Weakness: The most frequent criterion among pre-frail and frail older Portuguese

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ABSTRACT

Aim: In Portugal, the burden of pre-frailty and frailty in community-dwelling older adults is still unknown. The purpose of this study is to estimate the frequency of frailty in a Portuguese sample with ≥ 65 years and to evaluate its associated factors. We also intend to identify which criterion has more impact on the diagnosis of frailty.

Methods: 1457 older adults with ≥ 65 years from the Nutrition UP 65 study were evaluated in a cross-sectional analysis. Frailty was identified according to Fried et al. by the presence of three or more of the following factors: unintentional weight loss, self-reported exhaustion, slowness, weakness and low physical activity. Pre-frailty was defined as the presence of one or two of these criteria. The association between individuals' characteristics and frailty status was analysed through logistic regression analysis.

Results: The frequency of pre-frailty and frailty is 54.3% and 21.5%, respectively. In older adults classified as pre-frail or frail, 76.7% presented weakness and 48.6% exhaustion. In multivariate analyses, frailty was associated with age > 75, lower education level, being single, divorced or widower, being professionally inactive, poor self-perception of health status, not drinking alcohol, being obese and undernourished or at undernutrition risk.

Conclusion: This condition is very prevalent in Portuguese older adults, one fifth are frail whereas half are pre-frail. Weakness identified by low handgrip strength is the most prevalent criterion in pre-frail and frail Portuguese older adults.

1. Introduction

Frailty is a common clinical syndrome in older adults. It is characterised by multisystem dysregulations, leading to a loss of dynamic homeostasis, decreased physiologic reserve and increased vulnerability for poor health outcomes, such as falls, incident disability, hospitalization, and mortality (Chen, Mao, & Leng, 2014; Xue, 2011).

Several methodologies have been proposed to identify frailty (Fried et al., 2001; Rockwood et al., 2005; Romero-Ortuno, Walsh, Lawlor, & Kenny, 2010). Fried's frailty scale has been the most extensively tested for its validity and is the most widely used instrument in frailty research (Bouillon et al., 2013). Fried et al. suggested that individuals should be classified as normal, pre-frail or frail based on the following factors: unintended weight loss, exhaustion, weakness, slow walking speed and low physical activity. Frailty was considered as the presence of three or more of these characteristics and pre-frailty when one or two characteristics were present (Fried et al., 2001). Older adults categorised according to this definition, showed differences in the level of social, psychological and physical functioning between the three stages (Op het Veld et al., 2015).

In a systematic review where the prevalence of pre-frailty and frailty reported by studies in the community in older adults with 65 years or older was pooled, the average prevalence of pre-frailty was 41.6% and frailty of 10.7% (Collard, Boter, & Schoevers, 2012). Frailty numbers ranged substantially from 4% to 59.1% between the analysed studies. Nevertheless, when only studies using Fried's definition were analysed,

frailty prevalence ranged from 4% to 17% (Collard et al., 2012).

To our knowledge, only one study in Portugal has reported the frequency of pre-frailty (44%) and frailty (56%) among 50 institutionalized older adults using Fried's criteria (Vieira et al., 2016). Thus, the burden of this condition among Portuguese older adults living in the community is still unknown. This is of major relevance because the proportion of older people in Portugal is increasing (Instituto Nacional de Estatística, 2015) and, consequently, the number of individuals at risk of frailty.

Using data from the Nutrition UP 65 study, we aim to identify the frequency of frailty in a sample of Portuguese with 65 years or older, and to evaluate its associated factors. We also intend to evaluate the contribution of the different criteria for the diagnosis of frailty.

2. Methods

This study used data from the Nutrition UP 65 study which is a cross-sectional observational study conducted in Portugal. Details regarding the recruitment, selection and measures were outlined elsewhere (Amaral et al., 2016). Briefly, Nutrition UP 65 included a sample of 1500 Portuguese with ≥65 years old, representative of the Portuguese older population in terms of age, sex, education and regional area. Individuals presenting any condition that precluded the collection of venous blood samples or urine (eg, dementia or urinary incontinence) were excluded from the study. For the current analysis, 43 individuals were excluded due to incomplete data regarding frailty assessment. Therefore, a total of 1457 older adults were included.

2.1. Data collection

Data were collected between December 2015 and June 2016 and information on each subject was gathered by means of an interview conducted by previously trained registered nutritionists, also responsible for anthropometric and functional data collection. Demographic data, cohabitation, professional occupation, lifestyle practices, health status and clinical history, cognitive performance, and nutritional status data were collected using a structured questionnaire. Lifestyle practices included current tobacco use and number of alcoholic drinks daily. Chronic diseases were evaluated by the presence of asthma; chronic bronchitis, chronic obstructive pulmonary disease, or emphysema; myocardial infarction or chronic consequences of myocardial infarction; coronary heart disease or angina pectoris; hypertension; stroke or chronic consequences of a stroke; arthrosis; lumbar pain or other chronic lumbar problems; neck pain or other chronic neck problems; diabetes; hepatic cirrhosis; allergies; chronic renal disease, including renal failure; urinary incontinence or bladder control problems; depression; other disease, diagnosed in the past year. The variable was categorised as: absence of chronic diseases; presence of 1 chronic disease; or presence of 2 or more chronic diseases (Holzer, Siebenhuener, Bopp, & Minder, 2014).

2.2. Cognitive and nutritional assessment

Cognitive performance was assessed by the Portuguese version of the Mini Mental State Examination. The cut-off scores for cognitive impairment are as follows: individuals with no education, ≤15 points; 1 to 11 years of school completed, ≤22 points; and > 11 years of school completed, ≤27 points (Guerreiro, 2010). The Portuguese version of the Mini-Nutritional Assessment®- Short Form (MNA-SF) was also applied. A participant scoring ≤7 out of 14 points was classified as undernourished, one that scores between 8 and 11 is at risk of undernutrition and one scoring between 12 and 14 points was considered well-nourished (Nestle Nutrition Institute, 2009).

2.3. Anthropometric measurements

Anthropometric measurements were collected following standard procedures (Stewart, Marfell-Jones, Olds, & Ridder, 2011). Intra and inter-rater observer error was calculated and ranged from 0.05 to 0.34% and 0.19 to 1.48%, respectively. Standing height was obtained with a calibrated stadiometer (SECA 213, SECA GmbH, Hamburg, Germany), with 0.1 cm resolution. For participants with visible kyphosis or when it was impossible to measure standing height due to participant's paralysis or due to mobility or balance limitations, height was obtained indirectly from non-dominant hand length (Guerra, Fonseca, Pichel, Restivo, & Amaral, 2014), measured with a calibrated paquimeter (Fervi Equipment, Vignola, Italy), with 0.1 centimeter resolution. Body weight (in kilograms) was measured with a calibrated portable electronic scale (SECA 803, SECA GmbH, Hamburg, Germany) with 0.1 kg resolution, with the participants wearing light clothes. When it was not possible to weigh a patient, body weight was estimated from mid-upper arm and calf circumferences (Chumlea, Guo, Roche, & Steinbaugh, 1988). Mid upper arm, waist and calf circumferences were measured with a metal tape measure (Lufkin W606 PM, Lufkin, Sparks, Maryland, USA), with 0.1 cm resolution. Triceps skinfold thickness was obtained using a Holtain Tanner/Whitehouse (Holtain, Ltd., Crosswell, United Kingdom) skinfold calliper, with 0.2 mm resolution.

2.4. Muscle strength and function

Non-dominant hand grip strength (HGS) was measured with a calibrated Jamar Plus Digital Hand Dynamometer (Sammons Preston Inc., Bolingbrook, Illinois, USA), with 0.1 Kgf resolution. Individuals were asked to sit in a chair without arm rest, with their shoulders adducted, their elbows flexed 90° and their forearms in neutral position, as recommended by the American Society of Hand Therapists (Fess, 1992). Each participant performed three measurements with a one minute pause between them and the higher value, recorded in kilogram-force (kgf), was used for the analysis. When the individual was unable to perform the measurement with the non-dominant hand, the dominant hand was used.

Walking time was measured over a distance of 4.6 m with a chronometer (School electronic stopwatch, Dive049, Topgim, Portugal) and walking time in seconds was recorded. Participants were asked to walk at their usual pace in an unobstructed corridor. Those unable to walk due to mobility or balance limitations were considered frail for this criterion (n = 28).

2.5. Self-reported exhaustion and physical activity levels

Self-reported exhaustion was measured using two items from the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). The following two statements were read: "I felt that everything I did was an effort" and "In the last week I could not get going." The exhaustion criterion was considered present if a participant answered "a moderate amount of the time" or "most of the time" to the question: "How often in the last week did you feel this way?".

Physical activity was assessed by the short form of the International Physical Activity Questionnaire (Craig et al., 2003). Information regarding the previous seven days, namely on how many days and how much time the participant spent: walking or hiking (at home or at work, moving from place to place, for recreation or sport), sitting (at a desk, visiting friends, reading, studying or watching television), moderate activities (carrying light objects, hunting, carpentry, gardening, cycling at a normal pace or tennis in pairs) and vigorous activities, namely lifting heavy objects, agriculture, digging, aerobics, swimming, playing football and cycling at a fast pace was gathered.