Prevalence and factors associated with frailty among Peruvian older adults

Fernando M. Runzer-Colmenares [a,b,*], Rafael Samper-Ternent [c], Soham Al Snih [d,e,f], Kenneth J. Ottenbacher [d,e], José F. Parodi [a], Rebeca Wong [d]

[a] Aging Investigation Center, Universidad de San Martin de Porres, Peru
[b] Peruvian Naval Medical Center, Callao, Peru
[c] Universidad Javeriana, Hospital San Ignacio, Colombia
[d] Sealy Center on Aging, University of Texas Medical Branch, Galveston, TX 77555, United States
[e] Division of Rehabilitation Sciences. University of Texas Medical Branch, Galveston, TX 77555, United States
[f] Division of Geriatrics/Department of Internal Medicine. University of Texas Medical Branch, Galveston, TX 77555, United States

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ABSTRACT

The objective of this study is to examine the prevalence and factors associated with frailty in Peruvian Navy Veteran's older adults and family members. A total of 311 non-institutionalized men and women aged 60 years and older, from the Geriatrics Service of the Peruvian Navy Medical Center (Centro Médico Naval "Cirujano Mayor Santiago Távara") were assessed between May and October 2010. Frailty was defined as having two or more of the following components: (1) unintentional weight-loss, (2) weakness (lowest 20% in grip-strength), (3) self-reported exhaustion, and (4) slow walking speed (lowest 20% 8-m walk-time in seconds). Additionally, information on socio-demographic factors, medical conditions, depressive symptoms, disability, and cognitive function were obtained. Of the 311 participants, 78 (25.1%) were not frail, 147 (47.3%) were pre-frail, and 86 (27.8%) were frail. Using logistic regression analysis, we found that older age, being married, falls in the last year and disability were factors significantly associated with being frail. We conclude that prevalence of pre-frail and frail status in Peruvian Navy Veterans and family members is high. Our data reports risk factors for frailty that have been reported in the past in other population groups. A larger sample and longitudinal follow-up are needed to design and implement comprehensive geriatric interventions that can benefit Peruvian Navy Veteran's older adults at risk of becoming frail.

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1. Introduction

Aging in Latin American countries is changing. The population aged 60 years and older is projected to increase at an annual rate of 3.5% during the first quarter of this century and represents three times the rate of increase of the total population (McNicoll, 2002). The percent of persons 60 years is currently 8% and is projected to increase to 14% in the year 2025 and to 23% in 2050 in these countries (McNicoll, 2002). Latin American adults are reaching old age with more chronic diseases, more disability, and fewer resources than older people in developed countries. It is estimated that about one million older adults will be added to the region's

population each year during the next ten years (Kinsella & Wan, 2009; PAHO, 2002). Thus, by 2025, one in ten older adults will be aged 80 or older in Latin American countries (Kinsella & Wan, 2009; PAHO, 2002).

In Perú, 8.8% of the total population was 60 years or older in 2004 and chronic diseases were among the most important causes of death (PAHO, 2002). Projections for the year 2025 suggest that the older adult population in Perú will represent 12.4% of the total population, a similar demographic transition to the one observed in other Latin American countries (Kinsella & Wan, 2009; Varela, 2004). This growth will come with increases in prevalence of medical conditions and disability that will increase their risk of becoming frail. Frailty has been shown to decrease quality of life and further impair functional ability (Bortz, 2002; Fried et al., 2001).

Defined as "a physiologic state of increased vulnerability to stressors that results from decreased physiologic reserves, and even dysregulation, of multiple physiologic systems," (Hamerman, 1999) frailty is considered a highly prevalent syndrome and an

* Corresponding author at: Geriatrics Department Office, Bamboo Seniors Health Services Building, Caminos del Inca Ave. 556, Surco 33, Lima, Perú.
Tel.: +1 511 2722500; fax: +1 511 4422275.
E-mail addresses: Fernandorunzer@gmail.com (F.M. Runzer-Colmenares), soalsnih@utmb.edu (S. Al Snih).

important health problem associated with mortality, institutionalization and other adverse outcomes like falls, cognitive impairment and disability (Al Snih et al., 2009; Boyle, Buchman, Wilson, Leurgans, & Bennett, 2010; Ensrud et al., 2007; Fried et al., 2001; Fried, Ferrucci, Darer, Williamson, & Anderson, 2004; Rothman, Leo-Summers, & Gill, 2008; Samper-Ternent, Al Snih, Raji, Markides, & Ottenbacher, 2008). This condition is believed to be increasing rapidly among older adults in Latin American countries (Alvarado, Zunzunegui, Beland, & Bamvita, 2008; Avila-Funes et al., 2009). The number of studies that have examined the prevalence of frailty in older Latin American populations is limited. Few studies have analyzed this problem following commonly accepted methodologies making the data difficult to compare with data from other countries (Lawrence & Jette, 1996). One study of aging in Latin America and the Caribbean reports a prevalence of frailty between 30 to 48% in women, and between 21 to 35% in men (Alvarado et al., 2008). Conversely, findings from recent systematic review reported a prevalence of frailty between 4.5 to 59.1% (Borges & Menezes, 2011; Collard, Bother, Shoevers, & Oude Voshaar, 2012). Disability, falls, cognitive impairment, cardiovascular diseases, mood disorders, and inflammation were identifying as factors associated with frailty (Borges & Menezes, 2011).

Additionally, findings from the Hispanic Established Populations for the Epidemiologic Study of the Elderly (HEPESE) reported a prevalence of pre-frail and frail older adults of 55% among the largest minority group in the United States, Mexican-Americans (Ottenbacher et al., 2005). Diabetes, arthritis, smoking status, body mass index, cognition, and negative affect were significant predictors increasing the risk of frailty over time (Ottenbacher et al., 2009). Studies on frailty in Perú, like the rest of the region, are limited. Varela et al. in a sample of older adults reported a prevalence of frailty of 7.7% and found that disability and cognitive impairment were associated to frailty (Varela, Ortiz-Saavedra, & Chavez-Jimeno, 2008).

The objective of this study was to examine the prevalence and factors associated with frailty among Peruvian Navy Veteran's older adults and family members using a modified version of a validated frailty index (Fried et al., 2001) from the Geriatrics Service of the Peruvian Navy Medical Center (Centro Médico Naval "Cirujano Mayor Santiago Távara") that provides care for military personnel and their families.

2. Methods

2.1. Sample

Participants are from a hospital-based study cohort, assessed between May and October 2010. Sample size was calculated using a common prevalence formula (Bowers, 2008). For this study, patients from the Geriatrics Service of Centro Médico Naval "Cirujano Mayor Santiago Távara" (Peruvian Navy Medical Center) that had been seen as outpatients in the previous month were considered for our study. All participants were aged 60 years and older and resided either in Lima or Callao, Perú. Most of them were men and retired military personnel. The remaining participants consisted of their wives or parents. We created a database with all eligible participants. Participants were contacted over the phone and invited to participate in our study. According to our power calculation (80%) we needed 311 participants to be able to observe at least a 10% prevalence of frailty according to previous reports in the literature ranging from 4.9 to 59.1% (on average 10%) (Alvarado et al., 2008; Borges & Menezes, 2011; Collard et al., 2012; Fried et al., 2001; Ottenbacher et al., 2005; Varela et al., 2008). To reach this sample size we contacted 592 patients. Of these 592 patients, 281 were excluded: 217 refused to participate, 32 were unable to be present for the evaluation, 26 could not be reached with the

available information, 5 were homebound and had home healthcare support, and 1 patient was hospitalized and unable to complete the interview. Thus, the final sample consisted of 311 participants which represent a response rate of 52.5% of the patients contacted to participate in the study. Information on sociodemographic characteristics, health conditions, psychosocial characteristics, anthropometric measures, physical function, and muscle strength measures were obtained in the clinical setting.

2.2. Measures

Frailty was assessed using a modified version of the phenotype described by Fried et al. (2001). This phenotype was originally composed of five criteria: weight loss, exhaustion, physical activity, walk time, and grip strength. For our cohort, we did not have a physical activity measure. Following the procedure used by other researchers we created a score using only 4 criteria (Ottenbacher et al., 2005). Additionally, body mass index (BMI) and height values used to adjust for hand grip strength and walking time were calculated based on our sample characteristics. Finally, shrinking and exhaustion were assessed using different questions than those used in the original phenotype; however, other authors have used them to evaluate frailty. Therefore, the frailty index used in our study is constructed using the following criteria:

(1) **Shrinking:** Weight loss was assessed with a self-reported question: "Have you recently lost weight such that your clothing has become looser? (Yes = 1, No = 0) derived from the Edmonton Frail Scale (Rolfson, Majumdar, Tsuyuki, Tahir, & Rockwood, 2006).

(2) **Weakness:** Grip strength was assessed using a hand-held dynamometer (MODEL Dynamometer, series 120286) and was measured in kilograms (kg). The test was administered by a trained interviewer and two trials were performed. The best of the two trials was used for scoring purposes. Participants who were unable to perform the grip strength test and those in the

Table 1
Percent of individuals for each frailty index component (N = 311).

Characteristic	Definition	N (%)
Shrinking	Self-reported weight loss: One question of EFS[a]: "*Have you recently lost weight such that your clothing has become looser?*"	103 (33.1)
Weakness	Lowest 20% in grip strength [adjusted by gender and BMI (kg/m²)] for each quartile *Men* Strength ≤23.0 for BMI ≤22.0 Strength ≤23.0 for BMI 22.0–24.0 Strength ≤25.0 for BMI 24.0–28.0 Strength ≤25.5 for BMI > 29.5 *Women* Strength ≤24.0 kg for BMI ≤ 21.0 Strength ≤17.0 kg for BMI 21.0–24.0 Strength ≤23.0 kg for BMI 24.0–28.0 Strength ≤24.0 kg for BMI > 28.0	52 (16.7)
Exhaustion	One question of the GDS[b]: "*Do you feel full of energy?*"	133 (42.8)
Slowness	Slowest 20% of walking time from 4 m walk test adjusted by gender and median height (cm) *Men* Time ≥4.9 s for height ≤159 cm Time ≥6.5 s for height >159 cm *Women* Time ≥6.5 s for height ≤153.7 cm Time ≥7.0 s for height >153.7 cm	65 (20.9)

[a] EFS: Edmonton Frailty Scale.
[b] GDS: Geriatric Depression Scale.