

PREVALENCE OF CHRONIC DISEASES AND USE OF MEDICINES AMONG ELDERS PRACTICE SUPERVISED PHYSICAL ACTIVITY

Prevalência de doenças crônicas e uso de fármacos em idosos praticantes de exercício físico supervisionado

Prevalencia de enfermedades crónicas y el uso de fármacos en mayores que practican actividad física supervisada

Original Article

ABSTRACT

Objective: To assess the prevalence of chronic diseases and use of medicines among elders who practice supervised physical activity. **Methods:** The study was conducted from September to October 2011 with 148 individuals, aged over 60 years, women (N = 109) and men (N = 39) who practiced supervised physical activity, divided into Group 1 – water aerobics, Group 2 - weight training, and Group 3 - gymnastics / walking. It was used a questionnaire with general questions (gender, age, type of exercise) and closed-ended questions about health problems and use of medicines. Descriptive statistics (mean and standard deviation), absolute and relative frequency, and Chi-Square test were used for data analysis with a significance level of $p < 0.05$. **Results:** There was a high prevalence of diseases of the metabolic, endocrine, cardiovascular and musculoskeletal systems among women in the three groups. There was a higher prevalence of musculoskeletal disorders among men in the three groups. Regarding the use of medicines, all groups presented a higher prevalence of antihypertensive medication use by both genders. **Conclusion:** There was no significant difference (for both genders) in the prevalence of self-reported chronic diseases affecting organ systems among the groups of elders who practiced physical exercise. There was a high prevalence of elders affected by disorders relating to the musculoskeletal system and use of antihypertensive medication.

Descriptors: Elderly; Exercise; Epidemiology; Chronic Disease; Pharmacology.

RESUMO

Objetivo: Verificar a prevalência de doenças crônicas e o uso de fármacos em idosos praticantes de exercício físico supervisionado. **Métodos:** Estudo realizado no período de setembro a outubro de 2011, com amostra composta por 148 indivíduos com idade acima de 60 anos, dos gêneros feminino (n=109) e masculino (n=39), que praticam exercício físico supervisionado, distribuídos, conforme a modalidade, em Grupo 1 (hidroginástica), Grupo 2 (musculação) e Grupo 3 (ginástica/caminhada). Utilizou-se um questionário com perguntas gerais (gênero, idade, tipo de exercício físico) e fechadas acerca dos agravos associado à saúde e ao uso de substância medicamentosa. Para análise dos dados, verificou-se a estatística descritiva (média e desvio padrão), as frequências absoluta e relativa e o Teste Qui-Quadrado, com nível de significância de $p < 0,05$. **Resultados:** Com relação ao gênero feminino, houve, nos três grupos, alta prevalência de doenças relacionadas aos sistemas endócrino metabólico, cardiovascular e osteomuscular. No gênero masculino, houve maior prevalência, nos três grupos, de indivíduos praticantes de exercício físico acometidos por distúrbios osteomusculares. No que diz respeito ao uso de fármacos, todos os grupos apresentaram maior prevalência na utilização de fármacos anti-hipertensivos, em ambos os gêneros. **Conclusão:** Não se verificou diferença significativa na prevalência autorreferenciada de doenças crônicas por sistemas orgânicos entre os grupos praticantes de exercício físico, tanto no gênero feminino como no masculino. Constatou-se alta prevalência de idosos acometidos por distúrbios relacionados ao sistema osteomuscular e à utilização de fármacos anti-hipertensivos.

Descritores: Idoso; Exercício Físico; Epidemiologia; Doença Crônica; Farmacologia.

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RESUMEN

Objetivo: Verificar la prevalencia de enfermedades crónicas y el uso de fármacos en mayores que practican actividad física supervisada. **Métodos:** Estudio realizado en el periodo de septiembre y octubre de 2011, con una muestra de 148 individuos con edad por encima de 60 años, del género femenino (N=109) y masculino (N=39), que practican actividad física supervisada, dividida según la modalidad en Grupo 1: hidrogimnasia Grupo 2: musculación y Grupo 3: gimnasia/caminata. Se utilizó un cuestionario con preguntas generales (sexo, edad, tipo de actividad física) y con preguntas cerradas sobre los problemas asociados con la salud y el uso de sustancia medicamentosa. Para el análisis de datos, se verificó la estadística descriptiva (media y desviación típica), frecuencia absoluta y relativa y la prueba de Chi-cuadrado, con nivel de significancia de $p < 0,05$. **Resultados:** Hubo elevada prevalencia de enfermedades relacionadas al sistema endocrino metabólico, cardiovascular y osteomuscular en los tres grupos respecto al género femenino. Hubo mayor prevalencia, en los tres grupos, de individuos practicantes de actividad física que presentaban disturbios osteomuscular en el género masculino. Respecto al uso de fármacos, todos los grupos presentaron mayor prevalencia de la utilización de fármacos anti-hipertensivos en ambos géneros. **Conclusión:** No se verificó diferencia significativa en la prevalencia auto-referenciada de enfermedades crónicas por sistemas orgánicos entre los grupos practicantes de actividad física en el género femenino y masculino. Se constató elevada prevalencia de mayores acometidos por disturbios relacionados al sistema osteomuscular y la utilización de fármacos anti-hipertensivos.

Descriptor: Anciano; Ejercicio; Epidemiología; Enfermedad Crónica; Farmacología.

INTRODUCTION

Aging brings with it an overall decline in structure and functionality of organic systems, resulting in the emergence of a range of chronic illnesses. These changes may affect the cardiovascular, immune, endocrine, respiratory, renal and musculoskeletal systems, among others⁽¹⁾.

Chronic non-communicable diseases (NCDs) can affect patients over extended periods of time and be interrupted by acute episodes. Caused by irreversible pathological changes, they lead to residual disability and require special training for rehabilitation. The most common chronic NCDs in elderly patients may be acquired or genetic in nature, but their establishment is often preceded or worsened by long periods of physical inactivity and sedentary lifestyle⁽²⁾.

The aging is accompanied by some physiological changes, such as increased collagen in the cardiovascular system, degradation of myocardial muscle fibers with subsequent atrophy and hypertrophy of the remaining ones,

reduced ATP levels, high systolic arterial pressure, increased incidence of atherosclerosis and narrowing of the arteries⁽³⁾.

Arterial hypertension (AHT) is the main factor implicated in renal, cardiovascular and cerebrovascular complications in the elderly. It is responsible for 40% of deaths from stroke, 25% of deaths from coronary artery disease, and, when combined with diabetes, 50% of cases of terminal kidney failure^(4,5). According to the Brazilian Society of Hypertension, AHT affects 25% of the adult Brazilian population and over 50% of subjects over 60 years⁽⁶⁾.

With regard to the endocrine system, as a result of reduced hormone production, aging patients find it increasingly difficult to recover from wounds and surgical trauma, to deal with heat and cold stress and to maintain normal blood glucose levels⁽⁷⁾.

Changes in the musculoskeletal system include loss of muscle cells, tissue elasticity, bone mass (at 50, the loss is about 30% in women and 17% in men) and joint mobility, in addition to postural deformations as the back becomes arched or kyphotic⁽⁸⁾.

In the gastrointestinal system, the production of saliva, enzymes and gastric juice is reduced, also with reduction of peristaltic mobility, atrophy of the gastric mucosa and loss of ability to absorb nutrients⁽⁹⁾.

The elderly's respiratory system is affected by lung elasticity and complacency decrease, due to changes in elastic and collagenous tissues; dilatation of bronchioles, alveolar ducts and sacs; atrophy of skeletal muscles used in breathing; and reduction in the rib cage⁽¹⁾.

Despite the physiological changes experienced in old age are part of a natural process, the conditions brought about by this process may or may not become severe, having direct impact on health and quality of life⁽¹⁰⁾.

In terms of physical fitness, aging tends to be associated with increased body weight between 40 and 60 years of age, whereas the opposite is true after 70. The elderly experience a gradual reduction of body mass through bone loss leading to loss of free fat mass, in addition to decreased basal metabolic rates, loss of muscle and bone mass and increased body fat⁽¹¹⁾. Thus, seniors practicing physical exercise on a regular basis tend to be more independent than their counterparts that do not. The maintenance of physical ability has positive implications for the quality of life of the elderly as it allows them greater social interaction and independence until later life⁽¹²⁾.

Furthermore, physical exercise might offer acute and chronic physiological benefits. The acute benefits, which are directly associated with the exercise session, are classified as 'immediate' when they occur just after the session and as 'late' when they occur within 24-72 hours. Chronic benefits,

or adaptations, are resulting from frequent and regular exposure to exercise sessions⁽¹³⁾.

Therefore, physical exercise is physiologically complex, as it requires the interaction of many systems, such as the neuromuscular, cardiorespiratory, metabolic, hormonal, digestive, renal and others. Physiological benefits achieved through physical exercise are diverse, including lower incidence of osteoporosis, diabetes, depression, AHT, heart disease, obesity and other illnesses. Exercise might help increase basal metabolism while reducing triglyceride levels, blood pressure, body fat and loss of bone mass, also contributing to improve overall well-being, self-esteem, stamina and sociability⁽¹⁴⁾.

The positive effects of physical exercise are reflected in changes in body composition, lipid and glycemic metabolism, blood pressure, bone density and hormone and antioxidant levels, as documented in experiments with individually adjusted workloads (intensity, duration and frequency) conducted in controlled settings⁽¹⁵⁾.

The aging of human populations worldwide may become a problem to the society, leading to high costs, and this concern is becoming adapted to the current reality about this population. Although the elderly make up slightly more than 10% of the Brazilian population, healthcare spending on this group represents one third of the total national healthcare budget, a figure expected to increase rapidly⁽¹⁶⁾.

The acute and chronic benefits of physical exercise have led researchers to propose physical training as a non-pharmacological strategy to manage a range of chronic NCDs^(1,2,11,17-20).

Due to aging, the number of chronic diseases increases, and, consequently, the need for medications to control them. Thus, at least 85% of seniors take one or even more prescription drugs⁽²¹⁾. Age-related physiological changes might interfere directly in the absorption, distribution, metabolism (biotransformation) and excretion of active compounds, leading to negative effects⁽²²⁾.

Physiological changes associated to the elderly also make pharmacokinetic interactions more common. Such changes refer to increased total adipose tissue and

reductions in gastric juice production, gastric voiding, total water content, plasma protein levels, blood flow, hepatic enzyme activity, renal irrigation, glomerular filtration and tubular secretion, among others, which may induce pharmacokinetic interactions, either positive or negative (diminishing, potentiating or otherwise altering the effects of drugs). They might also trigger severe adverse reactions⁽²³⁾.

The purpose of the present study was to evaluate the prevalence of chronic diseases and the use of prescription drugs among elderly practitioners of supervised physical exercise, in order to subsidize the prescription of physical exercise and reduce risk factors for chronic non-communicable diseases, improving the health promotion for this population.

METHODS

Conducted in September and October 2011, this was a cross-sectional, observational and descriptive study using a quantitative approach⁽²⁴⁾, with population comprising practitioners of physical exercise programs, aged over 60 years, regarded elderly as to the Brazilian Elderly Statute⁽²⁵⁾, residents in the city of Fortaleza-CE.

The sample included 148 seniors (109 females and 39 males) and was divided into 3 groups, according to the type of exercise they practiced: **Group 1 (G1)** - water aerobics, **Group 2 (G2)** - weight training, and **Group 3 (G3)** - gymnastics/walking.

Table I describes the number (N) and average age in years of the study subjects, according to gender and the type of exercise they are engaged in.

Practitioners were included in the sample provided they exercised at least twice a week for at least 50 minutes, for two or more years prior to study entry, and agreed to sign a Free and Informed Consent Form. Subjects under 60 years of age and/or subjects practicing other types of exercise and/or unwilling to complete the questionnaire were excluded from the sample.

The study was conducted at the local where the study subjects performed their activities, attending one of three

Table I - Sample characterization of groups, divided by gender. Fortaleza-CE, 2011.

| | Female | | | Male | | |
|-----------|--------|------|--------------------|------|------|--------------------|
| | n | Mean | Standard Deviation | n | Mean | Standard Deviation |
| G1 | 37 | 69.3 | 7.1 | 18 | 71.1 | 7.4 |
| G2 | 30 | 66.4 | 5.2 | 13 | 69.2 | 7.3 |
| G3 | 42 | 69.6 | 6.6 | 8 | 74.8 | 8.2 |

G1 - Water aerobics

G2 - Weight training

G3 - Gymnastics//walking

supervised exercise programs: *Serviço Social da Indústria - SESI* (a social service program run by the local industry), *Serviço Social do Comércio - SESC* (social service program run by the local commerce) and '*Caminhada da Saúde*' (Health Walking), a program by the Physical Education School at the University of Fortaleza.

A questionnaire designed by the authors was used as the research tool, containing general questions about gender, age and type of exercise, followed by closed-ended questions about the prevalence of chronic diseases and prescription drugs. For the chronic diseases, the organic system were considered: endocrine-metabolic, cardiovascular, musculoskeletal, respiratory and gastrointestinal diseases. On the use of medicines, the options considered were: antihypertensive, antihyperlipidemic, hypoglycemic, hormones, gastric, musculoskeletal and anti-inflammatory drugs.

The data was submitted to statistical analysis using the Predictive Analytics SoftWare (PASW Statistics, former SPSS), including descriptive analysis (mean values and standard deviation), absolute and relative frequency, and the Qui-Square Test, with level of significance $p < 0.05$.

All study procedures were in accordance with the ethical and scientific guidelines specified in Resolution

196/96 by the National Health Council/Ministry of Health with regard to research involving human subjects. The study protocol was previously approved by the Human Research Ethics Committee of the University of Fortaleza, under Opinion no.061/2010.

RESULTS

Comparison between groups G1, G2 and G3 did not show significant difference with regard to average age. For women, the average age was 69.3 ± 7.1 in G1, 66.4 ± 5.2 in G2 and 69.6 ± 6.6 years in G3. Among men, it was 71.1 ± 7.4 , 69.2 ± 7.3 and 74.8 ± 8.2 years, respectively, in G1, G2 and G3. The age distribution was homogenous in the three groups, regardless of gender (Table I).

As shown in Table II, among women, there was a high prevalence of diseases involving the endocrine-metabolic, cardiovascular and musculoskeletal systems, regardless of the group. On the other hand, diseases of the gastrointestinal system were significantly more prevalent among women in G3 than in G1 or G2. In male gender, regardless of the group, the most prevalent diseases affecting practitioners of exercise were those of the musculoskeletal system.

Table II - Prevalence of elderly affected by chronic diseases in the organic systems, regarding groups, divided by gender. Fortaleza-CE, 2011.

| | Female | | | Male | | | | |
|----------------------------|--------|----|----|--------|----|----|----|-------|
| | | n | f | % | | n | f | % |
| Endocrine-metabolic | G1 | 37 | 21 | 56.76 | G1 | 13 | 7 | 53.85 |
| | G2 | 30 | 17 | 56.67 | G2 | 18 | 5 | 27.78 |
| | G3 | 42 | 23 | 54.76 | G3 | 8 | 4 | 50.00 |
| Cardiovascular | G1 | 37 | 24 | 64.86 | G1 | 13 | 8 | 61.54 |
| | G2 | 30 | 24 | 80.00 | G2 | 18 | 6 | 33.33 |
| | G3 | 42 | 24 | 57.14 | G3 | 8 | 6 | 75.00 |
| Musculoskeletal | G1 | 37 | 29 | 78.38 | G1 | 13 | 8 | 61.54 |
| | G2 | 30 | 25 | 83.33 | G2 | 18 | 11 | 61.11 |
| | G3 | 42 | 26 | 61.90 | G3 | 8 | 4 | 50.00 |
| Respiratory | G1 | 37 | 6 | 16.22 | G1 | 13 | 4 | 30.77 |
| | G2 | 30 | 8 | 26.67 | G2 | 18 | 3 | 16.67 |
| | G3 | 42 | 3 | 7.14 | G3 | 8 | 1 | 12.50 |
| Gastrointestinal | G1 | 37 | 6 | 16.22 | G1 | 13 | 3 | 23.08 |
| | G2 | 30 | 6 | 20.00 | G2 | 18 | 4 | 22.22 |
| | G3 | 42 | 17 | 40.48* | G3 | 8 | 2 | 25.00 |

* $p < 0.05$, Qui-Square Test

G1 - Water aerobics

G2 - Weight training

G3 - Gymnastics//walking

According to the epidemiological profile of chronic diseases among the elderly, as shown in Table III, the organic system most frequently affected by such diseases in both genders was the musculoskeletal system, followed by the

cardiovascular and the endocrine-metabolic systems. However, since many subjects presented multiple associated pathologies, the total relative frequency exceeded the number of subjects included in the study.

Table III - Prevalence of chronic diseases among the elderly, according to the organic system. Fortaleza-CE, 2011.

| | Female | | Male | |
|---------------------|------------|------------|-----------|------------|
| | n | % | n | % |
| Endocrine-metabolic | 61 | 23.55 | 16 | 21.05 |
| Cardiovascular | 72 | 27.80 | 20 | 26.32 |
| Musculoskeletal | 80 | 30.89 | 23 | 30.26 |
| Respiratory | 17 | 6.56 | 8 | 10.53 |
| Gastrointestinal | 29 | 11.20 | 9 | 11.84 |
| Total | 259 | 100 | 76 | 100 |

Table IV - Prevalence of self-reported medication, in different groups, divided by gender. Fortaleza-CE, 2011.

| | | Female | | | Male | | | |
|---------------------------|----|--------|----|-------|------|----|----|-------|
| | | n | f | % | n | f | % | |
| Antihypertensive | G1 | 37 | 13 | 35.14 | G1 | 13 | 6 | 46.15 |
| | G2 | 30 | 10 | 33.33 | G2 | 18 | 11 | 61.11 |
| | G3 | 42 | 22 | 52.38 | G3 | 8 | 5 | 62.50 |
| Antihyperlipidemic | G1 | 37 | 6 | 16.22 | G1 | 13 | 1 | 7.69 |
| | G2 | 30 | 7 | 23.33 | G2 | 18 | 4 | 22.22 |
| | G3 | 42 | 4 | 9.52 | G3 | 8 | 0 | 0.00 |
| Gastric disorders | G1 | 37 | 2 | 5.41 | G1 | 13 | 2 | 15.38 |
| | G2 | 30 | 2 | 6.67 | G2 | 18 | 0 | 0 |
| | G3 | 42 | 6 | 14.29 | G3 | 8 | 1 | 12.50 |
| Hypoglycemiant | G1 | 37 | 4 | 10.81 | G1 | 13 | 1 | 7.69 |
| | G2 | 30 | 2 | 6.67 | G2 | 18 | 1 | 5.56 |
| | G3 | 42 | 3 | 7.14 | G3 | 8 | 2 | 25.00 |
| Hormone | G1 | 37 | 1 | 2.70 | G1 | 13 | 0 | 0 |
| | G2 | 30 | 2 | 6.67 | G2 | 18 | 0 | 0 |
| | G3 | 42 | 4 | 9.52 | G3 | 8 | 0 | 0 |
| Musculoskeletal | G1 | 37 | 4 | 10.81 | G1 | 13 | 2 | 15.38 |
| | G2 | 30 | 4 | 13.33 | G2 | 18 | 4 | 22.22 |
| | G3 | 42 | 2 | 4.76 | G3 | 8 | 0 | 0 |
| Anti-inflammatory* | G1 | 37 | 0 | 0 | G1 | 13 | 0 | 0 |
| | G2 | 30 | 0 | 0 | G2 | 18 | 0 | 0 |
| | G3 | 42 | 0 | 0 | G3 | 8 | 2 | 25.00 |

*p<0.05, Qui-Square Test

G1 - Water aerobics

G2 - Weight training

G3 - Gymnastics//walking

Table IV shows the self-reported distribution of prescription drugs. In both genders, antihypertensive drugs were the most prevalent. The prevalence was significantly lower for anti-inflammatory drugs than any other class of drugs, regardless of gender and group.

Table V represents the prevalence of each drug class, as

reported by the elderly, confirming the antihypertensive as the most prescribed medicine for both genders. The second most prevalent drug class was the antihyperlipidemic for women and the musculoskeletal for men. Drugs for gastric disorders for women and antihyperlipidemic drugs for men represented the third one.

Table V - Overall prevalence of self-reported medication. Fortaleza-CE, 2011.

| | Female | % | Male | % |
|--------------------|-----------|------------|-----------|------------|
| Antihypertensive | 45 | 45.92 | 22 | 52.38 |
| Antihyperlipidemic | 17 | 17.35 | 5 | 11.90 |
| Gastric disorders | 10 | 10.20 | 3 | 7.14 |
| Hypoglycemiant | 9 | 9.18 | 4 | 9.52 |
| Hormone | 7 | 7.14 | 0 | 0 |
| Musculoskeletal | 10 | 10.20 | 6 | 14.29 |
| Anti-inflammatory | 0 | 0 | 2 | 4.76 |
| Total | 98 | 100 | 42 | 100 |

DISCUSSION

A sedentary lifestyle tends to have negative impacts on clinical status of the elderly's functionality in everyday activities. Conversely, physical activity constitutes a non-pharmacological aid in the prevention and treatment of many pathologies, improving the quality of life of the elderly and reducing spending on medications, potentially attenuating adverse effects caused by pharmacokinetic interactions⁽²⁶⁾.

In this study, no significant difference was observed between practitioners of water aerobics (G1), weight lifting (G2) and gymnastics/walking (G3) with regard to the prevalence of chronic diseases or use of medications. However, participation in and compliance with physical exercise programs were greater among women. This difference between genders is related to the women's life expectancy, which is, on the average, eight years longer than men's in Brazil. Because they live longer, women are more likely to develop chronic diseases, therefore tending to display greater interest in physical exercise as a form of prevention and treatment^(27,28).

The study also revealed that the organic system most frequently affected by chronic NCDs was the musculoskeletal system, prevalent in 30.89% of females and 30.26% of males. Among the musculoskeletal disorders, the most frequently reported were osteoarthritis and osteoporosis, which result in joint stiffness and pain, and are associated with unstable gait and loss of balance. In a study from Juiz de Fora, the authors stated that the musculoskeletal disorders, like osteoarthritis and osteoporosis, were present in 27.0% and 24.8% of the women, respectively⁽²⁹⁾.

The diseases of the cardiovascular system represented the second group in prevalence in the current investigation, with the AHT as the most frequent, present in 27.8% of females and 26.32% of males. Hypertension is a multifactorial clinical condition characterized by sustained high blood pressure levels and frequently associated with functional changes⁽³⁰⁾.

The endocrine-metabolic system was the third most frequently affected in this study, in 23.55% of female gender and 21.05% of males, with emphasis on dyslipidemia and type-2 diabetes. Epidemiologic studies have shown that the risk of death from cardiovascular disorders for patients with type-2 diabetes is 2-3 times greater among men and or 3-4 times among women, in comparison with non-diabetic individuals⁽³¹⁾.

A study conducted in the city of Rio Claro-SP aiming to evaluate the epidemiological profile and the prevalence of chronic diseases in 192 elderly subjects found prevalences for diseases of the cardiovascular system (44.8%), the musculoskeletal system (45.8%) and the endocrine-metabolic system (42.5%)⁽³²⁾.

Another relevant study found prevalences of approximately 53% subjects reporting cardiovascular disorders, especially hypertension, and approximately 46% with musculoskeletal disorders such as lumbago, arthritis, arthrosis and osteoporosis. Diabetes mellitus, an endocrine-metabolic disorder commonly seen in the elderly, had a prevalence of 18% among the sample in the SABE project⁽³³⁾.

The most frequently used drugs in the current study belonged to the class of antihypertensive, by 45.92% of females and 52.38% of males. In view of the greater prevalence of high blood pressure in the male gender, additional precautions and attention to this disorder is of great importance, being the supervised physical exercise a potentially helpful measure in the treatment. According to the Brazilian Society of Arterial Hypertension, men are at greater risk than are the women, due to their higher systolic and diastolic pressure levels⁽³⁴⁾.

The diuretics were the most frequently reported types of drugs, represented by hydrochlorothiazide; beta-blocker, represented by atenol and propranolol; the calcium channel blockers (amlodipine) and angiotensin-converting enzymes inhibitors, represented by captopril and enalapril.

CONCLUSION

No significant differences were observed between three groups of elderly male and female practitioners of water aerobics, weight lifting and gymnastics/walking, with regard to the prevalences of self-reported chronic diseases classified by organic system.

In general, the musculoskeletal system was the most frequently affected by chronic diseases. However, the most commonly used prescription drugs were antihypertensives, according to information provided by the participants.

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