167	p=0.144
No	39	55	94	OR=1.462
Total	124	137	261	CI95%: 0.878 - 2.435
Ranks average				
4. Age	128.88	132.92		p=0.666
5. Schooling	132.73	125.74		p=0.444
6. Income per capita	126.76	131.96		p=0.576
<hr/>				
	<b>Moderate</b>	<b>High</b>		
<b>1. Gender</b>				
Male	41	14	55	p=0.858
Female	96	35	131	OR=1.068
Total	137	49	186	CI95%: 0.520 - 2.193
<b>2. Origin</b>				
Capital	122	44	166	p=0.986
Interior	14	5	19	OR=0.990
Total	136	49	185	CI95%: 0.337 - 2,09
<b>3. Domestic partner</b>				
Yes	82	33	115	p=0.354
No	55	16	71	OR=0.723
Total	137	49	186	CI95%: 0.363 - 1.438
Ranks average				
4. Age	99.17	77.64		p=0.016
5. Schooling	97.19	83.19		p=0.111
6. Income per capita	96.75	82.60		p=0.113
<hr/>				
	<b>Low</b>	<b>High</b>		
<b>1. Gender</b>				
Male	52	14	66	p=0.103
Female	72	35	107	OR=1.806
Total	124	49	173	CI95%: 0.883 - 3.691
<b>2. Origin</b>				
Capital	100	44	144	p=0.147
Interior	24	5	29	OR=0.473
Total	124	49	173	CI95%: 0.170 - 1.322
<b>3. Domestic Partner</b>				
Yes	85	33	118	p=0.878
No	39	16	55	OR=1.057
Total	124	49	173	CI95%: 0.521 - 2.143
Ranks average				
4. Age	92.79	72.36		p=0.016
5. Schooling	89.85	73.11		p=0.041
6. Income per capita	88.58	79.58		p=0.282

Table 3 – Logistic regression for predictor factors of level of physical activity (0 – moderate/high; 1 – low) identified in people with arterial hypertension

Level of physical activity/predictors	Coef.	Wald (Sig)	OMN(Sig)	HL	R2	-2 Log
Origin	1.013	6.235 (0.013)	13.546	2.131	0.067	343.330
Schooling	0.073	5.238 (0.022)	(0.004)	(0.977)		
Time of diabetes	-0.615	4.349 (0.037)				
Constant	-1.450	4.476 (0.034)				

OMN – Omnibus test; HL - Hosmer and Lemeshow test; Wald – Wald test; R<sup>2</sup> - Nagelkerke coefficient of determination; -2 Log – log likelihood ratio

It is important to highlight that the characteristics regarding the remaining demographic factors identified among the study participants are similar to the profile usually described for this population. Factors such as advanced age, low socioeconomic level and low educational level are noted as important characteristics of people with hypertension<sup>(11)</sup>. Socioeconomic differences play an important role in health conditions due to several factors such as access to the health care system, level of information, understanding of the problem and adherence to treatment.

The percentage of overweight or obese individuals (80%) is highlighted in the analyzed clinical data. This fact is confirmed in the analysis of 40 articles where the prevalence of obesity varied from 7.9 to 20.8% and being overweight varied from 25.7 to 51.6%. In this same study, more than two thirds of individuals in studied populations did not have adequate regular physical activity<sup>(12)</sup>. Another study focusing on the increased prevalence of hypertension showed that this is directly proportional to the increase of body mass so that overweight and obese individuals presented hypertension considerably higher than individuals within the normal range of weight, which suggests a cause and effect relationship between these two variables<sup>(13)</sup>.

The strong association between excess weight and the occurrence of arterial hypertension indicates the urgent need for measures capable of influencing risk indicators that can decisively determine the prevalence of hypertension in populations<sup>(9)</sup>.

Another relevant piece of information, which is also directly associated with high BMI and hypertension, is the presence of diabetes mellitus in a large share of the studied sample (70%). The literature describes a clear increase in the prevalence of hypertension and diabetes mellitus with weight gain<sup>(14)</sup>.

The verification of the level of physical activity through IPAQ revealed the predominance of low and moderate levels of physical activity in the studied population. Similar data were found in other studies evaluating the level of physical activity in people with hypertension and an inverse relationship between physical activity and the prevalence of arterial hypertension was found<sup>(15)</sup>. A study conducted in Pelotas, RS, Brazil with methodological criteria similar to this study revealed a prevalence of physical inactivity between 38 and 41% between 20 and 65 years of age<sup>(16)</sup>.

It is important to heed the fact that many studies present the Brazilian population as having, in general, characteristics related to low levels of physical

activity. However, the evaluation of a population as physically inactive should be considered with caution because there is a limitation observed in studies in which physical activity is increasingly related to leisure activities. From this perspective, the IPAQ evaluation criteria are more relevant in poor countries where activities related to transportation, home and work tasks, and not only leisure activities, regularly impose a considerable energy expenditure on these populations.

The results of this study were similar to those of a previous study in which men presented higher rates of low levels of physical activity and sedentariness was significantly more frequent in men than in women<sup>(4)</sup>. An inverse relationship between physical activity and age was found in this study: younger individuals presented higher levels of physical activity ( $p < 0,001$ ). This result is in agreement with cross-sectional and longitudinal studies that point to a decline in the level of physical activity from 1 to 20% a year, showing a tendency for the proportion of inactive individuals to increase as they become older<sup>(17)</sup>.

The level of physical activity in the studied sample was significantly lower for people from the interior when compared to those from the capital. This result differs from previous research in which people from the metropolitan area of São Paulo presented lower levels of physical activity compared to people from the interior and coast<sup>(18)</sup>. It is important to keep in mind demographic differences between the two states. In the case of Fortaleza, Ce, Brazil, for instance, its metropolitan region includes the coast. Hence, comparison between the two studies is limited because in the article mentioned above<sup>(18)</sup>, people who lived on the coast of São Paulo presented the highest levels of physical activity, which matches the results from this study.

Low and moderate levels of physical activity identified in this study were possibly influenced by socioeconomic conditions, considering that a large part of the study population has low *per capita* income, which can reduce the free time people have available for physical activity, that is, they have to fill out most of their time with labor activities. In addition, there is a higher chance of these individuals to be relatively misinformed regarding the benefits of physical activity to health.

In this context, we noted the need for further research focusing on the development of strategies that encourage the adoption of regular physical activity as a way to control and prevent health problems.

Comparison of this study's results with other studies was limited because other authors re-codified the three levels of physical activity proposed by the

IPAQ according to the objective of their studies. Another point that deserves attention was the participants' difficulty in recollecting information. Due to questionnaire length and details in relation to how many times and how long activities were performed, there was the perception that, oftentimes, participants only estimated these values, which hindered a reliable collection of essential information to develop this study. Thus, these results should be considered with caution and confirmed in other populations and age ranges.

It is important to highlight that nurses have considered the evaluation of physical activity as a nursing diagnosis, referring to it as a sedentary lifestyle. However, in researching this diagnosis, one

still needs instruments and strategies that enable accurate measurement/verification of the characteristics that define this human response. In this perspective, a sedentary lifestyle is a diagnosis that presents defining characteristics difficult to measure and for which the IPAQ has the potential to provide a more accurate evaluation. Finally, given the scope and complexity of the sedentariness problem, we stress the need to change this condition through the supplementation and expansion of actions able to influence the behavior of populations with a view to promote physical activity so as to diminish the prevalence of hypertension and also health complications due to this disease.

## REFERENCES

1. Colombo RCR, Aguillar OM. Estilo de vida e fatores de risco de pacientes com primeiro episódio de infarto agudo do miocárdio. *Rev Latino- am Enfermagem* 1997 abril; 5(2):69-82.
2. Simonetti JP, Batista L, Carvalho LR. Hábitos de saúde e fatores de risco em pacientes hipertensos. *Rev Latino- am Enfermagem* 2002 maio-junho; 10(3):415-22.
3. Benedetti TB, Mazo GZ, Barros MVG. Aplicação do Questionário Internacional de Atividades Físicas para avaliação do nível de atividades físicas de mulheres idosas: validade concorrente e reprodutibilidade teste-reteste. *Rev Bras Ciên e Mov* 2004 janeiro-março; 12(1):25-34.
4. Siqueira FV, Facchini LA, Piccini RX, Tomasi E, Thumé E, Silveira DS, et al. Atividade física em adultos e idosos residentes em áreas de abrangência de unidades básicas de saúde de municípios das regiões Sul e Nordeste do Brasil. *Cad Saúde Pública* 2008 janeiro; 24(1):39-54.
5. International Physical Activity Questionnaire [homepage on the Internet]. Sweden: Karolinska Institutet [updated 2008 jul]. Guidelines for data processing and analysis of the International Physical Activity Questionnaire: short and long form; [1 scren]. Available from: <http://www.ipaq.ki.se/scoring.pdf>
6. Simão M, Hayashida M, Santos CB, Cesarino EJ, Nogueira MS. Hipertensão arterial entre universitários da cidade de Lubango, Angola. *Rev Latino-am Enfermagem* 2008 julho-agosto; 16(4):672-8.
7. Gus I, Harzheim E, Zaslavsky C, Medina C, Gus M. Prevalência, Reconhecimento e Controle da Hipertensão Arterial Sistêmica no Estado do Rio Grande do Sul. *Arq Bras Cardiol* 2004 novembro; 83(5):424-8.
8. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: WHO; 2000 (WHO technical report series, 894).
9. Jardim PCB, Gondim MRP, Monego ET, Moreira HG, Vitorino PVO, Souza WKS, et al. Hipertensão arterial e alguns fatores de risco em uma capital brasileira. *Arq Bras Cardiol* 2007 abril; 88(4):452-7.
10. Taveira LF, Pierin AMG. O nível socioeconômico pode influenciar as características de um grupo de hipertensos? *Rev Latino-am Enfermagem* 2007 setembro-outubro; 15(5):929-35.
11. Costa JSD, Barcellos FC, Sclowitz ML, Sclowitz IKT, Castanheira M, Olinto MTA, et al. Prevalência de hipertensão arterial em adultos e fatores associados: um estudo de base populacional urbana em Pelotas, Rio Grande do Sul, Brasil. *Arq Bras Cardiol* 2007 janeiro; 88(1):59-65
12. Bloch KV, Rodrigues CS, Fiszman R. Epidemiologia dos fatores de risco para hipertensão arterial – uma revisão crítica da literatura brasileira. *Rev Bras Hipertens* 2006 abril-junho; 13(2):134-43.
13. Feijão AMM, Gadelha FV, Bezerra AA, Oliveira AM, Silva MSS, Lima JWO. Prevalência de Excesso de Peso e Hipertensão Arterial em População Urbana de Baixa Renda. *Arq Bras Cardiol* 2005 janeiro; 84(1):29-33.
14. Carneiro G, Faria NA, Ribeiro FF Filho, Guimarães A, Lerário D, Ferreira SGF, et al. Influência da distribuição da gordura corporal sobre a prevalência de hipertensão arterial e outros fatores de risco cardiovascular em indivíduos obesos. *Rev Assoc Med Bras* 2003 julho-setembro; 49(3):306-11.
15. Castro RAA, Moncau JEC, Marcopito LF. Prevalência de hipertensão arterial sistêmica na cidade de Formiga, MG. *Arq Bras Cardiol* 2007 março; 88(3):334-9.
16. Hallal PC, Victora CG, Wells JCK, Lima RC. Physical Inactivity: Prevalence and Associated Variables in Brazilian Adults. *Med Sci Sports Exerc* 2003 November; 35(11):1894-900.
17. Alves JGB, Montenegro FMU, Oliveira FA, Alves RV. Prática de esportes durante a adolescência e atividade física de lazer na vida adulta. *Rev Bras Méd Esporte* 2005 setembro-outubro; 11(5):291-4.
18. Matsudo SM, Matsudo VR, Araújo T, Andrade D, Andrade E, Oliveira LC, et al. Nível de atividade física da população do Estado de São Paulo: análise de acordo com o gênero, idade, nível socioeconômico, distribuição geográfica e de conhecimento. *Rev Bras Ciên e Mov* 2002 outubro; 10(4):41-50.