

ORIGINAL ARTICLE

What Is the Relation Between Fear of Falling and Physical Activity in Older Adults?



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Abstract

Objective: To describe the association between fear of falling (FOF) and total daily activity in older adults.

Design: Cross-sectional observational study.

Setting: Ambulatory clinical research training center.

Participants: Community-dwelling older adults aged ≥ 64 years ($N=78$), who were independent in ambulation with or without an assistive device.

Interventions: Not applicable.

Main Outcome Measures: FOF was defined by self-reported fear ratings using the Survey of Activities and Fear of Falling in the Elderly and self-reported fear status determined by response to the following question: Are you afraid of falling? Physical function was assessed using the Late Life Function and Disability Instrument. Physical activity was recorded using an accelerometer worn on the waist for 7 consecutive days, and mean daily counts of activity per minute were averaged over the 7-day period.

Results: Fear ratings were related to total daily activity ($r = -.26$, $P = .02$). The relation was not as strong as the relation of function and physical activity ($r = .45$, $P < .001$). When stratified by exercise status or functional status, fear was no longer related to total daily activity. Physical function explained 19% of the variance in physical activity, whereas the addition of fear status did not add to the explained variance in physical activity.

Conclusions: FOF is related to total daily physical activity; however, FOF was not independently associated with physical activity when accounting for physical function. Some FOF may be reported as a limitation in function.

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Fear of falling (FOF) is known to be a modifier of physical performance in older adults. It is associated with a decrease in self-reported and performance-based physical function.¹ FOF is also associated with less participation in outdoor physical activity (PA), such as walking programs and sporting activities.^{2,3} In these studies, walking programs, formal exercise, and outdoor sports represented PA. However, in older adults, these activities account for only

a small portion of usual daily PA.⁴ Among older adults, a significant amount of PA performed is low intensity activity, unlike the outdoor and sporting activities examined in previous reports.^{3,4}

Although PA and exercise share common elements, including bodily movement and energy expenditure, it is important to note that exercise is only one subset of PA.⁵ Therefore, total daily PA may include exercise and functional tasks, such as rising from bed, walking from room to room, driving a car, and shopping; the latter activities are common among older adults. For many older adults, daily PA does not include exercise and in fact may be restricted to the activity involved in daily physical function. The relation of daily PA and physical function has been described based on self-reported daily PA, but the relation is not known for a performance-based measure of PA (eg, accelerometry) and self-reported function.⁶ Accelerometry-based measures of PA provide the

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means to describe what activity the person actually does and not the PA the person perceives he or she does or estimates from self-reported types of activities. Although prior studies have examined the relations among FOF and exercise, and FOF and physical function,^{2,3,7,8} the association between FOF and the total amount of daily activity performed by older adults has not been described. The primary aim of this study was to describe the associations among FOF and total daily activity in adults >65 years. To be able to explore relations between exercise, physical function, and PA in older adults in the present study with the established relations, we stratified the sample based on exercise and physical function and examined the relation of FOF and PA within the stratified groups.

Although community-dwelling older adults have generally demonstrated low amounts of daily PA based on the usual record of outdoor activities, exercise, and sports, it is possible that some older adults acquire substantial daily PA in the repeated performance of usual daily physical function. By using a performance-based measure to record total daily PA, we may capture the PA of daily functions. If usual daily physical function is a primary form of total daily PA, making activity recommendations for health promotion that incorporate physical functions of daily living may be a means to enhance the potential for older adults to meet recommended daily PA guidelines.

Methods

Community-dwelling older adults were recruited from the registry of the University of Pittsburgh Claude D. Pepper Older Adults Independence Center to participate in a longitudinal study describing mobility. Efforts have been made to populate the registry with older adults who are representative of the local metropolitan area. This study was approved by the Institutional Review Board at the University of Pittsburgh, and all subjects provided informed consent to participate.

Participants

Subjects were included in this observational, cross-sectional analysis if they were ≥ 64 years of age and could walk household distances with or without an assistive device and without assistance from another person. Exclusion criteria included neuromuscular disorders, active cancer treatment, hospitalization for a life-threatening illness or major surgery in the last 6 months, severe pulmonary disease, chest pain with activity, or a major cardiac event, such as a heart attack or stroke in the past 6 months. Data were collected from the baseline testing session at the research and training laboratory of the Pittsburgh Pepper Older Adults Independence Center. Participation was offered to 216 older adults by telephone. Seventy-six older adults were not interested in participating, and 20 were ineligible; the remaining 120 were enrolled. Seventy-eight of the 120 participants had complete FOF, physical function, and PA data and were included in this investigation (mean age \pm SD, 77.6 \pm 5.9). Those excluded for missing data did not differ from those who were included in terms of age, sex, race, or fall history ($P < .05$).

List of abbreviations:

FOF	fear of falling
LLFDI	Late Life Function and Disability Instrument
PA	physical activity
SAFFE	Survey of Activities and Fear of Falling in the Elderly

Measures

Demographic characteristics were collected by self-report and included age, sex, and race. Fall history was defined as >1 fall in the past year and was also determined by self-report.⁹

Fear of falling

We used both a global measure and an activity-specific measure of self-reported fear status. The global measure of fear status ("Are you afraid of falling: yes or no") was used to characterize the sample and provide information to enable readers to understand how the sample studied compared with the target population in prior articles. The Survey of Activities and Fear of Falling in the Elderly (SAFFE) fear subscale was chosen as the measure of FOF for the data analyses for the following 2 reasons: (1) the measure was designed to quantify fear related to physical activities in daily living, and (2) the scoring of the SAFFE fear subscale is a continuous variable, better suited for the relational analyses planned.

Self-reported fear status

A falls history questionnaire was used to determine current fear status⁹ from yes/no responses to the following question: "Are you afraid of falling?"

Self-reported fear ratings: SAFFE-fear subscale

The SAFFE¹⁰ is an interview-administered instrument for measuring FOF related to basic and instrumental activities of daily living. Eleven activities of daily living are surveyed, and 3 SAFFE subscales (fear, activity participation, and activity restriction) are determined from the responses. The SAFFE fear subscale score was determined based on the average fear ratings (0–3) across each of the 11 activities performed. For each of the 11 activities, the format for the question was "When you... (insert activity here, eg, go to the store), how worried are you that you might fall?" A score of 0 indicates no fear, 1 indicates a little fearful, 2 indicates somewhat fearful, and 3 indicates very fearful while performing each respective activity. For each activity, the range of scores is 0 to 3. Internal consistency reliability and concurrent validity have been established.¹⁰ SAFFE fear scores are significantly related to the Falls Efficacy Scale ($-.76$) and a 1-item afraid of falling question ($-.59$).¹⁰

Physical function: Late Life Function and Disability Instrument

The self-reported Late Life Function and Disability Instrument (LLFDI)¹¹ total functioning component was used to quantify physical functioning. The function component has 32 items in 3 areas: basic lower extremity function, advanced lower extremity function, and upper extremity function. Each item is rated on a 0 to 5 scale. The raw scores were converted to scaled scores of overall function and were used to describe physical function in the sample. The LLFDI has a range of scores from 0 to 100, with higher scores indicating better function. Test-retest intraclass correlations have been reported as .91 to .98.¹¹ LLFDI overall function scores are moderately associated with performance-based measures of physical function, such as the Short Physical

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