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Original Article

ASSOCIATION BETWEEN DISABILITY PENSION, NUTRITIONAL CONDITION AND PHYSICAL INACTIVITY IN ADULTS FROM A MIDDLE-SIZE BRAZILIAN CITY

ASSOCIAÇÃO ENTRE APOSENTADORIA POR INVALIDEZ, ESTADO NUTRICIONAL E INATIVIDADE FÍSICA EM ADULTOS DE UMA CIDADE BRASILEIRA DE MÉDIO PORTE

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RESUMO

Analisar a ocorrência de aposentadorias por invalidez e sua associação com inatividade física e estado nutricional, de maneira isolada e agregada, em pacientes do Sistema Único de Saúde com idade ≥ 50 anos. 542 adultos de ambos os sexos, com idade média de 61,9 anos (IC95%= 61,2; 62,7) foram avaliados em duas Unidades Básicas de Saúde, no ano de 2013. O índice de Massa Corporal (em Kg/m²) foi mensurado e a aposentadoria por invalidez, bem como a prática habitual de atividade física, e a presença de doenças foram auto-referidas. Variável cluster de inatividade física e obesidade foi criada com o objetivo de analisar, em conjunto, a atividade física e o estado nutricional. A ocorrência de aposentadorias por invalidez foi de 25,6% (IC95%= 21,9% - 29,3%). A agregação entre obesidade e inatividade física foi associada à maior ocorrência de aposentadoria por invalidez (OR= 2.26 [IC95%: 1.14; 4.47]) quando modelo foi ajustado por infarto, osteoporose, artrite/artrose, hérnia de disco e lombalgia. Conclui-se que a aposentadoria por invalidez nesta amostra foi superior a 25%, a qual foi significativamente influenciada pela agregação deobesidade e inatividade física.
Palavras-chave: Aposentadoria. Sistema único de saúde. Obesidade.

ABSTRACT

To analyze the occurrence of disability pension and its association with physical inactivity and nutritional condition, isolated and aggregated way, in Brazilian National Health System patients aged ≥50 years-old, in 2013. 542 adults of both sexes, with a mean age of 61.9 years (95% CI = 61.2, 62.7) were evaluated in two Basic Health Units. Body mass index (kg/m²) was calculated and disability pensions, habitual physical activity and presence of diseases were self-reported. Variable cluster of physical inactivity and obesity was created with the aim to analyze together physical activity and nutritional status. In overall sample, the occurrence of disability pension was 25.6% (95%CI= 21.9% - 29.3%), which it was associated with cluster of obesity and physical inactivity (OR= 2.26 [95%CI: 1.14; 4.47]) when model was adjusted for heart attack, osteoporosis, arthritis / arthrosis, disc herniation and low back pain. It is concluded that the occurrence of disability pension was higher than 25% and significantly related to cluster of obesity and physical inactivity.
Keywords: Pensions. Unified health system. Obesity.

Introduction

In Brazil, until 2015, the retirement process took into account the period of time that a person had worked (35 years for men and 30 years for women) and age (minimum of 65 years old for men and 60 years old for women). However, in 2015, the retirement criteria changed, and the minimum age is not a relevant factor anymore. From this point on, an individual is required to present a specific sum of points stipulated by the Brazilian government, consisting of the number of years worked during life plus chronological age[1]. However, several factors can lead to early interruption of working, such as illness and/or accidents, making individuals unable to perform their duties, and hence, eligible for disability retirement, a type of social security benefit that increased 2.3% between 2009 and 2011[2,3].

Consequently, the rise in the number of early retirements due to disability costs the government a large amount of money, since pensions are paid at the same time that the country loses individuals of working age from the labor market[3]. Data from the Ministry of Social Security[2] show that the number of disability retirees in Brazil in 2009 was 179,021, and in 2011 this number had increased to 183,301, an increase of 4,280 cases. Thus, considering the current minimum salary, this represents a monthly increase of at least 3,372,640.00 Reais. These figures, when analyzed from a long-term perspective, become an important issue.

Although the pattern and determinants of disability retirement differ between developed and developing countries, it has been associated with psychiatric disorders, circulatory system diseases, musculoskeletal diseases and neoplasms[3,4]. Furthermore, it should be considered that obesity and physical inactivity are risk factors for some of the outcomes mentioned above, and can thus indirectly influence absenteeism and early retirements[5,6].

Globally, the prevalence of overweight and obesity combined has risen by 27.5% for adults and 47.1% for children[7] and has been associated with increased mortality worldwide[8]. This outcome could be reduced with the practice of physical activity[5,9], however; this lifestyle habit is still uncommon. In Brazil, for example, approximately 88% of the population does not reach the recommended levels of physical activity, a situation that is exasperated by the aging population[10].

On the other hand, although this information is taken into consideration by national public health managers, the vast majority of studies concerning economic indicators, physical activity and obesity come from international sources, which cannot necessarily be applied to the Brazilian National Health System[9,11,12]. Brazilian studies have shown that, in public primary care, adults aged ≥50 years old who are obese and insufficiently active cost 35% more, over a period of 12 months, when compared to their peers of a similar age who are non-obese and physically active[12]. Additionally, the authors found that obesity, when analyzed in isolation, has a greater impact on health care expenditures than physical inactivity alone[12]. Furthermore, although both risk factors significantly affect health care expenditures[12], it is not clear if physical inactivity and obesity have a role in disability retirement and if this possible effect occurs independently or synergistically.

Thus, the objectives of this study were (i) to verify the occurrence of disability retirement among adult users of two basic health care units (BHU) in the city of Presidente Prudente, SP, Brazil, and (ii) to determine whether nutritional status and physical inactivity, isolated or combined, are associated with disability retirement.

Methods

Sample

The following inclusion criteria were defined: i) registered for at least one year at the BHU; ii) age ≥50 years (chosen due to the relationship with the occurrence of chronic diseases); iii) having active registration at the health care service (must have attended at least one medical visit in the past six months; iv) sign a standard consent form. Prior to implementation, the study was approved by the Ethics Committee Group from São Paulo State University (UNESP), Presidente Prudente Campus (Process number: 241291/2013).

This descriptive/analytical study with a cross-sectional design and retrospective characteristics was performed in two BHUs in the city of Presidente Prudente (~207,610 inhabitants; high human development index [0.806]; the largest city in the west region of São Paulo State)[13]. The sample size for the initial stage of the study was estimated considering that approximately 20% of all social security benefits are due to disability retirements[14], a sample error of 5% (arbitrary because there are no other similar studies), 5% statistical significance (z= 1.96) and design effect of 40% (using only two BHUs), resulting in a minimum of 343 individuals to be assessed. However, in anticipation of possible exclusions (50%) due to refusal to answer all questions during the interview or anthropometric assessment, a final sample size of 514 participants was estimated to be representative.

The BHUs involved in the study were selected by the Department of Health of the city, taking into account the location (two distinct neighborhoods) and the number of users (prioritizing the largest BHUs). During a four-week period (September/October 2013), researchers invited all individuals who were at the BHU for medical appointments or medication to participate in the study, performing the following steps: (i) explanation of the objectives and procedures of the research; (ii) inclusion criteria; (iii) sign the consent form; and (iv) interview/anthropometric measurements.

Data collection took place in September/October 2013 from Monday to Friday, in the mornings and afternoons. A group of six trained researchers conducted the interviews and performed anthropometric measurements. The number of researchers collecting data was the same in the mornings and afternoons; however, the flow of patients was higher in the mornings. At the end of the data collection period, 542 individuals agreed to participate in the study, of which 139 were disability retirees.

Outcome: disability retirement

At the interview, the participants were asked if they had retired in the previous 12 months and the reason for retirement. If the reason was health-related (139 cases), it was considered disability retirement[15]. For statistical purposes, participants were divided into two groups: (i) all participants, regardless of age (n = 542) and (ii) only participants who reported health-related retirement before 60 years of age for women and 65 years of age for men (working age). This division was established to indicate the presence of disability retirement among participants of working age and to distinguish them from the group of participants that, despite early health-related retirement, would already have been retired (due to age) at the date of data collection, thus not interfering in social security financial loss[1].

Independent variables

Obesity and physical inactivity

Body mass index (BMI), expressed in Kg/m², was calculated using measurement of weight (digital scale Welmy, W110H model) and height (stadiometer on the scale [Welmy brand, W110H model]), both measured at the BHUs, according to Lohman's protocol[16]. All equipment used had been previously tested/calibrated. The presence of obesity was classified as BMI $\geq$ 30 kg/m² [8].

The level of physical activity was estimated using the questionnaire developed by Baecke, Burema and Frijters[17], previously validated for the Portuguese language[18]. The physical activity level is calculated by specific equations taking into account 16 questions scored on a 5-point Likert scale, which considers three domains of physical activity

(occupational, exercise during leisure-time, and physical activity during leisure-time and transportation). For statistical analyzes, the sample was divided into quartiles according to overall score of physical activity: Physically inactive (Quartile 1), Moderately Active (Quartiles 2 and 3) and Active (Quartile 4)[19-21].

A cluster of physical inactivity and obesity was created to analyze the combined effects of the variables, thus the patients were classified into the following groups: i) NONE (n= 244): non-obese (BMI < 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; ii) ONLY OBESITY (n= 167): obese (BMI ≥ 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; iii) ONLY PHYSICAL INACTIVITY (n= 80): non-obese (BMI < 30 Kg/m²) and physically inactive (Quartile 1) participants; iv) BOTH (n= 51): obese (BMI ≥ 30 Kg/m²) and physically inactive (Quartile 1) participants.

Occurrence of chronic diseases and economic condition

Due to the difficulty in identifying a diagnosis of chronic diseases from the medical records of the participants and the high number of diseases reported, we used a questionnaire from a previous study to identify a selected group of diseases[22]. The questionnaire consists of closed questions identifying the presence of chronic diseases, which are subsequently classified according to the International statistical classification of diseases and related health problems (version 10). Economic status was assessed by a specific and previously validated Brazilian questionnaire[23], which estimates the family income in categories (A1 - highest to E - lowest).

Statistical analyzes

Categorical variables were expressed as rates and compared by the chi-square test (Yates's correction was applied in 2x2 contingency tables). Significant associations detected by the chi-square test were further analyzed using binary logistic regression, which generated values of odds ratios (OR) and 95% confidence intervals (CIs). The adjustment of the model was performed taking into account chronic diseases that were associated with the occurrence of disability retirement (heart attack, osteoporosis, arthritis/osteoarthritis, disc herniation and low back pain). In all multivariate models created, the Hosmer-Lemeshow test indicated no problems with the adjustments (p> 5%). All statistical analyses were performed using the software BioEstat (release 5.0) and statistical significance (p-value) was set at 0.05.

Results

The sample was composed of 542 adults of both sexes (161 men [29.7%] and 381 women [70.3%]), mean age 61.9 years (95% CI = 61.2 to 62.7). Economic condition was classified as: class D-E (n = 85; 15.7%), C1-C2 (n = 309; 57%) and B1-B2 (n = 148; 27.3%). There was no significant association between physical activity levels and obesity (Insufficiently active: 38.9%, Moderately active: 39.9% and Active: 42.9%; p = 0.583).

The overall frequency of disability retirement was 25.6% (95%CI = 21.9% - 29.3% [n= 139]), whereas this percentage was 26.6% (95%CI= 22.1% - 31.2% [n= 94]) among the younger group (<65 years old). Sex and age were not associated with disability retirement in either age group; however the cluster of obesity and physical inactivity was associated with disability retirement in both groups (Table 1).

Table 1. Associations between disability retirement and associated factors among adult users of the Brazilian National Health System (Presidente Prudente, 2013).

	All (n= 542)		<60 or 65 years old (n= 353)	
	(n= 139 disability retirements)		(n= 94 disability retirements)	
	N (%)	p-value	N (%)	p-value
Sex		0.303*		0.496*
Male	36 (22.4)		25 (30.1)	
Female	103 (27.1)		69 (25.6)	
Age		0.562*	---	---
≥ 65 years old	45 (23.9)		---	---
< 65 years old	94 (26.6)		---	---
Physical activity levels		0.008		0.001
Physically inactive	46 (35.1)		31 (44.3)	
Moderately active	65 (23.6)		43 (23.1)	
Active	28 (20.7)		20 (20.6)	
Nutritional Status		0.032		0.450
Normal	22 (19.1)		14 (19.7)	
Obese	65 (29.8)		42 (29.6)	
Cluster of physical inactivity and obesity		0.001		0.001
None	49 (20.1)		33 (19.9)	
Only obesity	44 (26.3)		30 (25.6)	
Only physical inactivity	25 (31.3)		19 (42.2)	
Both	21 (41.2)		12 (48.1)	

Notes: BMI: Body Mass Index; *= chi-square test with Yates's correction for 2x2 contingency tables; None: non-obese (BMI < 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; Only obesity: obese (BMI ≥ 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; iii) Only physical inactivity: non-obese (BMI < 30 Kg/m²) and physically inactive (Quartile 1) participants; iv) Both: obese (BMI ≥ 30 Kg/m²) and physically inactive (Quartile 1) participants.

Source: The authors.

In both age groups, a positive diagnosis for heart attack (No: 24.4% and Yes: 46.7%; p-value= 0.001), osteoporosis (No: 23.1% and Yes: 41.1%; p-value= 0.001), arthritis (No: 17.5% and Yes: 35.5%; p-value= 0.001), disc herniation (No: 18.5% and Yes: 49.6%; p-value= 0.001) and low back pain (No: 21.9% and Yes: 34.6%; p-value= 0.003) were associated with disability retirement (Table 2).

Table 2. Associations between disability retirement and chronic diseases among adult users of the Brazilian National Health System (Presidente Prudente, 2013).

	All (n= 542) (n=139 disability retirements)		<60 or 65 years old (n= 353) (n= 94 disability retirements)	
	N (%)	p-value*	N (%)	p-value*
Hypertension		0.408		0.461
No	49 (23.7)		38 (24.4)	
Yes	90 (26.9)		56 (28.4)	
Dyslipidemia		0.301		0.959
No	94 (24.3)		67 (26.9)	
Yes	45 (29.1)		27 (26.1)	
Diabetes Mellitus		0.971		0.563
No	107 (25.5)		74 (25.9)	
Yes	32 (26.2)		20 (30.3)	
Arrhythmia		0.421		0.297
No	114 (24.9)		76 (25.4)	
Yes	25 (29.8)		18 (33.3)	
Heart attack		0.013		0.030
No	125 (24.4)		84 (25.2)	
Yes	14 (46.7)		10 (50.1)	
Osteoporosis		0.001		0.001
No	107 (23.1)		72 (23.5)	
Yes	32 (41.1)		22 (46.8)	
Arthritis		0.001		0.001
No	52 (17.5)		30 (16.1)	
Yes	87 (35.5)		64 (38.3)	
Disc herniation		0.001		0.001
No	75 (18.5)		45 (17.6)	
Yes	64 (49.6)		49 (50.5)	
Low back pain		0.003		0.009
No	84 (21.9)		51 (22.1)	
Yes	55 (34.6)		43 (35.5)	

Note: *= chi-square test with Yates's correction for 2x2 contingency tables.

Source: The authors.

The magnitude of the associations between disability retirement and the cluster of obesity and physical inactivity is presented in Table 3. It was possible to identify that, regardless of the age group analyzed (All [n= 542], OR= 2.26 [95%CI: 1:14 to 4:47] / <60 or 65 years old [n= 353], OR= 2.95 [95% CI: 1:15 to 7:53]), participants with both conditions combined (group "both": obese and physically inactive) were more likely to retire due to disability when compared to the group of non-obese and physically active participants (group "none"). All multivariate models were considered properly adjusted (Hosmer-Lemeshow test with p-value greater than 5%) and explained more than 75% of the outcome.

Table 3. Associations between disability retirement and cluster of physical inactivity and obesity among adult users of the Brazilian National Health System (Presidente Prudente, 2013).

	All (n= 542)		<60 or 65 years old (n= 353)	
	OR (95%CI)*	p-value	OR (95%CI)*	p-value
Cluster of physical inactivity and obesity				
None	1.00		1.00	
Only obesity	1.06 (0.64-1.76)	0.806	0.92 (0.49-1.74)	0.819
Only physical inactivity	1.25 (0.68-2.29)	0.471	1.79 (0.83-3.84)	0.136
Both	2.26 (1.14-4.47)	0.018	2.95 (1.15-7.53)	0.024
Outcome explanation	76.2%		76.2%	
Hosmer-Lemeshow (p-value)	0.836		0.718	

Notes: OR= odds ratio; 95%CI= 95% confidence interval; *= model adjusted by heart attack, osteoporosis, arthritis/osteoarthritis, disc herniation and low back pain; None: non-obese (BMI < 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; Only obesity: obese (BMI ≥ 30 Kg/m²) and active/moderately active (Quartiles 2, 3 and 4) participants; iii) Only physical inactivity: non-obese (BMI < 30 Kg/m²) and physically inactive (Quartile 1) participants; iv) Both: obese (BMI ≥ 30 Kg/m²) and physically inactive (Quartile 1) participants.
Source: The authors.

Discussion

This study was conducted in the city of Presidente Prudente and assessed adult users of primary care in the Brazilian National Health System. We found that 25.6% of the participants reported disability retirement, which was associated with the cluster of obesity and physical inactivity. Studies have shown that obesity and physical inactivity are influential variables for disability retirement[3,4], but the scientific literature does not elucidate the combined influence of these variables on early retirement.

Studies conducted in Sweden have shown that approximately 60,000 disability retirements are granted annually, and they are strongly associated with psychiatric disorders (46%), musculoskeletal (24%) and circulatory diseases (9%)[3]. In two Brazilian cities, Recife/PE[14] and Campina Grande/PB[4], two studies explored the online Social Security database and found that circulatory system and musculoskeletal diseases were significantly associated with disability retirement. Even taking into account the proportions of the three studies above, we highlight that, in our sample, musculoskeletal and circulatory diseases were also associated with disability retirement (regardless of age group).

Likewise, epidemiological data also identified a high frequency of overweight among people over 60 years old[24], which could be partly explained by morphological changes resulting from the aging process, such as loss of muscle mass (observed more markedly among women)[25] and increased body fat. The combination of muscle loss and fat gain facilitate the development of cardiovascular diseases[26] and cardiorespiratory impairment[27], which helps to explain, at least in part, the association between obesity and disability retirement.

Although the aging process negatively affects the individual's functional capacity[28], which can lead to early retirement[4], the practice of physical activity decreases frailty in the elderly and provides several health benefits[29,30]. Similarly, it is known that regular exercise can reduce the gain in fat mass and changes in body composition associated with aging[31]. Data from a Swedish study identified that the adoption of healthy lifestyle habits (including higher levels of physical activity) was associated with a lower occurrence of retirement[32], information that is in accordance with our results.

It is worth mentioning our findings concerning the synergistic effect of obesity and physical inactivity, which showed that the association with disability retirement only existed when both variables were combined. In fact, our results are supported by another study demonstrating that the coexistence of obesity and physical inactivity is also associated with higher health care expenditures in primary care in Brazil[12]. On the other hand, different from the results regarding health care expenditures[12], our results indicate that obesity alone did not affect disability retirement. Apparently, this finding can be explained by the adjustments made in the multivariate models (chronic diseases associated with obesity), which could help to mitigate its effect on the outcome. Thus, our findings were corroborated by other studies[5,6,9,12] when identifying the economic and social importance of reducing physical inactivity and obesity.

As possible limitations of the present study we mention: i) the cross-sectional design that does not allow cause-effect conclusions; ii) the assessment of patients from only two BHUs of the city, so inferences for other BHUs should be made with caution (patients could present different profiles); iii) the selection of the sample was not randomized (limitation imposed by the Department of Health of the city), so interpretation of the prevalence rates should be also performed with caution (although the prevalence of the outcome in the sample [25.6 %] is similar to the reference used to calculate the sample size [20%][14]); iv) the absence of a time since retirement variable.

In summary, it is possible to conclude that disability retirement in our sample was higher than 25%, which was significantly influenced by the cluster of obesity and physical inactivity. These results highlight the importance of future national policies to promote healthy lifestyles, aiming to minimize economic losses due to health-related retirement for both the public and private sectors.

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