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Original Article

LEVEL OF PHYSICAL ACTIVITY AND THE OCCURRENCE OF CHRONIC DISEASES IN PATIENTS OF THE PUBLIC HEALTHCARE SYSTEM IN PRESIDENTE PRUDENTE-SP

NÍVEL DE ATIVIDADE FÍSICA E OCORRÊNCIA DE DOENÇAS CRÔNICAS EM PACIENTES ATENDIDOS PELO SISTEMA ÚNICO DE SAÚDE DE PRESIDENTE PRUDENTE-SP

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ABSTRACT
Aging is associated with a higher prevalence of chronic diseases, which can be minimized by a healthy and active lifestyle. The aim of this study was to analyze the occurrence of chronic diseases in Public Healthcare System patients, according to the level of physical activity. In total 542 patients, 29.7% (n = 161) male and 70.3% (n = 381) female, were evaluated in two Basic Health Units. The level of physical activity, presence of diseases and economic condition were verified through the use of questionnaires. Obesity was assessed using the Body Mass index (in kg/m²). Cardiac arrhythmia diseases (p = 0.033), arthritis/osteoarthritis (p = 0.010) and a herniated disc (p = 0.006) were associated with the level of physical activity. It is concluded that the level of physical activity is associated with the occurrence of chronic diseases in patients over the age of 50 years served by the Public Healthcare System of Presidente Prudente/SP city.
Keywords: Public Healthcare System. Chronic diseases. Physical activity.

RESUMO
O envelhecimento está associado a maior prevalência de doenças crônicas não transmissíveis, fato que pode ser minimizado em decorrência de estilo de vida saudável e ativo. O objetivo deste estudo foi analisar a ocorrência de doenças crônicas em pacientes atendidos pelo Sistema Único de Saúde, de acordo com o nível de atividade física. Participaram 542 pacientes, 29,7% (n=161) do sexo masculino e 70,3% (n=381) feminino, que foram avaliados em duas Unidades Básicas de Saúde. O nível de atividade física, presença de doenças e condição econômica foram verificados através de questionários. Obesidade foi verificada utilizando o índice da Massa Corporal (em Kg/m²). As doenças arritmia cardíaca (p=0,033), artrite/artrose (p=0,010) e hérnia de disco (p=0,006) foram associadas com o nível de atividade física. Conclui-se que o nível de atividade física está associado ao acometimento de doenças crônicas não transmissíveis em pacientes com idade acima de 50 anos atendidos pelo Sistema único de Saúde de Presidente Prudente/SP.
Palavras-chave: Sistema Único de Saúde. Doenças crônicas. Atividade física.

Introduction

The increase in the elderly population represents a global phenomenon[1] which is related to a higher occurrence of non-transmittable chronic diseases (NTCD)[2]. NTCDs are the main cause of death in the world[3], impacting on health expenditures[4,5]. In Brazil, NTCDs have become prominent in recent years[6], being responsible for 72% of the cases of death in the country, affecting mainly the elderly population[7,8].

Physical inactivity has great impact on health. Evidence shows that physical inactivity increases the risk of comorbidities related to the development of several NTCDs, especially coronary diseases, type 2 diabetes, breast and colon cancer[9-11]. These conditions represent a significant public health problem[9-11].

Aging is not necessarily related to the development of NTCDs[12], which could be prevented with the control of variables such as body weight, blood lipids, glucose and blood pressure. In this way, preventive attitudes such as regular physical activity practice and a healthy diet are fundamental[13,14]. Improvements in physical activity practice do not interrupt the aging process, but could decrease the physiological effects[15], helping in health promotion, increasing general wellbeing and productivity, improving cardiovascular health and decreasing, chronically, systemic inflammatory conditions[16-19]. However, although physical activity prevents the development of diseases, its impact on chronic diseases in patients of the Brazilian National Health System is still unclear[20], mainly because studies on this issue are scarce.

Thus, the aim of the present study was to analyze the occurrence of chronic diseases in patients of the Brazilian National Health System, according to their level of physical activity.

Methods

Sample design

A descriptive study with a cross sectional design that evaluated 543 adults of both sexes, aged ≥50 years old (mean of 61.9 ± 9.2 years old), attended by two Basic Healthcare Units (BHU) in the city of Presidente Prudente (~200,000 habitants), located in western Sao Paulo State.

The Municipality Health Department indicated both BHUs, taking into account their localization in highly populated metropolitan areas. The data were collect by trained Physiotherapy and Physical Education undergraduate and post-graduate students. During the morning, for 60 days, all patients attended in the BHU were invited to take part in the research, if they fulfilled all inclusion criteria: i) aged ≥ 50 years old; ii) up to date medical records (at least one consultation in the previous six months), iii) signed the Written Consent Form. The patients that agreed to participate were asked to sign the Written Consent Form. The study followed the ethical principles, according to National Health Council resolution number 466/12, and was approved by the Ethical Committee of Sao Paulo State University, Presidente Prudente (process number 241.291/2013).

Physical Activity Level

The Baecke questionnaire was used to analyze the physical activity level[21]. The questionnaire is translated into Brazilian Portuguese [22], and is composed of 16 questions using a Likert scale. The questionnaire identifies the physical activity level in three domains (occupation, exercise/sport, and leisure/locomotion) and the sum of all domains represents the habitual physical activity. The patients were divided into quartiles using their habitual physical activity score[20], being classified as: i) Active (P≥P75), ii) Moderately Active (P25 and P50), and iii) Inactive (≤P25).

Diagnoses of chronic diseases

The diagnosis of chronic diseases was evaluated through the use of a self-reported questionnaire, proposed by Freitas Júnior et al.[23], which is composed of information about the date of diagnosis and medicine use. In this study, the diseases evaluated were arterial hypertension (AH), dyslipidemia (DLP), diabetes mellitus (DM), arrhythmia (ARTM), stroke (STK), angina (ANG), osteoporosis (OSTP), arthritis and arthrosis (ART-AT), herniated disc (HERN), low back pain (LBP) and scoliosis (SCO).

Overweight/Obesity

The Body Mass Index (BMI) was calculated using values of body weight (kg) and height squared (m) (kg/m^2). The patients were classified according to the cutoffs proposed by the World Health Organization (WHO), being eutrophic 18.5 to 24.9 kg/m^2, overweight 25 to 29.9 kg/m2 and obese ≥ 30 kg/m^2. There was no cases of BMI <18.5 kg/m^2.

Car and television ownership

The questionnaire developed by the Brazilian Association of Research Companies[24] is used to analyze economic condition through information about schooling of the family head and possession of domestic items. For the present research, information about possession of cars (no car, 1 car and ≥2 cars) and televisions (none or 1 television, 2 televisions and ≥3 televisions) was used.

Statistical Analysis

The descriptive statistics were composed of percentage values. The chi-square analyzed associations between the dependent variables (chronic diseases – metabolic, cardiovascular and musculoskeletal) and the independent variable (physical activity level). Multivariate models were built using binary logistic regression, adjusted by sex, age and BMI. The measurement of effect sizes of the associations were expressed as odds ratio (OR) values and their 95% confidence intervals (95%CI). In all analyzes, the significance level was set at p-value <0.05 and the statistical software used was BioEstat (5.0 version).

Results

The sample was composed of 542 patients, 29.7% males (n=161) and 70.3% females (n=381). There were no significant differences between physical activity level and the variables: sex, age, number of cars, number of televisions and BMI (Table 1).

Table 1. Physical activity level according to possible determinants in Brazilian National Health System patients.

Variables	Outcome (physical activity level)	
	Active (≥P75)	*p*-value $^{\text{chi-square}}$
Sex		0.339
Male	28.1%	
Female	23.6%	
Age		0.079
<65 years old	27.5%	
>65 years old	20.2%	
Car		0.667
None	22.2%	
01 Car	27.9%	
≥02 Cars	18.8%	
Television		0.105
0-1 Television	27.2%	
02 Televisions	24.6%	
≥03 Televisions	17.1%	
BMI		0.338
Eutrophic	20.9%	
Overweight	25.8%	
Obese	26.1%	

Notice: BMI= body mass index.
Source: The authors

Table 2 presents the association between physical inactivity and metabolic, cardiovascular and musculoskeletal diseases. Arrhythmia (p-value=0.033), arthritis/arthrosis (p-value 0.010) and herniated disc (p-value=0.006), presented associations with physical activity level.

Table 2. Associations (chi-square test) between physical inactivity and metabolic, cardiovascular and musculoskeletal diseases in Brazilian Health Care System patients.

Physical	Diseases reported by patients of the Unified Health System, Presidente Prudente – SP									
Activity	AH	DLP	DM	**ARTM**	STK	ANG	OSTP	**ART-AT**	**HERN**	LBP	SCO
Inactive	67.2%	28.2%	24.4%	**21.4%**	7.6%	12.2%	16.1%	**55%**	**32.8%**	35.1%	25.2%
M. Active	60.9%	33.7%	22.2%	**14.5%**	2.9%	4.7%	15.2%	**43.5%**	**22.1%**	27.5%	13.4%
Active	58.5%	18.5%	21.5%	**11.9%**	8.9%	7.4%	11.1%	**39.3%**	**18.5%**	27.4%	20,%
p-value$^{chi-squre}$	0.148	0.075	0.567	**0.033**	0.634	0.136	0.251	**0.010**	**0.006**	0.171	0.362

Notice: M. Active= moderately active; AH= arterial hypertension; DLP= dyslipidemia, DM= diabetes mellitus, ARTM=arrhythmia, STK= stroke, ANG= angina, OSTP= osteoporosis, ART-AT=arthritis and arthrosis, HERN= herniated disc, LPB= low back pain and SCO= scoliosis.
Source: The authors.

When only variables associated with level of physical activity were analyzed, the logistic regression model (adjusted by sex, age and BMI) demonstrated that physically inactive patients have 2.04 more chances of presenting arrhythmia, and 2.17 and 2.73 more chances of presenting arthritis/arthrosis and herniated disc, respectively, than physically active patients (Table 3).

Table 3. Associations between physical activity level and occurrence of chronic diseases in Brazilian Health Care System patients.

Physical Activity Level	ARTM OR* (CI95%)	ART-AT OR* (CI95%)	HERN OR* (CI95%)
Active	1.00	1.00	1.00
Moderately Active	1.28 (0.68 to 2.40)	1.10 (0.71 to 1.71)	1.33 (0.78 to 2.27)
Inactive	**2.04 (1.03 to 4.02)**	**2.17 (1.30 to 3.64)**	**2.73 (1.51 to 4.93)**

Notice: OR= odds ratio; CI95%= 95% confidence interval. *=adjusted by sex, age and BMI.
Source: The authors.

Discussion

This cross-sectional study found associations between physical activity level and chronic diseases in patients aged ≥50 years old, attended by the Brazilian National Health System in Presidente Prudente, Brazil.

Taking into account all cardiovascular diseases investigated, only arrhythmia presented association with physical activity level. Although data about the relationship between arrhythmia and habitual physical activity are scarce, the scientific literature supports the link between higher physical activity level and lower mortality from cardiovascular causes[25-29]. Even in patients with cardiac insufficiency, the practice of walking significantly increases the heart ejection force[30]. In the same way, in addition to the traditional mechanisms involving physical activity practice and better cardiovascular health, new research has

suggested that regular physical activity could mobilize stem cells, which in turn, could regenerate injuries in cardiac tissue[31].

This kind of information is important to professionals working with physical exercise in BHUs and is useful to raise awareness in decision makers in public health of the importance of stimulating active lifestyles among patients of the Brazilian National Health System. The principles related to health care have improved significantly in Brazil since the 80s, due to the creation of the Brazilian National Health System[32]. However, constant improvement is necessary[33], highlighting the need to increase actions to promote physical exercise in BHUs, as well as to guide patients about the benefits of a healthy lifestyle in the prevention of comorbidities related to chronic diseases[34.35].

Regarding musculoskeletal diseases, in the present study, physically inactive adults presented a higher occurrence of arthritis/arthrosis and herniated disc. Arthritis and arthrosis are more frequent in individuals aged ≥45 years old, contributing to the profile of a low quality of life in the older population. However, physical exercise interventions could be an efficient treatment for this group of diseases since a higher physical activity level in these patients is related to better physical functions. Data from a middle-size Brazilian city show that in about 200 elderly individuals attended by BHUs, arthritis and arthrosis were the second most prevalent chronic diseases in this population. In this way, physical activity practice can contribute to a decrease in the occurrence of these diseases, being important in actions to promote health in BHUs.

With respect to musculoskeletal diseases, the presence of a herniated disc also presented association with physical activity level. Although in our study a direct relationship between these variables was not found, it is possible to hypothesize that physical inactivity is associated with higher scores of obesity, a variable related to the appearance of a herniated disc; obese individuals present 12 times more chances of presenting a herniated disc when compared to non-obese individuals[39].

As limitations of this study, it is possible to highlight the cross-sectional design that does not allow establishment of cause and effect, so it should be stated that symptoms of the diseases investigated could preclude physical exercise practice. The self-reporting of chronic disease information (disease diagnosis) is also a limitation since there is the possibility of memory error or unreliability. On the other hand, to attenuate this limitation, information about diseases was confirmed in the medical records. Lastly, it is necessary to point out that only 2 BHUs were evaluated which could lead to selection bias, although both units are in highly populated metropolitan areas, it is possible that the profile would not be the same in other regions of Presidente Prudente city, in this way, generalizations should be made with caution.

Conclusion

Physical activity level was associated with the occurrence of chronic diseases such as arrhythmia, arthritis/arthrosis and a herniated disc in patients aged ≥ 50 years old, attended by the Brazilian National Health System in a middle-size Brazilian city. It is recommend that other research, especially longitudinal, which overcomes the causality limitations in the present study, as well as broader and more comprehensive studies involving physical activity practice and healthcare costs in basic healthcare systems be carried out, as studies of this nature in BHUs are very rare and therefore extremely necessary.

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