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Physical Activity, Hypertension Control and Quality of Life in Primary Health Care

Original research

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Abstract

Background: Physical activity in hypertensive patients may be associated with blood pressure (BP) control, and this control may be associated to a better quality of life(QoL). Thus, the objective of this study is to describe physical activity and QoL in hypertensive patients in primary health care, and the correlation of these variables with BP control measured through 24-hour Ambulatory Blood Pressure Monitoring (ABPM).

Methods: Cross-sectional study with 143 hypertensive patients seen in a primary health center in the south of Brazil. QoL (WHOQOL Bref) and physical activity (IPAQ – short version) were evaluated, followed by the application of 24-hour ABPM. **Results:** All patients were classified as sedentary or irregularly active and no patient was considered active. Sixty-one percent of sedentary patients and 49.3% of patients who were irregularly

active presented high BP. QoL was associated to ABPM alterations, especially with significant lower QoL in the physical domain in the 24-hour ABPM (p=0.05). **Conclusions:** Quality of life was positively associated to adequate control in hypertensive patients in primary health care. Physical activity, even if irregular, was associated with better BP control when compared to a sedentary lifestyle.

Keywords: Physical Activity, Systemic Arterial Hypertension, Quality of Life.

Introduction

Systemic arterial hypertension (SAH) has a prevalence between 22 and 44% in adults [1], and represents the most important isolated risk factor for mortality [2] and the main modifiable risk factor for cardiovascular disease [3]. In Brazil, around 17.6% of hospital admissions are due to medical complications related to SAH, which represents, in terms of monetary costs, about 5.9% of the financial resources available in SUS (Brazil's public health system) [4,5]. As a consequence of the growing figures of survival of patients with chronic and/or serious diseases, the importance of evaluating the quality of life (QoL) was recognized and incorporated to clinical research [4]. Thus, preventive and therapeutic interventions should aim not only to the control goals of BP levels, but also to the improvement of QoL [6].

Regular and moderate physical exercise (intentional body movement promoting energy expenditure) [7] may decrease BP by diminishing peripheral sympathetic activity and the activity of the sympathetic tone in the heart. These features, by their turn, determine the decrease of the heart rate (HR) and the consequent decay of cardiac output (CO) and, besides, reduce the level of serum catecholamines and the peripheral vascular resistance (PVR) [8].

Additionally, the regular practice of physical exercise provokes autonomic and hemodynamic adaptations that improve significantly the functioning of the cardiovascular system, providing important clinical implications, considering that it can prevent or even treat SAH [9]. It is known that even acute physical activity presents a hypotensive effect that is clinically relevant, especially in hypertensive individuals, a fact that suggests that physical exercise must be indicated in non-pharmacological treatment of SAH [10]. In this regard, physical activity, which is a kind of non-intentional physical exercise, may favor, in a lesser extent, these benefits to hypertensive individuals. And, when it is associated with pharmacological treatment, it may improve the quality of life of a patient [10]. Thus, there is clear evidence of a correlation between the habits of a hypertensive patient, regarding physical activity and quality of life, and control goals of BP.

We have previously shown that 24-hour ABPM is useful to evaluate BP in the primary care setting [11]. Thus, the objective of the present study was to evaluate the quality of life and the level of physical activity in hypertensive patients in primary care units (PCU), and the association of these habits on the control of BP taken through 24-hour ABPM.

Methods

Participants

The participants of this study were hypertensive who sought care at the primary care centers and were registered on Hiperdia program (a computerized system that enrolls hypertensive and diabetic patients in the public National Health Service) in the town of Antônio Prado (RS) [12]. Antônio Prado (RS) is a town in Southern Brazil with a total population of 12.837 inhabitants [12], which has two primary health care units, and, therefore, the sample of 143 patients represents the city's hypertensive patients.

The patients included were over 18 years old, and they were under pharmacological treatment in the last three months. They were invited by the primary care doctor in order to take part in the study during a routine medical appointment performed between January 2009 and December 2010. Patients who had electrocardiograms with non-sinus rhythm, pregnant women, people who lived outside the area covered by the local health centers, and individuals who were not able to answer the questionnaire were excluded from the study.

A cross-sectional study was carried out and the work was based on a health care center. All the participants of this study agreed with the signed an informed consent term. The project was approved by the Committee of Ethics in Research (CER) (IC/FUC – 4278.08).

All the participants included in this research received a free and informed consent term.

Monitor of Blood Pressure and Measurements

The study used three monitors of ABPM validated and calibrated according to the criteria approved by The British Hypertension Society [13]. The intervals between the measurements of BP through 24-hour ABPM were done every 15 minutes during the period of wakefulness and every 30 minutes during the sleep period. The patients were asked about their sleeping and awakening habits in order to adjust the intervals of BP measurements according to each individual. We regarded as adequate data from at least 70 measurements in a 24-hour period, considering that two registrations, at least, were taken per hour during the night. The parameters evaluated through ABPM were average systolic and diastolic 24-hour BP, and systolic and diastolic BP during the wakefulness and the sleeping periods.

Hypertension Definition

Uncontrolled BP measured in the office was defined through measurements taken by a calibrated sphygmomanometer with values equal or higher than 140/90 mmHg. The results of ABPM (the gold standard test) were analyzed blindly by the researcher in relation to conventional measurements of BP (index test) quality of life and physical activity data. We considered non-controlled hypertension using ABPM as a criteria when the values were, on average, above 130/180 mmHg in a 24-hour period. Considering the values for the wakefulness period, non-controlled BP was defined when the average was above 130/185 mmHg. Absence of nocturnal

dipping was defined as a reduction of BP by ABPM lower or equal to 10% in relation to the diurnal average. White coat hypertension (WCH) was regarded as a condition in which BP is high when it is measured in a doctor's office, but controlled in the other situations [14].

World Health Organization Quality of Life Questionnaire (WHOQOL – Bref)

WHOQOL is an instrument that evaluates the perception of individuals their quality of life. It is a self administered and generic questionnaire and it is not directed to a specific group of people. It accounts for the last 15 days of the patients, and is composed by 26 questions that cover several aspects of daily life, and approaches four domains of quality of life: physical, psychological, environmental, and social relationships. For each aspect of quality of life, the individual may present his answer through scores that range from zero to five, being zero the worst condition, and five the best. In the statistical analysis, the scores were transformed into a scale of 0 – 100, considering that the worst results were closer to zero, and the best closer to 100 [15].

International Physical Activity Questionnaire (IPAQ – short version)

This instrument measures the level of physical activity [16] of the individuals, presenting the length and the intensity of the physical activity during an "ordinary" week, considering occupational activities as well as locomotion, leisure or sports played. In order to classify the level of physical activity, individuals who performed at least 150 minutes of physical activity per week, distributed in five or more days in the week, were considered physically active, whereas sedentary individuals were those who performed physical activity for less than 10 minutes per day. Individuals who related to perform physical activity, but did not follow the proposed recommendations, were considered insufficiently or irregularly active and the individuals who responded that they did not perform any physical activity were considered sedentary.

Biochemical Analysis and Lifestyle

A review of clinical forms was done, and the researcher requested complementary biochemical examinations, considering the following items: lipid profile, creatinine, potassium, high-sensitivity C-reactive protein (hs-CRP), fibrinogen, complete blood count, A1c hemoglobin, microalbuminuria and glycemia. Weight, height, body mass index, waist-hip ratio and the habit of smoking and/or consuming alcohol were evaluated.

Statistical Analysis

The input and analysis of data were performed through the statistical program SPSS 17.0. Continuous parametric data are presented as absolute frequencies, and demonstrated as mean and standard deviation (M ± SD). In order to compare the difference between the means of the variables, Student's t-test and chi-square test for independent samples were used. Statistical significance was considered at $p<0.05$. The mains objective of the

study was to assess the accuracy of blood pressure measurement from a total of 618 patients registered at the clinic of hypertension in the primary care. Having estimated the concordance between conventional measurements of BP and 24-hour ABPM with a probability of BP control with ABPM of 30% and 10% of control with a conventional measurement, with a CI of 95% and a power of 80%, the estimated sample size was 142 patients.

Results

There were a total of 146 hypertensive patients registered on Hiperdia Program in the primary health centers of the city of Antônio Prado (RS) during the period of January 2009 and December 2010. Three of the patients were subsequently excluded due to abandon of protocol.

An ABPM was performed, in the 143 patients that were part of the inclusion criteria. The ABPM was performed 10 minutes after their BP was measured in the doctor's office. The studied population was constituted mainly by women (67%) and, white patients (79.6%), with an average age of 59.8 ± 12.7 years old. Moreover, 21% had diabetes, 63.6% presented high cholesterol level, 9.2% were smokers, 16.1% used to drink regularly and 32.6% were obese (Table 1). All the patients used anti-hypertensive medication.

Variables	Frequency in Percentage and Average
Demographic Variables	
N	143
Sex, Female	96 (67%)
Age	59.8 (29 – 89)
White	113 (79.6%)
Diabetic	30 (21%)
Inflammatory markers	
Hs-CRP > 3 (mg/dL)	59 (41.3%)
Fibrinogen > 400 (mg/dL)	42 (29.37%)
Metabolic descriptors	
Glycated hemoglobin A1C (%)	6.19 (4.4 – 13.14)
Glucose fasting (mg/dL)	101 (53 – 282)
Microalbuminuria (mg/g creatinine)	91.9 (1.3 – 3471)
Lipid variables	
Total cholesterol (mg/dL)	212.55 (125 – 362)
HDL (mg/dL)	49.15 (22 – 91)
LDL (mg/dL)	130.7 (55 – 265)
Triglycerides (mg/dL)	164.13 (50 – 626)
Anthropometric data	
BMI, Kg/m2	27.98 (19.8 – 47.9)
Normal	30.5%
Overweight	36.9%
Obesity	32.6%
Waist/Hip	1.52
Lifestyle	
Smokers	13 (9.2%)
Alcohol use > 5 drinks per day	23 (16.1%)

Table 1. Descriptive Characteristics of the Sample

Regarding BP control measured by ABPM , 79 patients (55.2%) were identified as presenting controlled systolic arterial hypertension (SAH) (<130/80 mmHg), 103 (72%) presented absence of BP nocturnal dipping, and 60 (41.9%) were not controlled during the period of wakefulness (Figure 1).

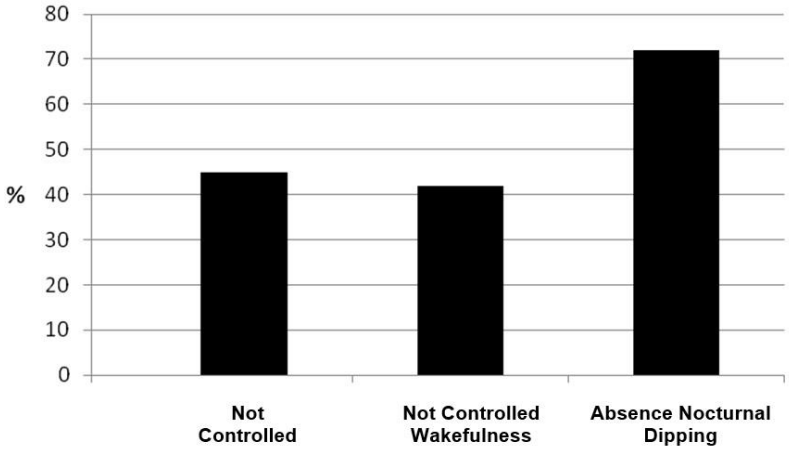

Figure 1. Findings Measurements of 24-hour ABPM, Antonio Prado – 2011.

Regarding the level of physical activity, obtained through IPAQ, there were 71 patients classified themselves as irregularly active (49.7%) and 72 patients as sedentary (50.3%). No patient was considered active according to IPAQ criteria. Considering the level of physical activity and 24-hour ABPM, we observed that 61.1% of the sedentary patients presented an alteration in 24-hour ABPM (>130/80 mmHg), whereas 49.3% of the irregularly active individuals presented this alteration (Figure 2).

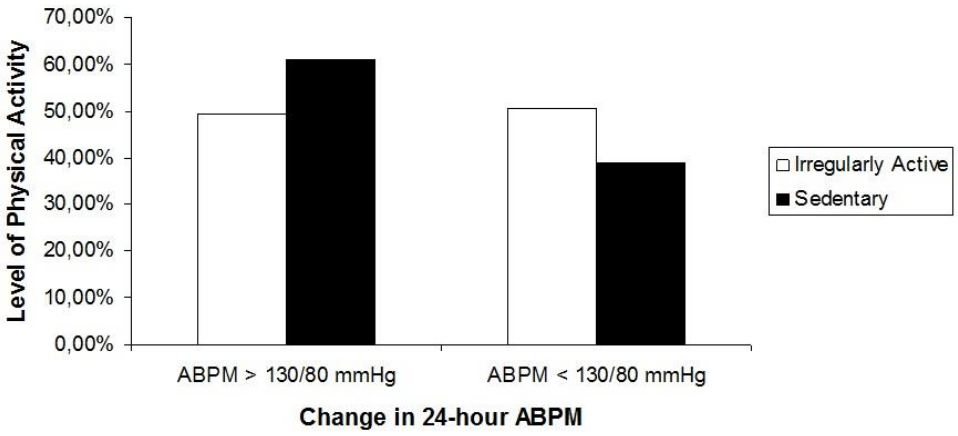

Figure 2. Influence of Physical Activity on Change in 24-hour ABPM. Significant p ($p<0.05$).

When the association between physical activity and quality of life was analyzed, we observed a significant difference between the groups in the physical domain ($p=0.032$). The group composed by the patients who were irregularly active presented less pain, discomfort and fatigue (51.68 ± 18.61) when compared to the sedentary group (58.55 ± 18.67) (Figure 3).

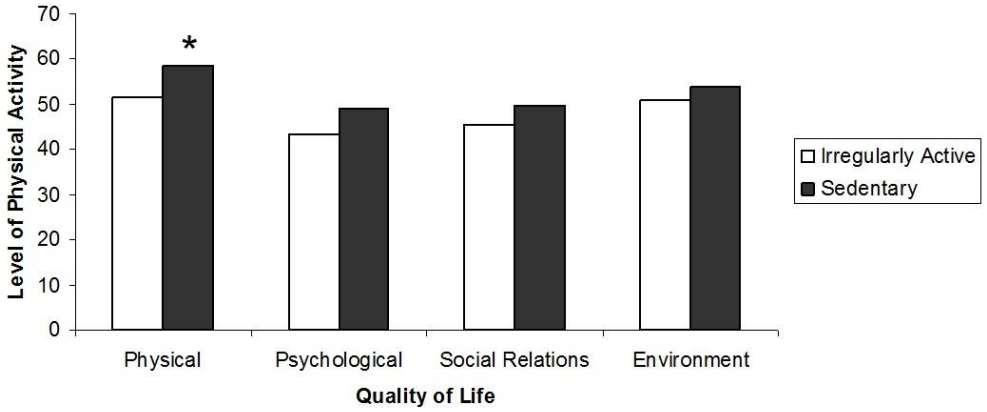

Figure 3. Influence of Physical Activity on Quality of Life. Significant p ($p<0.05$); *p=0.032.

Low quality of life directly influenced the alteration of 24-hour ABPM, and in the physical domain we observed a significant alteration of 24-hour ABPM (>130/80 mmHg) (p=0.05), as can be seen in Figure 4.

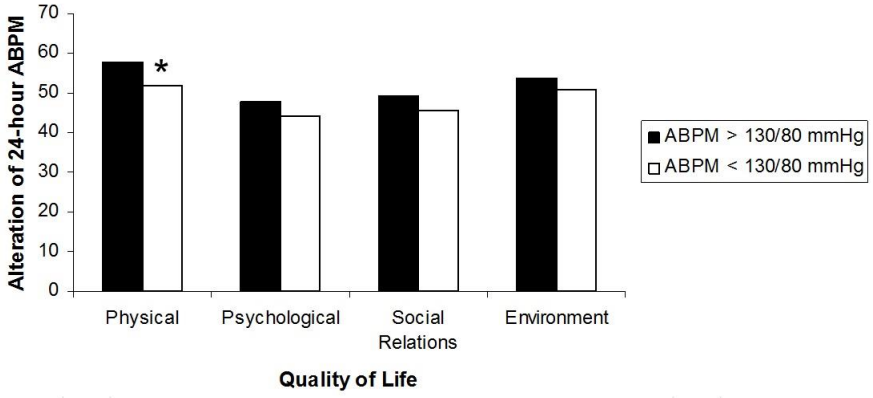

Figure 4. Influence of Quality of Life Changes in 24-hour ABPM. Significant p ($p<0.05$); *p=0.05.

Discussion

In this study with hypertensive patients in a primary care setting, quality of life was positively associated to adequate BP control, and physical activity was associated with higher quality of life scores, especially in the physical domain.

Aerobic and resistance exercise are related with a decrease in BP [17,18], and may reduce the incidence of hypertension. These findings are important in the search for SAH control, considering that the prevalence of hypertension in American adults increase from 25.8% in 2005 to 28.3% in 2009, with a concomitant increase in the use of antihypertensive medication that includes 62.6% of the individuals for the same group of patients [19]. Moreover, a recent study showed that an equivalent amount of energy is spent in a moderate exercise (walking) compared to a vigorous exercise (running), which allows the same reductions in the risk of SAH, hypercholesterolemia, diabetes mellitus and possible heart diseases [20]. In the same way, our findings show that, even if irregularly active, the patients who perform physical activity present more benefits in terms of a

lower percentage in the alteration of uncontrolled ABPM when compared to the sedentary group. The data reinforce the real benefits of physical activity – cardiorespiratory, metabolic, circulatory, muscular, and cognitive [21,9] – which contribute to the prevention of heart diseases or help restoring these functions if the disease is already developed in the patient.

If we transpose the benefits of aerobic physical exercises to numbers, exercises of low to moderate intensity performed 3 to 5 times a week, in periods of at least 30 minutes, are capable to reduce BP levels of hypertensive patients, reducing 7.4 mmHg in systolic pressure and 5.8 mmHg in diastolic pressure [14] In another study, the authors observed the reduction of BP in relation to the intensity of physical activity, regardless of the frequency it is performed [18]. Thus, physical activity programs may be customized to hypertensive patients in primary care [22].

The increase in the survival of patients who suffer from chronic diseases raised the attention of researchers who have carried out clinical studies to evaluate the quality of life in these populations [4]. In this regard, the reductions of BP has been shown to presents a positive mental effect in the mood and cognitive functioning, and in the physical functioning and vitality in elderly patients [23].

In the present study, we observed a high frequency of symptoms in the physical domain, such as pain, discomfort or fatigue. This symptoms influence significantly the quality of life of hypertensive patients. In a study by Brito et al. [24], the authors evaluated the impact of SAH in Health-related quality of life (HRQoL) showing that in spite of the fact that the patients considered their disease as a curable condition and not a serious problem, there was an interference in certain domains of HRQoL. In another study, Trevisol et al. [25] correlated the impact of SAH on HRQoL, in a situation in which the hypertensive patients, when compared to normotensive patients, presented an impairment in the physical domain in the evaluation of HRQoL. However, two other studies [26,27] reported that hypertensive patients have worse QoL when BP is controlled with medication. This could be due to labeling effect, medication's side effects, comorbities and other confounding factors. The present study adding the aspect of BP control using 24-hour ABPM as an auxiliary tool, and observed a worse quality of life, considering the physical domain of WHOQOL, in those patients who did not present a control of their BP evaluated by 24-hour ABPM.

Assuming that physical activity has benefits on cardiorespiratory, metabolic, circulatory, muscular and cognitive functions, the reduction of BP provokes an improvement in the quality of life because it influences these physiological aspects, contributing significantly to the recovery of body functions [21, 9].

Due to the fact that our sample was constituted mainly by women, other relevant aspects should be considered, such as the finding that elevated values of BP in women have been associated with an increase in the incidence of depression [28], and with a lower level of social activity. The evaluation of physical activity and quality of life of the hypertensive patient must also be performed in a social context in which other variables can be important. Thus, the control of hypertension improves HRQoL, whereas an increase in the use of anti-hypertensive drugs is related to the deterioration of HRQoL, a feature that highlights the importance of adherence to the indicated treatment [25,29].

The small sample size is a limitation of our study. However, when we consider the sample, the total number of patients selected for the study is representative of the hypertensive individuals who are attended in

primary care units in the town Antonio Prado, a small city, and our purpose was to study this specific group of patients, that receive care away from the reference centers in the state capitals.

Thus the concept of health-related quality of life is commonly used in clinical research to assess pharmacological care and the improvement in the results of the treatment [6]. Nevertheless, the incorporation of an evaluation of physical activity and the control of BP through 24-hour ABPM in hypertensive patients from primary care units is a contribution of our study that may help to establish public policies in the health care of hypertensive patients.

Conclusions

The control of BP in hypertensive patients in primary care units, performed through 24-hour ABPM, was associated with lifestyle of patients who do physical activity, even if in an irregular way, and who present a better quality of life, especially in the physical domain. In this context, the regular performance of physical activity, which characterizes physical exercise and the search for a better quality of life, may constitute essential procedures for hypertension control.

Competing Interests

The present study was created and carried out in an independent way by its authors and did not need financial support for its execution. So, the authors declare that there are no conflicts of interest.

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