



Original article

Early frailty transition predicts 15-year mortality among nondisabled older Mexican Americans



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ABSTRACT

Purpose: To investigate the effect of early frailty transitions on 15-year mortality risk.

Methods: Longitudinal data analysis of the Hispanic Established Populations for the Epidemiological Study of the Elderly involving 1171 community-dwelling Mexican Americans aged ≥ 67 years and older. Frailty was determined using the modified frailty phenotype, including unintentional weight loss, weakness, self-reported exhaustion, and slow walking speed. Participants were defined at baseline as nonfrail, prefrail, or frail and divided into nine transition groups, during a 3-year observation period.

Results: Mean age was 77.0 years (standard deviation [SD] = 5.3) and 59.1% were female. Participants who transitioned from prefrail to frail (hazard ratio [HR] = 1.68, 95% confidence interval [CI] = 1.23–2.28), frail to prefrail (HR = 1.54, 95% CI = 1.05–2.28); or who remained frail (HR = 1.72, 95% CI = 1.21–2.44), had significant higher 15-year mortality risk than those who remained nonfrail. Participants transitioning from frail to nonfrail had a similar 15-year mortality risk as those who remained nonfrail (HR = 0.96, 95% CI = 0.53–1.72). Weight loss and slow walking speed were associated with transitions to frailty.

Conclusions: An early transition from frail to nonfrail in older Mexican Americans was associated with a 4% decrease in mortality compared with those who remained nonfrail, although this difference was not statistically significant. Additional longitudinal research is needed to understand positive transitions in frailty.

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Introduction

Frailty is a common geriatric syndrome, widely associated with adverse health outcomes including falls, disability, cognitive decline, hospitalization, increased health services utilization, and mortality [1–6]. Approximately, 50% of adults in the United States aged 65 years and older are frail [7]. Among community-dwelling older adults, 10%–25% of those over age 65 years and 46% over age 80 years are frail [8].

In disadvantaged and ethnic minorities, frailty prevalence is higher [9]. Research suggests that minority and disadvantaged populations could be affected more by frailty because of less access

to educational and health care resources and economic disadvantage compared with non-Hispanic whites [10]. Hispanic older adults also have a significantly higher incidence of certain medical conditions, such as diabetes and obesity, than non-Hispanic white [11]. Hispanics are currently the largest U.S. minority population, comprising 17.6% of the total population, with 3.1 million aged 65 years and older [12]. From 2000 to 2020, this Hispanic older population will grow by 76%, compared with 38% for non-Hispanic whites and 34% for African Americans [13].

While our knowledge of frailty and disability has improved dramatically in the past decade, little is known about frailty transition in the older minority population. Mexican Americans' access to, and use of, health care services is different from that of non-Hispanic whites [14]. For example, when the Affordable Care Act was implemented, over 40% of Mexican Americans were without health insurance [14], the highest rate of any racial or ethnic group in the United States. Research is needed to better understand frailty

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transition in older Mexican Americans to determine effective methods for prevention and intervention. This information is particularly important for persons aged 80 years and older who will experience higher levels of frailty and subsequent disability [6]. Health care costs are also the highest for this age category [15], as 5% of Medicare beneficiaries are responsible for ~50% of Medicare spending [16]. A large portion of these 5% includes persons >80 years with frailty and chronic conditions [16]. To improve health care and reduce costs, a better understanding of this minority and disadvantaged subpopulation of persons aged more than 80 years is essential.

More longitudinal studies of frailty are also needed in the oldest segment of the Mexican American population (>80 years). Previous longitudinal research [17–19] has examined frailty transitions in non-Hispanic older adults using the states of nonfrail, prefrail, and frail [20] and also the cumulative number of deficits as identified by the frailty index [21]. Gill et al. [17] suggest that transitions occur most frequently between adjacent states of frailty, and these states interact in complex ways that influence functional status, disability, hospitalizations, and mortality. Fallah et al. [18] found that baseline frailty status, age, and mobility were significantly associated with frailty transition. Pollack et al. [19] found that frailty status could be improved by managing comorbidity, disability, Instrumental Activities of Daily Living function, physical exercise, and nutritional and social support. However, frailty may manifest in different ways within racial and ethnic groups, and whether findings from non-Hispanic whites can be applied to Hispanic older adults remains unclear.

This study examined changes in frailty states over 3 years and monitored mortality for the next 15 years in a nationally representative sample of community-dwelling older Mexican Americans. We hypothesized that different early frailty transition patterns would be associated with different long-term mortality risk.

Methods

Data source

Data were retrieved from the Hispanic Established Populations for the Epidemiological Study of the Elderly (EPESE), an ongoing, longitudinal study of community-dwelling Mexican Americans aged 65 years or older since 1993/1994. The Hispanic EPESE used geographical probability sampling procedures to select participants from five Southwestern states: Texas, Colorado, New Mexico, Arizona, and California. Nine waves of data have been collected from 1993 to 2016. The present study used data obtained from the second to the eighth wave (1995/1996–2012/2013). A detailed description of EPESE is available elsewhere [11].

Cohort selection criteria

This study included participants who did not report any functional disability at baseline (wave 2, 1995/1996). Functional disability was determined if the participant required assistance or was not able to perform one of the following items from the Katz Activities of Daily Living (ADL) scale [22]: walking, bathing, grooming, dressing, eating, transferring-bed to chair, and toileting.

A total of 364 participants were lost-to-follow-up from wave 2 to 3. We also exclude 136 participants with missing information on the frailty items at either wave 2 or 3, and 381 participants with missing information in any covariates at wave 3. The final sample included 1171 participants. Appendix Figure 1 demonstrates the cohort selection process for the study.

Modified frailty phenotype

Frailty was assessed based on a modified measure described by Fried et al. [20] and referred to as the modified frailty phenotype because physical activity data were not available in all eight waves of the Hispanic EPESE data collection. The physical activity data were only collected at wave 2 due to a different research focus of the Hispanic EPESE project over time. Four frailty items were used: weight loss, weakness, exhaustion, and slow walking. Participants with unintentional weight loss of more than 4.5 kg were categorized as positive for the weight loss criterion (score = 1). Exhaustion was identified using two items from the Center for Epidemiologic Studies Depression Scale [23]: “I felt everything I did was an effort” and “I could not get going.” The respondents answered, “How often in the last week did you feel this way?” 0 = rarely or none of the time (<1 day), 1 = some or a little of the time (1–2 days), 2 = a moderate amount of the time (3–4 days), or 3 = most of the time (5–7 days). Participants answering “2” or “3” to either of these two items were scored as positive (score = 1). Walking speed was assessed with a 2.4-meter-timed walk test at normal pace. The test time was adjusted for height and gender and the slowest 20% were scored as positive (score = 1). Persons unable to perform the walk were also scored 1. Grip strength (weakness) was assessed using a handheld dynamometer [1]. Participants unable to perform the handgrip test and those in the lowest 20% (adjusted for body mass index [BMI: calculated by weight {kilograms}/height² {meters}] and gender) were categorized as positive for weakness (score = 1). The summary frailty score ranged from 0 to 4, with higher scores indicating increased frailty. Participants were categorized as nonfrail (0 criterion), prefrail (1 criterion), and frail (2+ criterion).

Early frailty transitions

Early frailty transitions were defined as the absolute change in frailty state measured at two earliest time points, 1995/1996 (wave 2) and 1998/1999 (wave 3), for our study cohort. Participants were stratified into nine transition groups: (1) nonfrail to nonfrail, (2) nonfrail to prefrail, (3) nonfrail to frail, (4) prefrail to nonfrail, (5) prefrail to prefrail, (6) prefrail to frail, (7) frail to nonfrail, (8) frail to prefrail, and (9) frail to frail (Table 1).

Functional disability

Functional disability was assessed by items from the Katz ADL scale [22] described previously. ADL disability was scored as positive (yes) if the participant needed physical help or was unable to perform one or more of the seven ADL activities.

Covariates

Covariates included wave 3 sociodemographic variables (age, gender, marital status, and years of formal education), BMI, cognitive function (Mini-Mental State Examination [MMSE] score of <21) [24], smoking status and comorbidity status (self-reported presence of any of seven medical conditions: arthritis, diabetes, hypertension, heart attack, stroke, cancer, or hip fracture).

Outcome

Fifteen-year mortality (1998/1999–2012/2013) was identified using the date of death from the National Death Index and reports from relatives at each follow-up.

Statistical analyses

χ^2 test, *t* test, and analysis of variance were used to examine the demographic distributions between the included and the excluded

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