Fatigue and Function Over 3 Years Among Older Adults

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Background. Fatigue is a common complaint among older adults, but the association of fatigue with subsequent function is not well known.

Methods. This 3-year longitudinal study of older primary care patients evaluates the association of fatigue, operationalized as feeling tired most of the time, with functional status at baseline and over time.

Results. After adjustment for multiple potential confounders, participants who were tired at baseline had worse Short Form-36 Physical Performance Index scores, activity of daily living scores, and gait speeds. These functional deficits persisted throughout the follow-up period.

Conclusions. Fatigue in older adults is associated with functional deficits that persist for years. Further research is needed to understand the causes of fatigue and to develop specific treatments for this serious symptom.

Key Words: Fatigue—Gait speed—Functional status—Longitudinal studies.

ALTHOUGH fatigue is a normal response to exertion, it is abnormal when it is distressing and persistent, is not proportional to recent activity, and interferes with usual function (1). Fatigue is highly prevalent; approximately 20%–25% of adults report fatigue (2). Among 199 ambulatory assisted living residents, 98% reported at least mild fatigue, with 40% reporting moderate and 7% severe fatigue (3). Fatigue is the most common reason given by community-dwelling older adults for restricted activity (4), and is commonly reported as a cause of disability by older women (5). Fatigue is highly prevalent among both the chronically ill and the acutely hospitalized (6,7). It has been associated with a wide array of chronic diseases (8–11), and has been identified as a key component of the frailty syndrome (12).

The association of fatigue with decreased daily function makes clinical sense, but relatively little research has examined the relationship between fatigue and function. Fatigue has been associated cross-sectionally with limitations in daily activities in a general population of older adults (13), and in several chronic diseases (10,14,15). Tiredness with daily activities predicts the subsequent development of disability in those activities (16,17), but the predictive ability of general fatigue has not been evaluated.

Our objective was to determine the association of general fatigue with functional trajectories over 3 years in older primary care patients. We operationalized fatigue as tiredness because it is a commonly used synonym for fatigue in published fatigue scales (16,18–20), and we did not have data available directly assessing “fatigue.”

METHODS

Overview

Participants were recruited from two primary care clinics (a Medicare Health Maintenance Organization and a Veterans Affairs clinic) in 1996. The original study evaluated the use of physical performance measures as predictors of health and function in the primary care setting. Participants were evaluated in person 10 times over 3 years. The study was approved by the relevant institutional review boards. Study methods, described in detail elsewhere (21), are summarized below.

Participants

Community-dwelling patients 65 years old or older were eligible if they were cognitively intact [Mini-Mental State Examination (MMSE) (22) score ≥ 24] or mildly impaired (MMSE score 16–23) with a caregiver, able to walk 4 meters, and had a gait speed between 0.2 and 1.3 meters per second.

Assessment of Tiredness

As part of a baseline symptom assessment, participants were asked if, during the past month, they had been “feeling tired most of the time.” Participants who reported tiredness were asked how much it affected their function.

Functional Measures

Functional status was evaluated with the following self-report and performance-based measures at each assessment:
the Medical Outcomes Study Physical Function Index (18), the National Health Interview Survey Activities of Daily Living (NHIS) scale (23), and usual gait speed over a 4-meter course.

**Covariates**

All covariates were measured at baseline and included demographic characteristics, cognition (22), and self-reported physician-diagnosed chronic conditions (24). Depressive symptoms were assessed with the Geriatric Depression Scale (25). Because fatigue is a symptom of depression, we also created a scale using four items assessing mood (life is empty, downhearted and blue, good spirits, happy most of the time), with a range of 0–4. Body mass index (BMI) was calculated from height and weight from the medical record. Interrater and test–retest reliability for our measures was excellent with intra-class correlations generally >0.9 (21).

**Statistical Analysis**

We used hierarchical linear models to determine the effect of baseline tiredness on function at baseline and on change in function over time, and multiple linear regression to determine the effect of baseline tiredness on function at 3 years. Models were adjusted for age, gender, race, education, cognition, BMI, comorbidity, and depressive symptoms. SAS (version 8.2; SAS Institute, Cary, NC) was used for all analyses.

**RESULTS**

Of the 572 individuals screened, 496 (87%) entered the study. Participants had a mean age of 74 years, and 44.4% were women (Table 1, first column). Men were overrepresented because of recruitment from a Veterans Affairs clinic. At baseline, 212 participants (43%) reported feeling tired most of the time. Among participants who reported tiredness, 33 (16%) said their function was affected not at all, 62 (29%) a little, 61 (29%) moderately, and 56 (26%) quite a lot. Participants who reported tiredness were more likely to be female and non-white (Table 1). Tiredness was associated with higher rates of specific conditions, more concurrent conditions, and more depressive symptoms. There was no significant difference in loss to follow-up between participants who were and were not tired at baseline ($p = .39$).

For all three outcomes, tiredness at baseline was associated with worse baseline function (Table 2). Persons who were tired had persistently worse function throughout the follow-up period, although the rate of decline did not differ from that of participants without tiredness.

**DISCUSSION**

This study demonstrated that fatigue, operationalized as feeling tired most of the time, is associated with functional...
Tiredness, although a synonym for fatigue, may not stand the pathophysiologic origins of fatigue. Fatigue could be the symptomatic presentation of subclinical disease (12), increased inflammation (12,26,27), physiologic dysregulation (28), or increased work in maintaining homeostasis (29). More research is needed to understand the pathophysiologic origins of fatigue.

Several aspects of the current study deserve comment. Tiredness, although a synonym for fatigue, may not encompass all aspects of fatigue (e.g., weakness or cognitive fatigue). Longitudinal studies of older adults are at risk of disproportionate loss to follow-up of the most vulnerable participants. However, tiredness was not significantly associated with loss to follow-up, and our repeated-measures design allows us to use all available data on each participant.

Fatigue is common, is associated with functional limitations that persist for years, and should be taken seriously. Further research is needed to identify underlying mechanisms and to develop specific treatments for fatigue.

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REFERENCES


Editor Nominations

Journal of Gerontology: Biological Sciences

The Gerontological Society of America’s Publications Committee is seeking nominations for the position of Editor of the Journal of Gerontology: Biological Sciences, the Society’s Journal on the biological science of aging.

The 4-year position will become effective January 1, 2010. The Editor makes appointments to the journal’s editorial board and develops policies in accordance with the scope statement prepared by the Publications Committee and approved by Council (see the Journal’s General Information and Instructions to Authors page). The Editor works with reviewers and has the final responsibility for the acceptance of articles for the Journal. Although the editorship is a voluntary position, support is provided for the editorial office. Candidates must be dedicated to enhancing a premier scientific Journal.

Nominations and applications may be made by self or others, but must be accompanied by the candidate’s curriculum vitae and a statement of willingness to accept the position. All nominations and applications must be received by March 31, 2009. Nominations and applications should be sent by mail or e-mail to the Publications Committee, Attn: Patricia Walker (pwalker@geron.org), The Gerontological Society of America, 1220 L Street, NW, Suite 901, Washington, DC 20005-4018.