Assessing Recurrent Fall Risk of Community-Dwelling, Frail Older Veterans Using Specific Tests of Mobility and the Physical Performance Test of Function

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Background. The purpose of this prospective cohort study was to determine if older individuals at risk for recurrent falls are best identified by mobility or functional assessments.

Methods. Eighty-four community-dwelling, frail male veterans, mean age of 75.5 years (SD = 7.33), participated. The history of recurrent falls was determined by self or proxy report in a clinical interview. Mobility assessments included the Modified Gait Abnormality Rating Scale (GARS-M), stride length, and walking velocity; functional performance was determined using the Physical Performance Test (PPT). The clinical usefulness of the measures was described by determining the sensitivity and specificity of each measure using the history of recurrent falls as a standard.

Results. Stepwise logistic regression analysis of the data indicated that the GARS-M ($p < .01$) and the PPT ($p < .01$) were the most important predictors of recurrent fall risk. The sensitivity and specificity of the measures used were: GARS-M, 62.3% and 87.1%; PPT, 79.3% and 71.0%; walking speed, 71.7% and 74.2%; and stride length, 63.2% and 77.4%. Together the GARS-M and PPT demonstrated the highest sensitivity of 90.6% and the highest specificity of 87.1% based on a subject testing positive on at least one test.

Conclusion. Used independently and in combination, the GARS-M and the PPT were clinically useful measures in screening for older individuals at risk for recurrent falls.

Comprehensive geriatric assessment has been focused on identifying problems and factors contributing to the disruption of physical function, the decline in performance of activities of daily living (ADLs), and the loss of the optimal level of independence (1,2). Comprehensive geriatric assessment and management performed by a multidisciplinary team (3) and targeted for frail older adults has reduced mortality (4,5). The impact of the multidisciplinary assessments on morbidity, particularly the maintenance of functional independence, is less clear (6–8), and the time, effort, and costs of comprehensive geriatric assessment for the older patient and the clinician may be prohibitive (2,9).

Sensitive and specific measures of the physical function of frail older adults are necessary to address the impact of geriatric assessment on morbidity. Among a cohort of older adults independent in basic ADLs, Gill et al. (10) indicated that performance-based assessments of physical function could be used to identify community-dwelling, older adults who were at increased risk for loss of functional independence. We were interested in defining clinical measures that would be useful in screening among a population of frail, older adults (e.g., the targeted population for whom comprehensive geriatric assessment has reduced mortality [4,5]), for physical performance consistent with independence in community dwelling. Determining the sensitivity (the ability of a measure to recognize the target problem in individuals with the problem), and the specificity (the proportion of individuals without the target problem who are correctly identified by the clinical measure) (11) of the physical performance measures is important to improve the accuracy of recognizing frail older individuals at risk for losing their independence and who may benefit from intervention.

Consistent with living in the community is the ability to take care of oneself and avoid secondary injury or disease (12–14); factors represented by clinical measures of the physical performance of ADL and mobility. Definitive information about the diagnostic characteristics of physical performance screening tools could improve the utilization of health care services and the effectiveness of comprehensive geriatric assessment and management relative to morbidity (11,15).

In this study we were particularly interested in describing the overlap of two domains of physical performance important for community dwelling: (a) physical function in ADL, and (b) factors associated with mobility and fall risk. Mobility is a major factor contributing to level of independence (16,17), and the loss of independence frequently follows a fall, or an injury associated with a fall (18,19). The more frequent the occurrence of a fall, the greater likelihood of mortality and morbidity for the older adult. Thus, a primary objective of geriatric assessment is recognizing the
older person with a history of recurrent falls (17,20). According to Hogue et al. (21), recurrent falls "...occur when individuals with impaired mobility experience multiple failures to remain upright, even during routine activities of daily living" (p. 275).

Risk factors for recurrent falls among older adults include mobility and numerous non-mobility factors: environment, cognition, behavior, medications, and specific diseases (17,18). Previous research has indicated that most falls among community-dwelling older adults occur during ambulation and among frail but active older persons, suggesting gait abilities and the usual activities of the older person may be important risk factors (16–18,22,23). In our clinical screening evaluations of the physical performance of community-dwelling, frail older adults, no specific limitation in mobility seemed to be characteristic of the older person with a history of recurrent falls. We questioned whether the older individual at an increased risk for recurrent falls is recognized by specific characteristics of mobility associated with falling or by a deficiency in physical function abilities.

The purpose of this study was to determine if older individuals at risk for recurrent falls could best be identified by specific mobility assessments or by a more general assessment of physical function performance. Defining the diagnostic ability (sensitivity and specificity) of specific mobility and functional status assessments to recognize risk for recurrent falls is important in improving the efficacy of physical performance-based screening assessments of community-dwelling, frail older individuals. Presently the best predictor of falling among such individuals is a history of two or more falls in the past year (17,24). Given recurrent fall history as the screening instrument for recognizing individuals at risk for falling who may benefit from intervention to reduce their risk, only those individuals who have repeatedly fallen (and not those whose abilities may be declining and whose fall risk is increasing) can be identified and provided the opportunity for appropriate management. The identification of physical performance-based measures that have predictive validity for recognizing older individuals at risk for recurrent falls would provide a mechanism for intervention before the fall that may lead to loss of independence, increased morbidity, and even mortality.

Methods

Subjects

Participants in the study were veterans referred to the Geriatric Evaluation and Management Program (GEM) of the University Drive Veterans Affairs Medical Center (UDVAMC), Pittsburgh, for evaluation. The GEM Program is an interdisciplinary team approach to the assessment and management of community-dwelling, frail older veterans. The target population of veterans for GEM programs has been the community-dwelling older veteran experiencing difficulty managing the daily activities and responsibilities of living in the community. Nonambulatory older veterans, and those with severe dementia or acute terminal illness, are generally not seen by the GEM team, as the benefits of GEM appear limited for the severely impaired older veteran (3,4). The Biomedical Institutional Review Board of the University of Pittsburgh approved the study of the physical assessment of ambulation and fall risk among frail older veterans with the consent form waived, as the assessments are a part of the typical evaluation of the veteran who had agreed to participate in GEM.

Eighty four community-dwelling, frail older veterans referred to the GEM team for an initial evaluation from December, 1991, through May 1995, who demonstrated the ability to follow verbal requests for movement or tasks, demonstrated antigravity strength of the ankle dorsiflexor and plantarflexor muscle groups, and ambulated without assistive devices other than a straight cane, participated. Because of the vast predominance of males among older veterans, subjects included in the study were limited to male veterans only. (In the time period indicated, 157 veterans were referred and evaluated by the GEM team, but three veterans were excluded from the study because of female gender, and 70 veterans did not meet the criteria listed above or were not community dwelling at the time of the evaluation.) The mean age, height, and weight of the group studied was 75.5 years (SD, 7.33; range, 61–97), 155.47 cm (SD, 13.70; range, 115.50–189.20), and 80.74 kg (SD, 14.69; range, 50.00–123.00), respectively.

Measurements

Fall history.—In a structured interview with the veteran or the veteran and a caregiver, the GEM geriatric clinical nurse specialist assessed the history of falls in the past year. A fall was defined as any unexpected loss of balance resulting in coming to rest on the ground or floor. Defined in this way, two or more falls in the past year represent a substantially greater odds ratio of the older person falling than for the older person who fell once or not at all in the previous year (17,24).

Fall history recorded in this way depended on the recall of the older veteran or the caregiver. To reduce the potential for recording erroneous information about fall history, the report of falls was collaborated with the caregiver report if a caregiver was present. In most cases a caregiver was present, as a criterion for eligibility for a GEM team assessment was that a caregiver be involved in the care of the patient and present at the time of the assessment and be willing to work with the team in carrying out the recommendations. If the caregiver was not present and the geriatric clinical nurse specialist suspected recall might be in error (based on performance of the older veteran on cognitive screening examination portions of the interview or the report of the GEM team psychologist or geriatrician), then fall history was not recorded, and the veteran was not included in the study.

Mobility.—Gait characteristics were recorded as described by Cerny (25) in 1983, and previously performed by Wolfson and Whipple (26). Briefly, the participants wore permanent markers attached with masking tape to the back of the heel of the shoe, with the tip of the marker just touching the floor, during a timed walk at a self-selected pace, on a 6-meter brown paper walkway. Stride length and walking speed were determined from the measurement of three cen-
the floor or ceiling values, among a community-dwelling comparison to accepted functional status assessments (28). Performance, the PPT requires few props and about 10 to lift a book, don and doff a jacket, pick up a penny, turn 360 including basic ADL and instrumental ADL tasks (28). The item performance-based test of usual daily activities, indicating poorer performance. The total GARS-M score is a sum of the scores for the seven items and ranges from 0-21, with higher scores representing greater abnormality of walking and risk for falling.

Physical function.—Functional performance was determined using the Physical Performance Test (PPT), a seven-item performance-based test of usual daily activities, including basic ADL and instrumental ADL tasks (28). The seven items included are: write a sentence, simulate eating, lift a book, don and doff a jacket, pick up a penny, turn 360 degrees, and walk 50 feet.

The PPT was originally developed, targeted, and tested on community-dwelling, frail older adults, with demonstrated interrater (mean Kappa value for the total GARS-M score for three raters, $K = .968$) and intrarater (mean of the Kappa value for intrarater reliability for three raters, $K = .967$) reliability, concurrent validity by comparison with temporal and distance measures of gait, and construct validity for distinguishing older adults with or without a history of recurrent falls (27). The interrater and intrarater reliability for the single rater who determined the GARS-M score for all participants was $K = .968$, and $K = .984$, respectively.

The GARS-M score was determined from the videotaped recording of the participant walking at a self-selected pace on the smooth tile surface of the hallway of an outpatient clinic. The videotaped recording of gait usually included the participant walking approximately 25 feet in one direction, a turn, and a return 25 feet of walking, for a total distance of about 50 feet. Videotapes of the recorded walks were replayed on standard video-monitoring equipment for scoring. Video-monitoring allowed for repeated playback, and slow- and stop-action viewing of the walk while scoring. The seven items of the GARS-M were each scored on a 0-3, criterion-based rating scale, with higher scores indicating poorer performance. The total GARS-M score is a sum of the scores for the seven items and ranges from 0-21 with higher scores indicating greater abnormality of walking and risk for falling.

Each of the seven items has 0-4 levels of performance, based on completion of the task and time for completion. The PPT score is a total of the individual item scores, with total scores ranging from 0-28; higher scores represent better performance.

All of the physical performance measures were conducted and scored by physical therapists experienced in the uses of the measures. The physical therapists were unaware of the subjects’ history of recurrent falls prior to recording or scoring the mobility and physical function assessments.

Data Analysis

Descriptive statistics were used to determine the group mean and distributions of each of the clinical measures. Differences in mean age and the mean for the clinical measures between groups of veterans with and without a history of recurrent falls was determined using a Student’s $t$ test, with a two-tailed test of significance, and an alpha level of .05.

Stepwise logistic regression analysis (31) was used to predict the dependent variable, history of recurrent falls, from age, and the specific mobility and general physical function factors assessed. The dependent variable—history of recurrent falls—was transformed into a dummy variable, with history of recurrent falls scored as 1 and no history of recurrent falls scored as 0. The variables were entered into the equation in the order of assumed causal priority (age, speed of walking, GARS-M score, stride length, and seven-item PPT score). Causal priority was based on previous studies of the association among the mobility and physical function factors and risk of falling (26,27,32-34). The criteria for entry into and removal from the regression equation was: alpha-to-enter, .05, and alpha-to-remove, .10.

Sensitivity and specificity were calculated using established methods (11,35) for each of the clinical measures that independently contributed to the prediction of fall risk, under the assumption that these measures had the best potential for distinguishing between categories of older adults with a history of recurrent falls and those without a recurrent fall history. Using the report of recurrent fall history as the standard for distinguishing those veterans with and without a risk for falls, the number of veterans above and below a given clinical test value were counted and categorized as: true positive, false positive, true negative, or false negative. To determine the optimal cutoff value for each of the clinical measures, receiver operating characteristic (ROC) curves were plotted for a range of values of the measure. Sensitivity was plotted on the y-axis and the false positive rate (1-specificity), a reflection of the specificity, was plotted on the x-axis. The optimal cutoff values were determined by observing the ROC curve for the point that provided the best combination of sensitivity and specificity (i.e., the point on the curve closest to the upper left-hand corner of the curve [11]). Subsequently, the likelihood ratios (sensitivity/1-specificity) for the clinical measures were determined to indicate the odds of correctly identifying the veteran with or without an increased risk for falling given a certain value of the measure.

Lastly, the sensitivity and specificity of the combined use of the clinical measures that independently distinguished
between veterans with and without a risk for falling were determined. The veteran was considered to be at risk for falling if at least one of the clinical tests was positive (14).

Based on clinical experience with community-dwelling, frail older veterans and nonveterans, we expected the PPT would be the best measure to use to identify older veterans with a history of recurrent falls. Secondly, we expected that a specific measure of walking mobility would add to the accuracy of recognizing older individuals with a history of recurrent falls. In our experience, frailty alone (e.g., difficulty with performance of multiple ADLs) appeared to be a common characteristic of older persons with a history of recurrent falls. The combination of frailty and some apparent difficulty in making judgments about one’s own physical performance abilities or ability to take risks in physical performance appeared to be major risks for falling. The PPT involved assessment of the subject’s performance of usual activities of daily living, and in attempting to demonstrate performance of the PPT items, the subject’s judgment of physical and risk-taking abilities contributed to the time to complete performance of each item. The majority of falls among community-dwelling older persons occur in the home and among those individuals who venture from their home approximately one time per week. Thus, we expected the PPT, representing physical performance of ADLs, and a specific mobility test would be the best predictors of a history of recurrent falls among the community-dwelling, frail older veterans. In our previous work studying measures of physical performance of community-dwelling, frail older persons, the specific mobility tests (walking speed, stride length, and the GARS-M) have all been highly correlated (27). We expected any one of the mobility tests used would be representative of the others, but that the GARS-M might be the best measure for recognizing older veterans with a history of recurrent falls; this is because the scale was developed to identify older adults at risk for falling, and the scale involved the direct assessment of a broader range of characteristics of walking than only speed or stride length. The broader range of characteristics of walking assessed may improve the ability to recognize subtle changes in walking performance that predispose the older person to an increased risk for falling.

Results

Of the 84 community-dwelling, frail older veterans studied, 53 had a history of recurrent falls and 31 of the veterans did not report a history of recurrent falls. Mean values for all of the clinical measures of mobility and physical function were significantly different for the older veterans with, compared to the veterans without, a history of recurrent falls, \( p = .000 \) (Table 1). No significant differences were noted for age, \( p = .395 \) (Table 1), height, or weight (not shown) between the older veterans with a history of recurrent falls and the veterans without a history of recurrent falls. Walking speed of both the veterans with and without a history of recurrent falls (approximately .50-.74 m/s) is considerably slower than the walking speed of younger adults (i.e., 1.21-1.31 m/s [36]) and previously reported for community-dwelling older adults (i.e., 1.00-1.20 m/s [26]). The slower walking speed likely represents the relative frailty of the community-dwelling, older veterans studied, compared to other community-dwelling older adults. The walking speeds recorded are more comparable to the gait speed of the older adults in residential care facilities (15).

The mean GARS-M scores for the veterans with a history of recurrent falls and without a history of recurrent falls were similar to the GARS-M scores previously demonstrated for community-dwelling, frail older veterans at risk and not at risk for falling (i.e., GARS-M scores of 9 and 3.8, respectively [27]). The mean PPT score for the veterans with a history of recurrent falls corresponds to physical function abilities in a range near the 10th percentile of community-dwelling older adults (10th percentile score = 11). The veterans without a history of recurrent falls demonstrated functional abilities as indicated by the mean PPT score equivalent to nearly the 50th percentile of community-dwelling older adults (50th percentile score = 18.3) (28).

Predicting risk of recurrent falls.—The result of the logistic regression of age, walking speed, the GARS-M score, stride length, and the PPT score on recurrent fall risk status by report indicated the GARS-M \( (p < .01) \) and the PPT \( (p < .01) \) were the most important factors associated with identifying recurrent fall risk (chi-square = 34.93, \( df = 2, \ p = .000 \)). The GARS-M and the PPT scores were the only independent factors in the prediction of recurrent fall risk, each making a greater contribution to the prediction beyond the contribution of the other factors of age and mobility studied (Table 2). Based on the logistic regression model, the estimated probability (31) of a veteran having a history of recurrent falls would be determined from the equation \( 1/(1 + e^{-z}) \), where \( z = 2.25 + .19 \times \text{(GARS-M score)} - .19 \times \text{(PPT score)}. \) The \( e \) is the base of the natural logarithm, 2.718; the values of the logistic coefficient, \( b \), are weights for the predictor variables; and 2.25 is the constant of the regression equation. The prediction accuracy (percentage of frail older veterans correctly identified as members of the

<table>
<thead>
<tr>
<th>History of Recurrent Falls (n)</th>
<th>Age in Years* mean (SD)</th>
<th>Walking Speed, m/s† mean (SD)</th>
<th>GARS-M Score† mean (SD)</th>
<th>Stride Length, cm† mean (SD)</th>
<th>PPT 7-Item Score† mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (53)</td>
<td>76.0 (7.92)</td>
<td>.50 (.24)</td>
<td>9.3 (4.85)</td>
<td>76.12 (24.23)</td>
<td>11.8 (4.62)</td>
</tr>
<tr>
<td>No (31)</td>
<td>74.6 (6.20)</td>
<td>.74 (.25)</td>
<td>3.6 (3.52)</td>
<td>99.83 (23.50)</td>
<td>17.6 (4.02)</td>
</tr>
</tbody>
</table>

Note: Univariate test (t test) of differences between groups, \( * t = .86, df = 82, p = .395; † t = -4.29, 6.29, -4.38, -5.98, \) respectively, for walking speed, GARS-M score, stride length, and PPT score, \( df = 82, p = .000. \)
**FALL RISK, MOBILITY, AND PHYSICAL FUNCTION TEST**

Table 2. Stepwise Logistic Regression of Recurrent Falls on Age, Mobility, and Functional Status Characteristics of Community-Dwelling Older Veterans

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Logistic Coefficient</th>
<th>Partial Correlation R</th>
<th>p value</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>*</td>
<td>*</td>
<td>.45</td>
<td>1.20</td>
<td>1.04–1.40</td>
</tr>
<tr>
<td>Walking speed</td>
<td>*</td>
<td>*</td>
<td>.91</td>
<td>1.56</td>
<td>.71–.96</td>
</tr>
<tr>
<td>GARS-M</td>
<td>.19</td>
<td>.19</td>
<td>.01</td>
<td>1.20</td>
<td>1.04–1.40</td>
</tr>
<tr>
<td>Stride length</td>
<td>*</td>
<td>*</td>
<td>.56</td>
<td>1.20</td>
<td>1.04–1.40</td>
</tr>
<tr>
<td>PPT</td>
<td>-.19†</td>
<td>-.19†</td>
<td>.01</td>
<td>.82</td>
<td>.71–.96</td>
</tr>
</tbody>
</table>

**Note:** Prediction accuracy = 82.14%.
*Variables not selected by stepwise logistic regression.
†Negative indicates higher PPT score, less probability of history of recurrent falls.

**DISCUSSION**

For the community-dwelling older veterans studied, only the GARS-M mobility test and the PPT of functional status were independent factors in recognizing older veterans with a history of recurrent falls from older veterans without. Although all the measures studied were physical perfor-
mance-based measures, and walking speed and stride length are measures of mobility previously associated with the risk of falling (26,27,32–34) as is the GARS-M, the broader scope of components of mobility and physical function assessed by the GARS-M and the PPT measures appeared to account for the multifactorial nature of the risk for falling (16–18,22,23).

As a general functional assessment instrument, the PPT obviously involves an evaluation of a wider array of physical performance, including upper extremity (e.g., write a sentence, simulate eating), as well as lower extremity tasks (e.g., turning around, walking, and climbing the stairs) and tasks requiring coordination of the arms, legs, and trunk in goal-directed behaviors (e.g., lift a book to a shelf, don and doff a sweater, and pick up a penny from the floor). Several of the items of the PPT, such as writing a sentence and putting on and taking off a jacket, are either cognitive skills or require complex (multiple step), problem-solving abilities or judgment to successfully complete. Thus, the PPT may be sensitive to cognitive deficits that contribute to the risk of falling among older persons.

Although the GARS-M is a measure of mobility, the scale was derived from the GARS (27), which was originally developed to identify older persons at risk for falling by assessing qualitative aspects of gait (26). The greater discriminative ability of the GARS-M compared to the other gait measures may also be due to the attention of the scale to upper (i.e., shoulder extension) as well as lower extremity movement (i.e., heel contact, hip extension) and considerable focus on components of gait requiring coordination of the arms, legs, and trunk for walking (i.e., variability, guardedness, and arm-heel strike synchrony). The GARS-M criterion-based rating of gait characteristics may allow the clinician to detect subtle alterations of the neuromusculoskeletal system contributing to gait, which may predispose the older individual to an increased risk of falling. The subtle changes in the neuromusculoskeletal system may not produce notable alterations in the speed of walking or stride length, particularly in the safe, smooth surfaces of the typical clinical setting. However, the subtle changes recognized by using the GARS-M to measure gait characteristics on the usually smooth tile surface of the clinic may represent a major risk for falling during gait on the less even surfaces of community-dwelling settings.

The GARS-M and PPT measures appear to overlap in identifying physical performance factors contributing to recurrent fall risk. However, the significant contribution of the PPT to the prediction of risk of recurrent falls in the stepwise regression analysis, after accounting for the contribution of the GARS-M score, illustrates the unique contribution of the measures (Table 2). Recognition was enhanced by using both tests, as evidenced by the increase in sensitivity over the values obtained for the sensitivity of either test used alone (Table 3).

Harada et al. (15) also found that the use of two screening measures over a single measure of balance and mobility produced the best sensitivity and specificity for recognizing older adults who would benefit from a specific, detailed physical therapy assessment among older adults living in a residential care facility. The Berg Balance Scale and gait speed, used together, demonstrated a similar level of sensitivity (91%) but a lower specificity (70%) for identifying individuals with balance and mobility impairment that deserved a more specific physical therapy evaluation. Although we used mobility and general physical functional status instruments in screening to target the identification of older veterans at risk for falling, the intent was to refer the older adults identified as at-risk to a specific physical therapy evaluation and intervention of the mobility and physical function problems. As in the study by Harada et al. (15), the screening instruments were administered and scored by physical therapists who are trained and experienced in the assessment of physical function, which may be a factor in the information obtained from the screening. However, the PPT has been performed by other health care personnel, with no apparent problem in the accuracy of scoring (28,37). Videotaping of the brief walk required for scoring the GARS-M could likely be done by nonprofessional support staff, and subsequently scored at a later time by the physical therapist specially trained in mobility and experienced in the use of the scale. (Previous work has indicated that prior clinical experience of the physical therapist is a factor in the reliability of scoring the GARS-M (27).) When the screening of physical performance is done by physical therapists, information gained during screening may be useful in guiding the specific assessment and planning the intervention. Used in this way, screening by the physical therapist may be time well spent for the patient and the therapist, and a cost savings in the final analysis of outcomes.

If the intervention related to the identification of recurrent fall risk were invasive or included potentially hazardous side effects for the patient, the incidence of false positive cases would be a serious concern. The four false positive cases among the older veterans not at risk for recurrent falls are less troubling because the intervention for reducing the risk of recurrent falls, given the mobility and functional assessments, would likely be a conservative approach (referral for physical therapy). The risk of iatrogenic disease or injury by participation of the veteran, falsely identified as at-risk for falling, in physical therapy would be assumed to be low.

It is also possible that the older veterans without a history of recurrent falls, who were falsely identified, may truly be at risk for recurrent falls and have been recognized by the assessments prior to the occurrence of falling. The predictive validity of the GARS-M and the PPT for the future event of a fall is unknown; however, the PPT has been shown to have predictive validity for institutionalization or mortality (29). Recent studies of dependence in basic ADLs and instrumental ADLs as early predictive signs of functional decline, loss of independence, and even death within the year after onset of functional dependence suggests that subtle changes in several aspects of the physical performance of daily activities may have significant predictive ability for the future health status of older adults (10,38–41).

The major limitations of this study involve the sample of community-dwelling, frail older adults. The all-male veteran sample studied is not representative of the general population of community-dwelling, frail older adults in terms of gender or in comparison to other studies, and level...
of frailty as evidenced by the walking speed and PPT scores. The prevalence of a history of falling for the sample of veterans was considerably greater than reported for other community-dwelling elders, with the proportion of the veterans with a history of recurrent falls, 63%, whereas previous reports of the proportion of community-dwelling older men with a history of recurrent falls is roughly 30% (16, 42).

Further evaluation of the clinical measurement properties of the GARS-M and the PPT as screening assessments of physical performance for independent community dwelling and for use in determining who would benefit from intervention to improve physical performance is indicated. Determining the range of physical performance for which each assessment is most responsive (e.g., percent of floor and ceiling values obtained for the population of interest) may enable the assessments and perhaps interventions targeted to the specific deficits noted with physical performance testing to be sequenced in a clinically relevant and effective manner (in terms of health benefits for the older adult patient, clinician time and effort, and cost of health care). Prescriptive validity for targeted interventions based on the screening assessments of physical performance for independent community dwelling and the predictive validity of the measures for determining daily living status will be helpful in enhancing the impact of comprehensive geriatric assessment on morbidity for community-dwelling frail older individuals.

In summary, the GARS-M specific mobility assessment and the PPT general assessment of functional abilities were both independent factors contributing to the recognition of recurrent fall-risk among community-dwelling, frail older veterans. While the individual tests effectively identified veterans with and without a history of recurrent falls, the recognition of the status of the veterans was best using the combination of the GARS-M test of mobility and PPT test of functional performance. Although considerable overlap of the construct of physical performance defined by the specific mobility assessment and the general assessment of function studied existed, some unique aspects of physical performance contributing to the risk for recurrent falls were detected by the GARS-M and by the PPT. Continued clinical evaluation of the applications of the measures to enhance the accuracy of screening for deficits in performance of daily activities and the efficacy of interventions tailored to improve physical performance for independent community-dwelling of older adults is encouraged.

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REFERENCES


REFERENCES


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