Multifactorial Screening for Fall Risk in Community-Dwelling Older Adults in the Primary Care Office: Development of the Fall Risk Assessment & Screening Tool

Mindy Oxman Renfro, MS, PT, GCS, CPH1; Steven Fehrer, PhD, PT2

ABSTRACT

Background: Unintentional falls is an increasing public health problem as incidence of falls rises and the population ages. The Centers for Disease Control and Prevention reports that 1 in 3 adults aged 65 years and older will experience a fall this year; 20% to 30% of those who fall will sustain a moderate to severe injury. Physical therapists caring for older adults are usually engaged with these patients after the first injury fall and may have little opportunity to abate fall risk before the injuries occur.

Purpose: This article describes the content selection and development of a simple-to-administer, multifactorial, Fall Risk Assessment & Screening Tool (FRAST), designed specifically for use in primary care settings to identify those older adults with high fall risk. Fall Risk Assessment & Screening Tool incorporates previously validated measures within a new multifactorial tool and includes targeted recommendations for intervention.

Methods: Development of the multifactorial FRAST used a 5-part process: identification of significant fall risk factors, review of best evidence, selection of items, creation of the scoring grid, and development of a recommended action plan.

Results: Fall Risk Assessment & Screening Tool has been developed to assess fall risk in the target population of older adults (older than 65 years) living and ambulating independently in the community. Many fall risk factors have been considered and 15 items selected for inclusion. Fall Risk Assessment & Screening Tool includes 4 previously validated measures to assess balance, depression, falls efficacy, and home safety. Reliability and validity studies of FRAST are under way.

Conclusion: Fall risk for community-dwelling older adults is an urgent, multifactorial, public health problem. Providing primary care practitioners (PCPs) with a very simple screening tool is imperative. Fall Risk Assessment & Screening Tool was created to allow for safe, quick, and low-cost administration by minimally trained office staff with interpretation and follow-up provided by the PCP.

Key Words: community-dwelling older adults, falls, fall risk, fall risk assessment tool, primary care practitioner

INTRODUCTION

One in 3 adults who are 65 years or older will fall this year; 20% to 30% of those who fall will sustain significant injury.1 For many older adults, falls are the primary cause for the loss of independent living, development of fear, which may result in limitation of physical activity, and loss of social contact and/or death.2 Many health care provider groups have studied falls; most have identified and measured single-dimension factors as being important in assessing fall risk. Physicians and physical therapists (PTs) have created tests for balance and physical mobility, such as the Timed Up and Go Test (TUG),3 the Performance-Oriented Mobility Assessment (POMA),4 the Berg Balance Scale (BBS),5 and others.6 Pharmacists have recognized that polypharmacy significantly increases fall risk.7 Occupational therapists (OTs) have looked at hazards in the home.8 Psychologists have studied the negative effects of fear of falling, depression, and anxiety.9 Optometrists and otolaryngologists are responding to the risks of poor vision, multifocal lenses, dizziness, and hearing loss.10 Recently, researchers have begun to recognize the value and increased need for multifactorial fall risk assessments.11 A single 1-dimensional tool used alone may not accurately identify all potential fallers.12

Now that the Center for Medicare Services has announced funding for preventative care, health care providers must begin to screen for fall risk as part of normal preventative health care for older adults in the primary care office. Proactive steps to alleviate the identified risk factors must be instituted to prevent falls. Physical therapists may play a critical role in facilitating this change.

The primary care office needs a simple, multifactorial, fall risk assessment tool that can be administered by minimally trained office staff and then be interpreted by a primary care practitioner (PCP). For the purposes of this article, “minimally trained office staff” will include all people who are not trained minimally trained office staff.
clinicians. After the administration of this tool by the minimal-
ly trained office staff, the PCP would sit down with the patient,
review the results, and determine the best individualized plan
for intervention. Recommendations for interventions within
the tool itself facilitate a well-targeted plan.

This article describes the content selection used in the
development of the Fall Risk Assessment & Screening Tool
(FRAST). Reliability and validity studies of FRAST are cur-
rently under way and will be reported in a subsequent paper.

METHODS

Development of FRAST was a 5-part process, which
included the following:
1. Review of the literature to identify key risk factors for
   falls;
2. Evaluation of evidence-based tools currently used to
   assess fall risk factors;
3. Assembling of a variety of measures meeting criteria for
   reliability and validity and ease of administration into a
   single source measure;
4. Creation of a simple scoring grid; and
5. Development of recommendations for interventions
   based on responses.

Literature Review

Publications from the Centers for Disease Control and
Prevention (CDC) were first considered to focus the
authors’ literature search on fall risk factors. The CDC has
identified 4 actions older adults can take to prevent falls,
including regular exercise, medication review, vision care,
and making one’s home safer.13 Extrapolating from these
recommendations, the first 4 fall risk factors investigated
included physical inactivity, polypharmacy, vision care, and
home safety. Searches were conducted in Hooked on
Evidence, PubMed and Cochrane reviews between
December of 2009 and July of 2010 for studies written in
English and published in peer-reviewed journals. Although
more recent studies were reviewed first (published between
2005 and 2010), dates were extended to include older key
studies on the basis of citations in recent studies. Search cri-
teria included a variety of combinations of the following
key words: falls, fall risk, fall prevention, older adults, com-

   munity-dwelling, age, balance, physical activity, depression,
   fear of falling, medications, polypharmacy, vision, multifac-
torial glasses, epidemiology, home modification, vestibular,
   dizziness, interventions, statistics, physical therapy, primary
   care, physician, and rural.

Only risk factors found to be significant by the CDC
and/or found to be significant in 2 or more Cochrane
reviews for the target population were included. Overall,
more than 425 article abstracts were read. Only articles
dealing with the specific target population and published in
peer-reviewed journals were retrieved. More than 300 arti-
cles were reviewed and catalogued into 15 fall risk cate-
gories (Figure 1). The categories included age, gender, fall
history, physical activity, medical conditions and polyphar-
armacy, vision and hearing, home safety, dizziness/vestibular
issues, gait deviations and use of assistive devices, risk-tak-

   ing behavior, social contact and support, mood and depres-
   sion, fear of falling, balance, and multifactorial risk.

Because of the broad range of risk factors examined and
lack of homogeneity of studies, a meta-analysis was not
conducted and risk factors could not be ranked or weight-
ed.

Evaluation of Fall Risk Tools

For each identified fall risk category, existing objective
measures were sought. Only fall risk tools demonstrating
both reliability and validity for the target population in
multiple studies and described in more than 1 Cochrane
review were included. Tools requiring purchase, found to be
lengthy, or requiring a skilled and/or licensed tester were
excluded. In addition, those measures, including items that
may require immediate follow-up (ie, suicidal ideation),
were excluded.

Assembling of Measures

Levels of scores (denoting low, medium, or high fall risk)
for each measure were taken from best evidence available.
For example, the CDC WISQARS data was used to deter-
mine the age parameters related to low, medium, and/or
high fall risk.13 Multiple studies were considered in setting
the cutoff scores for TUG,14 Modified Falls Efficacy Scale
(MFES),15 and the Geriatric Depression Scale (GDS).16

Creation of Scoring Grid

Many test formats were considered for use in FRAST.
Expert opinions were gathered from members of the
National Council on Aging’s Falls Free Coalition as well as
posttest feedback from subjects. On the basis of this input,
the original form was modified to improve ease of use. The
current grid format was chosen for the facilitation of both
quick visualization of results and improved attention to rec-

mended interventions by the PCP. A low-vision form is
available and language translations are under way. FRAST
is not intended for use by older adults experiencing cogni-
tive impairments. Weighting of the items was not possible
on the basis of current literature and will be considered
after the statistical analysis of reliability and validity stud-
ies. Scoring at this time is based on raw scores over 15
items, in which low risk = 0, medium risk = 1, and high
risk = 2, resulting in total test scores ranging from 0 to 30.
Since any score greater than 0 indicates at least medium risk
on some items, a total FRAST score greater than 5 would
result in PCP review.

Development of Interventions

Most recommended interventions were taken from the ref-
enced articles describing the specific measure. Some input
was based on the clinical expertise of the authors. When
potential interventions fell outside of the scope of physical
therapy practice of PT, the appropriate health care profes-
sionals from the faculty at the University of Montana’s
College of Health Professions and Biomedical Sciences were consulted for input and recommendations.

RESULTS

Multiple factors have been shown to increase fall risk in community-dwelling adults older than 65 years.17 These factors can be broken down into demographic traits (age, gender, etc), internal factors (health, medications, etc), and external factors (home environment and social) on the basis of best-available evidence; only those risk factors that were consistently identified as important were included in FRAST.18 Some fall risk factors, such as the condition of community sidewalks, are difficult to assess objectively and so were not included. On the basis of the combined clinical experience of the authors, risk-taking behavior (Figure 1, item 10) was felt to be an important aspect of fall risk that had not been previously studied and was included on FRAST for the purpose of primary data collection.

DEMOGRAPHIC FACTORS

Age

According to the CDC, in 2005, Americans aged 65 to 85 years and older, reported 2,284,671 unintentional injuries, of which 64.4% were falls.13 Epidemiologic research demonstrates that 1 of 3 adults older than 65 years will fall each year in the United States.19 Stevens et al120 described that the risk of being seriously injured in a fall increases with age and that the rates of fall injuries for adults aged 85 years and older were 4 to 5 times that of adults aged 65 to 74 years. Nearly 85% of deaths from falls in 2004 were among people aged 75 years and older,20 and people older than 75 years who fall are 4 to 5 times more likely to be admitted to a long-term care facility for a year or longer.1 On the basis of these statistics, FRAST will assign a medium risk for those aged 65 to 74 years and a high risk level for those aged 75 years and older (Figure 1, item 1).

Gender

In studying unintentional, nonfatal injury falls, it was found that about 70% of fallers were women.21 Although men are more likely to die from a fall, women are more likely to sustain a hip fracture. On the basis of these findings, being a woman will impart a high fall risk on FRAST and being a man will impart a medium fall risk on FRAST (Figure 1, item 2).

INTERNAL FACTORS

History of Falls

Literature on falls quickly reveals the high risk of falls in people with a history of falls.22 Among the general population of older adults, previous falls are the factor most strongly associated with risk of falling.23 In a literature review and meta-analysis on fall risk factors, Deandrea et al23 found that the strongest associations were found for history of falls for all fallers. Sai et al18 studied fall predictors in the community-dwelling older adults and also concluded that a significant predictor of being a faller was history of falls.18 On the basis of this evidence, fall history is included in FRAST (Figure 1, item 3). In Shumway-Cook’s3 1997 study, a faller is defined as a person who self-reports 2 or more falls within the past 6 months and a fall is defined as any event that led to an unplanned, unexpected contact with a supporting surface.3 To provide consistency with the evidence, these criteria are utilized in FRAST.

Chronic Medical Conditions

Many chronic medical conditions are known to result in lower physical activity,24 diminished balance,25 and physical decline, all of which can lead to a heightened risk of falls.25 Older adults with lower extremity arthritis have been found to experience increased fear of falling, fall risk, and fall incidence.26 Some medications commonly prescribed for pain, diabetes, psychological disorders, and cardiovascular disease have each been associated with a higher fall risk.27 Patients with diabetes, peripheral neuropathy, and vascular disorders may all experience diminished lower extremity sensation and/or muscle strength, with a higher fall risk.28 Capturing a full medical history and assigning fall risk based on that medical history would be difficult on a simple screening tool; however, the importance of this information must be remembered. For the purposes of FRAST, polypharmacy will be one indication of a complicated medical history (Figure 1, item 5). The PCPs, including PTs, must be cognizant of the role of medical conditions and medication use in the assessment and treatment of their patients, especially those at risk for falls.

Physical Activity

The literature describes the protective influence of daily physical activity on health and mental well-being in older adults as well as a direct positive impact on their fall risk.29 Kruger et al30 conducted a detailed analysis of the Behavioral Risk Factor Surveillance system data and concluded that regular physical activity can reduce the risk of falling. In a 2007 Cochrane review, which included 34 studies representing 2,883 participants, Howe et al31 concluded that there were statistically significant improvements in balance with exercise interventions. Rogers et al32 found significant improvements in the physical functioning of older adults, which included reduction of blood pressure, fall risk, depression, and anxiety. Both the American College of Sports Medicine and the American Heart Association recommend that adults older than 65 years exercise moderately for 30 minutes per day, 5 to 7 days per week.33 On the basis of these findings, FRAST includes a self-assessment of physical activity level (Figure 1, item 4) and advises participation in age-appropriate, therapist-prescribed, exercise programs. The physical activity risk levels and recommendations on FRAST are based on the guidelines of the American College of Sports Medicine’s Current Comments on Exercise and the Older Adult.34

Vision

Grue et al10 found that patients older than 65 years with hip fractures frequently had hearing, vision, and combined
**Directions:** For each question, please check the box with the response that best represents you today. Whenever your responses are in the high or medium risk column, we strongly encourage age you to discuss the recommended actions in the last column with your health care provider. Please fill in your initials, year of birth and age on each page. Thank you.

<table>
<thead>
<tr>
<th>RISK FACTOR</th>
<th>LOW RISK - 0</th>
<th>MEDIUM RISK - 1</th>
<th>HIGH RISK - 2</th>
<th>ACTION RECOMMENDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. As of today, my age is</td>
<td>Below 65 years old.</td>
<td>Between 65 and 75 years old.</td>
<td>Over 75 years old.</td>
<td>Attending a fall prevention program may be recommended to lower your fall risk.</td>
</tr>
<tr>
<td>2. My gender is</td>
<td>Male</td>
<td></td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>3. A fall is any event that led to an unplanned, unexpected contact with a supporting surface such as the floor. Have you fallen?</td>
<td>No, I have not fallen.</td>
<td>In the past six months, I have fallen only once and was NOT injured.</td>
<td>In the past 6 months I have fallen 2 or more times, OR In the past 2 years, I have fallen and been injured requiring medical attention.</td>
<td>People who have had falls or have balance issues are at greater risk for more falls. Your doctor may recommend a: 1. Full annual physical exam 2. Fall prevention program 3. PT evaluation for balance 4. PT or OT evaluation of home 5. PT or podiatrist evaluation of footwear 6. Home fall alarm system</td>
</tr>
<tr>
<td>4. How would you describe your daily physical activity level? This might be walking, an exercise class, working out at the gym, swimming or dancing. When you are active, your heart works harder and your breathing gets deeper.</td>
<td>I am engaged in exercise or moderate physical activity at least 15 min/day, 2-4 times/week.</td>
<td>I am engaged in exercise or moderate physical activity at least 30 min/day, 5-7 days/week.</td>
<td>I am generally not active and do not do exercise that makes my heart rate or breathing increase.</td>
<td>Your doctor may feel that you should begin to exercise, but before you do, s/he might suggest a physical therapy referral to design a safe, individualized program that meets your needs safely.</td>
</tr>
<tr>
<td>5. How many prescription medicines do you take?</td>
<td>I have not been prescribed any medications.</td>
<td>I currently take at least one but not more than 4 prescription medications.</td>
<td>I currently take 5 or more prescription medications.</td>
<td>It is recommend that: 1. Your doctor and/or pharmacist review your medications carefully 2. You use a weekly pill dispenser to avoid mistakes 3. You keep a list of your medicines</td>
</tr>
<tr>
<td>6. In regard to your eye care, please choose the best answer:</td>
<td>I see my eye doctor at least once/year.</td>
<td>I have seen an eye doctor once in the past 2 years.</td>
<td>I have not seen an eye doctor in the past 3 years.</td>
<td>Your doctor may refer you to an eye doctor for an annual exam and to discuss vision care options.</td>
</tr>
<tr>
<td>7. In regard to your glasses or contacts, please choose the best answer</td>
<td>I do not wear glasses or contacts.</td>
<td>I wear single-vision glasses or contact lenses (not bifocals or progressive lenses).</td>
<td>I wear multifocal lenses or contacts.</td>
<td>Your doctor may refer you to an eye doctor for an annual exam and to discuss vision care options. Please Note: Multifocal lenses (bifocals, progressive lenses, etc.) may increase fall risk.</td>
</tr>
<tr>
<td>8. Do you ever get dizzy?</td>
<td>No, I do not have any problem with dizziness.</td>
<td>Occasionally feel dizzy if I get up out of bed fast or when I am ill.</td>
<td>Dizziness is a problem for me.</td>
<td>Your doctor can check to see if your blood pressure drops when you stand up or if there are other medical problems. He/she may also recommend PT, audiologist or ENT referral.</td>
</tr>
</tbody>
</table>

**Figure 1.** Fall Risk Assessment & Screening Tool (FRAST). (continues)
<table>
<thead>
<tr>
<th>RISK FACTOR</th>
<th>LOW RISK = 0</th>
<th>MEDIUM RISK = 1</th>
<th>HIGH RISK = 2</th>
<th>ACTION RECOMMENDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. In the past week, have you used any assistive devices (AD) to walk?</td>
<td>No I don't have an assistive device or need one to walk safely. My doctor has not recommended that I use an assistive device.</td>
<td>I have and correctly use an assistive device that was prescribed for and fit to me. A therapist taught me how to use it correctly.</td>
<td>I use an assistive device but no one has taught me how to use it. <strong>OR</strong> I lean on furniture and walls as I walk by.</td>
<td>If you use an assistive device (AD) or need one, your doctor might want you to see a PT if: 1. You need to begin to use an AD. 2. Yours was not fit for you by a PT. 3. You have not been taught how to use it properly. 4. It has been a long time since a PT fit it and it may now need updating.</td>
</tr>
<tr>
<td>10. Choose the group of statements that best describes your overall risk-taking behaviors:</td>
<td>I am careful and seldom take risks. I am not easily distracted. I do not hurry to answer the phone.</td>
<td>Sometimes I do things that later I (or others) think may have been risky.</td>
<td>I refuse to limit myself as I age. I might climb up a ladder or learn a new risky sport.</td>
<td>Remaining active is critical, but sometimes taking risks has greater implications as we age. Discuss your answers with your health provider and seek their advice.</td>
</tr>
<tr>
<td>11. In the past week, how socially active have you been?</td>
<td>I come and go often and see others 5-7 days/week and/or I am married.</td>
<td>I see other people 2-4 days/week.</td>
<td>I see other people less than 2 times/week.</td>
<td>Your doctor might advise you to visit with the service coordinator at your Area Agency on Aging and/or Senior Center to learn about programs to assist you.</td>
</tr>
<tr>
<td>12. Please carefully complete the Home Safety Checklist on pages 4 and 5.</td>
<td>I have fewer than 6 check marks.</td>
<td>I have 6-11 checks.</td>
<td>I have more than 11 checks.</td>
<td>It appears that your home is not as safe as it might be. It is important that either an OT or PT make a home visit and help you consider modifications that would make your home safer for you.</td>
</tr>
<tr>
<td>13. Please complete the Modified Falls Efficacy Scale on page 6.</td>
<td>My average score is 8, 9 or 10.</td>
<td>My average score is between 3 and 7.</td>
<td>My average score is 0, 1 or 2.</td>
<td>This score might indicate that your concern about falling is causing you to limit your activities. Your doctor may recommend any or all of the following: 1. Group fall prevention program. 2. Physical therapy referral. 3. Referral to a counselor/social worker.</td>
</tr>
<tr>
<td>14. Please complete the Mood Scale on page 7 and then score it following the directions on the bottom</td>
<td>I scored between 0 and 5 on the mood scale.</td>
<td>I scored 6, 7 or 8.</td>
<td>I scored 9 or above.</td>
<td>Your doctor may want to discuss a number of options with you to help improve your mood.</td>
</tr>
<tr>
<td>15. Please let the receptionist know that you are ready to take your timed-up-and-go test (TUG).</td>
<td>My TUG score was 7 seconds or less.</td>
<td>I scored between 8-13 sec. on my TUG test.</td>
<td>My TUG test score was greater than 13 sec.</td>
<td>The TUG test is a test for balance and mobility. If your time is longer, your doctor may want to have you see a physical therapist.</td>
</tr>
</tbody>
</table>

**TOTAL SCORE**

___ out of 30

Scoring: 0-4 = low fall risk; 5 and above: recommend review with your PCP.

Test reviewed and discussed with client. The following actions have been suggested: ____________________________

Total Score: Fall Risk Rating: ___ out of 30 Fall Risk: Low Risk or High Fall Risk

Printed Name/Signature/credentials/Date: ____________________________

Your Initials: ___________ Year of Birth: ___________ Age Today: ___________

1Physical Therapist, 2Occupational Therapist, 3Ear, Nose & Throat doctor

Figure 1. (Continued) Fall Risk Assessment & Screening Tool (FRAST).
impairments. Abdelhafiz and Austin recommended that annual measurement of visual functions, such as acuity, contrast sensitivity, and depth perception, might identify older people at risk of falls and hip fracture. They further added that targeted intervention might have the potential of improving visual function and preventing falls in older people. Lord et al stated that impaired vision is an important and independent risk factor for falls. Adequate depth perception and distant-edge contrast sensitivity appear to be important for maintaining balance and detecting and avoiding hazards in the environment.

Research documents show that the use of multifocal lenses by older adults increases fall risk. Lord et al found that multifocal glasses might add to fall risk because the near-vision lenses impair distance-contrast sensitivity and depth perception in the lower visual field. Johnson et al concluded that because of increased within-subject variability in vertical toe clearance when wearing multifocal glasses, older adults might be at greater risk of falling when negotiating steps and stairs. On the basis of these findings, FRASST assigns a high fall risk for those who do not regularly visit an eye professional (Figure 1, item 6) and/or those who wear multifocal lenses (glasses and/or contact lenses) (Figure 1, item 7). Although older adults may decide to not give up multifocal lenses, awareness of the risk is still important.

Dizziness

Self-reported dizziness is a lay term describing many symptoms (lightheadedness, vertigo, etc) with a wide variety of etiologies (vestibular, orthostatic hypotension, etc). Ekwall et al found that dizziness was associated with an increased risk of falling. Agrawal et al reported that study participants with vestibular dysfunction who were clinically symptomatic (ie, reported dizziness) had a 12-fold increase in the odds of falling. Ramdas et al found that the main outcome measures indicating an increased fall risk were a positive falls history and the presence of orthostatic hypotension. Other researchers have also reported that dizziness and vertigo are important public health care issues. Given the evidence cited indicating self-reported dizziness as a significant fall risk factor, FRASST assigns a high fall risk rating for a current complaint of dizziness (Figure 1, item 8).

Assistive Devices

Many older adults require assistive devices to walk safely and independently. In FRASST, assistive devices will include all forms of canes and walkers.

Older adults commonly self-prescribe assistive devices for a variety of reasons. Brooks et al found that of 70 patients interviewed, only 71% of the assistive devices being used had been prescribed. In Sheehan and Millicheap’s study, which evaluated the use of canes, 38% were used incorrectly, 44% were of incorrect length, and 54% were in poor condition. Joyce and Kirby concluded that prescribed assistive devices were underutilized and needed to be fit correctly. A correctly prescribed, fit, and used assistive device may result in a lower fall risk; however, a self-prescribed, misfit, or inappropriate assistive device may result in a higher fall risk. For these reasons, FRASST (Figure 1, item 9) includes an item that imparts high fall risk both for those who use an assistive device that was not prescribed and fit for them and for those who cruise along furniture and walls and may benefit from the use of an assistive device.

Balance

Many physical changes associated with aging have a negative effect on balance. Cognitive slowing may impact reaction times; lower extremity weakness may limit postural stability; and degenerative joint changes may limit motion needed to reestablish equilibrium. Diminished balance is associated with heightened fall risk and improved balance after intervention is associated with a lower fall risk. Balance must be screened as part of FRASST, and diminished balance requires early intervention.

Choosing the best objective instrument to assess balance in older adults is difficult. Many tools have been developed, studied, and updated. Researchers have established validity, reliability, and sensitivity for certain populations. The goal of this project was to identify a validated balance test, designed specifically for community-dwelling older adults, which can be safely and reliably administered and scored by personnel with minimal training. Many balance assessment tools were considered. In a systematic review, Langley and Mackintosh concluded that of 17 studied tests, the BBS and TUG were most rigorously studied and had published reliability and validity with community-dwelling older adults. Although the BBS has been shown to be valid and reliable, a few of the test items require the patient to attempt difficult tasks while the tester is timing or rating the patient. Therefore, it was concluded that this test required the judgment and skills of a clinician to assure patient safety and was not selected for FRASST.

Shumway-Cook et al found TUG to be a sensitive and specific measure for identifying community-dwelling adults who are at risk for falls. She found TUG to be easy and simple to administer. Older adults who take longer than 14 seconds to complete TUG were found to have a high risk for falls. The addition of manual or cognitive tasks to TUG did not result in a more sensitive test. Herman et al found that TUG also exhibited some psychometric assessment capabilities, adding an indirect cognitive measure. Desai et al compared TUG, the BBS, gait speed, and the 6-minute walk test and concluded that only TUG was able to differentiate between the faller and non-faller groups. Morris et al concluded that combining the factors of previous falls with a prolonged time on the TUG test resulted in the ability to predict falls with high specificity. Considering the current best evidence, the TUG test was selected as a reliable, valid, and simple-to-administer balance test for inclusion on FRASST (Figure 1, item 15).

Polypharmacy

Many physiologic changes of aging affect both pharmacokinetics and pharmacodynamics, which may increase the inherent risks imparted by polypharmacy (defined as >4 prescription medications taken simultaneously). In older
adults, fall risk increases with an increase in medication use.\(^{23}\) Prescription of more than 4 medications was associated with an increase in falls,\(^{56}\) and central nervous system drugs, especially psychotropics, seem to be associated with an added risk.\(^{2}\) Use of over-the-counter, nonsteroidal anti-inflammatory drugs have also been shown to increase fall risk for older adults.\(^{57}\)

On the basis of the findings of these studies, FRAST will include the use of 1 to 4 prescription medications to impart medium fall risk and the use of more than 4 medications to impart high fall risk. Although this is an effective screening method, pharmacist-led medication reviews have been studied and proposed as an effective adjunct to routine health care and will be included in FRAST’s recommended intervention for identified polypharmacy risk\(^{58}\) (Figure 1, item 5).

Fear of Falling

Falls increase the fear of falling, and fear of falling increases fall risk.\(^{59}\) In addition, fear of falling often leads to self-imposed restriction of physical activity, which further heightens fall risk, and fear of falling is oftentimes experienced even without a fall.\(^{59}\) It has been found that fear of falling was increased with advancing age, female gender, perceived poor health, and history of falls,\(^{60}\) as well as limitations in activity of daily living, impaired vision, chronic morbidity, low general self-efficacy, and depression.\(^{61}\)

Since fear of falling results in a significant increase in fall risk, it is important that we be able to quantify this experience objectively. The 3 scales considered for inclusion on FRAST were the Activities-Specific Balance Confidence (ABC),\(^{62}\) the Falls Efficacy Scale (FES),\(^{63}\) and the Survey of Activities and Fear of Falling in the Elderly (SAFE).\(^{64}\) Hotchkiss et al\(^{65}\) studied the 3 scales and concluded that the ABC and the FES were highly correlated with each other and to a lesser extent with SAFE. They also found that the FES was the best predictor for those people who restricted their activity.\(^{65}\) The FES also included fewer items than the ABC, making it slightly faster to administer. The original FES was developed and reported by Tinetti et al\(^{66}\) in 1990 as an instrument to measure fear of falling. Subjects who reported avoiding activities because of fear of falling had higher FES scores, representing lower self-efficacy or confidence, than the subjects not reporting fear of falling. However, the FES did not include community-level activities, so it was updated in 1996 as the MFES, which was studied and validated by Hill et al\(^{66}\) in 1996. Since the MFES is aimed at community-dwelling older adults in the United States and has been shown to reliably indicate activity avoidance due to fear of falling, it has been selected for FRAST (Figure 1, Item 13).

Depression

Depression has been shown to significantly increase fall risk in community-dwelling older adults.\(^{67}\) The occurrence and undertreatment of depression in later life is well documented.\(^{68}\) Geriatric depression may be misinterpreted as fatigue or dementia or simply misattributed to normal aging. Many psychological and physical aspects of advancing years may contribute to depression, including loss of spouse and/or friends, decreases in vision and hearing, nocturia, sleep disturbance, pain, and lack of physical activity.\(^{69}\) According to the National Institute of Mental Health, suicide rates are significantly elevated in older adults when compared with the general population.\(^{70}\)

Many tools have been developed to objectively measure depression, but only a few tools are validated for older adults. Well-known, validated, and commonly used measures, both the GDS\(^{71}\) and the short form of the GDS (GDS-short or Mood Scale),\(^{16}\) are self-administered, user-friendly measures. Because of its ease of use, short completion time, and wealth of literature on its validity, the GDS-short is utilized to screen for the signs of depression on FRAST (Figure 1, item 14).

Risk-Taking Behaviors

Although the fear of falling can result in a higher fall rate, what about the opposite end of the spectrum—elevated risk-taking behavior? In considering unintentional falls, the authors were curious about the role of risk-taking behaviors as a personality trait in fallers. Increased risk-taking behavior is not an identified fall risk factor in older adults in the current literature. A study has identified the increase in human immunodeficiency virus positive older adults, which has been tied to increased risk-taking behavior in this population.\(^{72}\) Traffic accidents are higher in adults older than 65 years, which may reflect decline in judgment, reaction time, or an increase in risk taking.\(^{73}\) Although risk-taking behavior is not identified as a fall risk factor in older adults, it may be worthwhile to study.

Attempts to identify a validated objective test to quantify risk-taking behavior in this population were unsuccessful. The psychometric Balloon Analogue Risk Task does exist for use in adolescents and young adults but is not validated for use in this population.\(^{74}\) Therefore, FRAST asks each subject to self-rate their risk-taking behavior (Figure 1, item 10). Engaging in risky behavior will be correlated with a high fall risk and will prompt a discussion with the PCP to ascertain whether further intervention is warranted. Item validity will be studied.

EXTERNAL FACTORS

Home and Living Situation

About half of all falls occur in the home. Making the home safer is listed by the CDC as 1 of the 4 most important things older adults can do to decrease their fall risk.\(^{13}\) Studies demonstrate that home hazard assessments need to be accompanied by education, facilitation of modifications, consideration of the person and home interface, and follow-up.\(^{75}\) In 2003, Nikolaus and Bach\(^{75}\) found that home intervention based on home visits to assess the home for environmental hazards, providing information about possible changes, facilitating any necessary modifications, and training in the use of technical and mobility aids, was effective in a selected group of older adults with a history of recurrent falling. Iwarsson et al\(^{87}\) found that the person-environment
fit or interface was a stronger fall predictor than number of environmental barriers. For example, standard-height kitchen cabinets might present a problem for a shorter person but not for a taller person. These studies certainly highlight the need for a carefully completed home hazard assessment done by a therapist as part of an effective abatement of fall risk. FRAS will use a self-assessment for screening the CDC’s Home Fall Prevention Safety Checklist. A high fall risk score on this item will prompt the PCP to consider a referral for PT or OT to complete an individualized home assessment and follow-up (Figure 1, item 12).

**Sidewalks, Traffic, and Adverse Weather**

A great deal of time and attention is afforded to falls within the home, but we must also look at the city or county infrastructure, as it relates to safety for pedestrians. Access to the community must be made possible to ensure successful aging in place. Therapists performing home visits should consider factors that may hinder access to and from the home into the community. Despite the importance of these issues, the literature regarding the characteristics of the physical environment outdoors in relation to falls is limited, as are assessment tools, making objective comparison of neighborhoods difficult. For these reasons, evaluation of community access has not been included in FRAS. Lack of social contact (Figure 1, item 11) may indicate issues of limited community access.

**Social Support and Contact**

Social isolation is very common for adults as they age. Loss of spouse, friends, employment, expendable income, and independent driving can all lead to a sense of captivity at home. This shrinking-world phenomenon may lead to physical inactivity, cognitive decline, and heightened fall risk. Stanley et al found that the experience of loneliness was a pressing issue. Peel et al found that healthy psychosocial factors (being married, living in the same home, etc) were protective, that is, prevented older adults from falls. It has been consistently reported that increased social contact (more than 5-7 per week) is correlated with a lower fall risk. On FRAS, subjects will self-rate their frequency of social contact (Figure 1, item 11). On the basis of the findings of Mossey and Strawbridge et al, a response indicating fewer social contacts (less than 2 per week) correlates to a high fall risk and triggers a recommendation for referral to an aging services provider.

**OVERALL FALL RISK**

In addition to examining each fall risk individually, FRAS is scored for overall fall risk. Scores in all columns are added for a score of 0 to 30 out of 30. Since FRAS is only a screening tool, there is greater risk in not identifying heightened fall risk than in overdiagnosing high fall risk. For this reason, a low cutoff of 5 was chosen. Scoring ranges may be updated following reliability and validity data analysis.

**Actions Recommended**

The interventions recommended in FRAS are based primarily on the referenced literature in combination with extensive clinical expertise of the authors. Clinical judgment of the PCP and/or referral practitioners, geographic location, third-party payor guidelines, and availability of staff will affect which interventions are utilized in this situation.

**DISCUSSION**

FRAS has been developed as a multifactorial, simple-to-administer, fall risk screening tool for community-dwelling adults older than 65 years. The tool is intended for use by minimally trained staff, with follow-up interpretation and action by the trained PCP. Evidence regarding many of the significant components of fall risk for community-dwelling older adults has been presented. Reliable and validated objective measures for these fall risks have been discussed. Action recommendations are included for consideration by the PCP to proactively address each aspect of heightened fall risk based on the patient’s individual needs.

Limitations impacted this article. Most fall risk studies deal with 1 risk factor or a limited group. Multifactorial studies each considered a different group of factors, making comparison between studies difficult. To maintain simplicity and brevity, not all risk factors could be included in FRAS or addressed in this article. However, some of these factors are indirectly included by items on FRAS. For instance, 1 study has concluded that cognition is measured indirectly by the TUG test. Gait disorders, quadriceps strength, and flexibility may all adversely affect the TUG test performance. Research to document the validity and reliability of FRAS is under way. Plans for dissemination of FRAS via a number of routes are being investigated. Future prospective longitudinal study is planned.

The population projections for this age group create a pressing time line for intervention. The need to add fall risk assessment in primary care has been well documented. Rubenstein et al found that community physicians appear to underdetect falls and gait disorders. As physical therapy evolves into a doctoring profession and we assume a greater role as PCPs, utilization of tools like FRAS will facilitate our comprehensive screening.

**CONCLUSIONS**

Early identification of heightened fall risk in community-dwelling older adults, when combined with proactive fall prevention interventions, should lead to a decrease in fall risk, fall rate, and injury or death resulting from falls. Providing the primary care office with a simple, objective, multifactorial screening tool, which includes targeted intervention recommendations, is imperative. Each component of FRAS represents 1 or more of the fall risk factors that have been demonstrated to significantly impact fall risk of community-dwelling older adults. Risk-taking behavior has been added...
to ascertain its significance as a fall risk factor. The interrelated effect of some of these risk factors has been clearly demonstrated in the literature. Assessing fall risk by using any 1 criterion may result in missing heightened fall risk in a significant portion of the older adult population. Considering each risk factor individually allows the PCP to provide targeted intervention for specific risk factors. PRFST is intended for administration by minimally trained staff in primary care offices and/or public health departments, with interpretation and management by PCPs to facilitate early identification and abatement of fall risk. Dissemination and utilization of this tool by PTs and PCPs should serve to abate fall risk and positively impact older adults’ ability to successfully age in place.

REFERENCES

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