ORGANIZATION NEWS

Information/Education Page

In-Home Falls Risk Assessment in Parkinson Disease: A Guide for Clinicians

Check for updates

Globally, neurologic disorders have become the leading cause of disability. According to the Global Burden of Disease Study, the fastest growing neurologic disorder is Parkinson disease (PD).[1] At the time of diagnosis, the risk of falls is twice as high in people with PD as in the general population. For the purpose of this Information/Education Page, a fall is defined as an event that results in a person coming to rest unintentionally on the ground or lower level, not as a result of a major intrinsic event or overwhelming hazard. Falls are a leading cause of disability in people living with PD. Falls risk increases with age and with disease progression. Consequently, it is critical for clinicians to evaluate, prevent, monitor, and educate their patients with PD about their fall risk.

The goal of this page is to assist any clinician who may perform a fall risk assessment within the home either in-person or virtually in selecting valid and reliable fall assessment tools and rationale for exercise. We provide information on how to evaluate fall risk at the patient's home as well as approaches to prevent falls. Falls risk assessment and exercise care for PD is different in PD than in adults without PD who fall. This is because of the complexity of PD's motor and nonmotor features, including freezing of gait, cognitive issues, and other co-occurring health conditions. A guide for clinician rehabilitative assessment or virtual care in the home is especially important when the person with PD is unable to seek or receive in-person hospital and/or outpatient therapy care. The advantage of assessing falls risk in the home

environment is that this is where most mobility problems are encountered.

Why are people with PD at risk of falling?

The reasons people with PD fall are multifactorial. Falls risk can be associated with prior falls; fear of falling; deep brain stimulation[2-4]; problems with balance control and walking-related mobility (eg, rigidity, freezing, loss of arm-swing); neuropsychological problems (eg, cognitive impairment, worsening semantic fluency[4]); co-occurring health conditions (eg, arthritis, cardiovascular disease, dementia); and demographic (for example disease duration), environmental, or pharmacologic factors (for example antidepressant use).

What can health care providers do to evaluate falls risk in the home?

To evaluate falls risk in the home, guidelines recommend[5] that home health care providers:

- Ask the patient about prior falls during each encounter. If the person answers 1 or more, then he/she is at increased risk of falls. Clarify the context of the fall (eg, how, when, where, and why the fall occurred) and use standardized, valid, and reliable falls assessment tools. Cutoff scores for estimating risk of falling in patients living with PD can be useful to differentiate between fallers from nonfallers (table 1).
- Administer a test to assess fear of falling, freezing of gait, cognitive status, attention, and executive function (see table 1).

Table 1 Tests and cutoff scores supportive of increased falls risk among people living with PD[5]

Fall Tools*	Equipment Needed	Instructions	Hoehn and Yahr Stage	Cutoff Score for Increased Fall Risk	Sensitivity (%), AUC or OR
History of falls (12 mo)[†]	• None	Ask patient how many falls they have experienced in 12 mo	1-5 1-3 1-4	≥1 fall ≥1 fall ≥1 fall	77 77, OR 5.36 OR 4.0
10MWT	• Stopwatch • Measuring tape	Walk 10 m at a self-selected speed	1-4	<0.98 m/s	80, AUC 0.80
FTSTS	• Stopwatch • Chair	Start seated in a chair, stand up and sit down 5 times	1-4	>16 s	75, AUC 0.77
TUG	• Stopwatch • Chair • Cone or tape mark • Measuring tape	Start seated in a chair, stand up, walk 3 m to the cone or tape mark, walk back to the chair, and sit down	2-3 1-4 2.8	≥7.95 s ≥8.5 s ≥16 s	93 68 OR 3.86
3-Step Falls Prediction Model • 10MWT[†] falls/12 mo • NFOG-Q	• History of falls taking • Stopwatch	Administer the 10MWT, ask about falls in past 12 mo, and administer the NFOG-Q	1-4	<1.1 m/s and ≥1 fall and FOG 1 mo	AUC 0.80 (95% CI, 0.73-0.86)
4-Step Falls Prediction Model[6] • TUG time • NFOG-Q sum score for items 3 +4+5+6	• NFOG-Q • History of falls taking • Stopwatch	Administer TUG, NFOG-Q, and the UPDRS tool and ask what year the patient was diagnosed with PD	2-4	≥2 UPDRS ≥5 NFOG-Q ≥15.6 s TUG	OR 2.97 (95% CI, 1.26-7.00) OR 3.56 (95% CI, 1.65-7.68) OR 3.29 (95% CI, 1.48-7.30)

(continued on next page)

Table 1 (*Continued*)

Fall Tools*	Equipment Needed	Instructions	Hoehn and Yahr Stage	Cutoff Score for Increased Fall Risk	Sensitivity (%), AUC or OR
• UPDRS item 15 (walking) disease duration				≥8.3 y dd	OR 2.16 (95% CI, 1.01-4.62) 71% for identifying fallers

Abbreviations: AUC, area under the curve; CI, confidence interval; dd, disease durations; FOG, freezing of gait; FTSTS, 5 times sit to stand test; NFOG-Q, New Freezing of Gait Questionnaire; OR, odds ratio; 10MWT, 10 meter walk test at self-selected walking speed; TUG, Timed Up and Go test; UPDRS, original version of the Unified Parkinson's Disease Rating Scale.

* Measures see: www.sralab.org/rehabilitation-measures/database.

† Predictive of fall in 6 months; Hoehn and Yahr stage column indicates the stage of Parkinson disease. AUC and sensitivity/OR are the AUC for discriminating between fallers and nonfallers and sensitivity/OR. In general, AUC of 0.7-0.8 is considered acceptable, 0.8-0.9 is considered excellent, and >0.9 is considered outstanding; an OR of 5.0 indicates 5 times higher odds of falls.

- Record number of years since PD diagnosis. If ≥8 years since PD diagnosis, then the patient is at increased risk of falls.
- Record medications known to interfere with cognition and/or lower the blood pressure. Antidepressants, addition of amantadine, and potentially anticholinergics or antipsychotics contribute to falls risk.[4]
- Record co-occurring health conditions that may increase risk of falls, including urinary incontinence or nocturia (getting up to use the bathroom at night), arthritis, depression, dementia (eg, Mini Mental Status Exam score <24), or visual deficits.
- Observe the patient walking (note lack of arm swing, freezing, flexed posturing, shuffling pattern, use of assistive devices) and performing transfers.
- Make note of potential environmental hazards (eg, loose rugs, clutter, power cords, poor lighting, slippery floor, inadequate footwear).
- Ask the patient if there is any change in the level of participation in Activities of Daily Living. If there is decrease or avoidance in participation in Activities of Daily Living due to social isolation refer to specialist such as neuropsychologist.
- If possible, track the amount of physical activity (steps) using wearable sensors.

The clinician may adapt any of these items to evaluate fall risk in the home for a virtual encounter (eg, asking a patient or family member to take photos or take video of different areas of the home to evaluate environmental hazards).

What are potential barriers to consider during virtual assessment of falls risk in PD?

Potential barriers include:

- People with advanced PD might have difficulty using digital technology owing to cognitive impairments or dementia.
- Remote rural areas may not have sufficient internet infrastructure to provide adequate video conferencing facilities or people with PD living in rural areas may not have access to internet.

- Concern over privacy issues may limit patients' willingness to connect remotely to care providers.
- Difficulty with/unable to use standardized assessment tools.

Why are in-home falls prevention exercises important for people with PD?

Clinician-led PD in-home or virtual falls assessment is a first logical step to determine falls risk in people living with PD. Recent studies indicate exercise is both neuroprotective and neurorestorative for people at all stages of PD. Resistance training and balance exercise improve balance, muscle strength, and other motor and nonmotor features of PD and potentially reduce the risk of falls.[7]

Parkinson disease resources

For additional resources about outcome measures in PD and falls, please refer to the literature citations or visit the Michael J. Fox Foundation website (www.michaeljfox.org/news/five-fall-prevention-strategies-people-parkinsons-disease). For video instructions on home exercises please see "The Parkinson Home Exercises App" recommended for use by the International Association of Parkinsonism and Related Disorders (https://www.iaprd.org/parkinson_home_exercises_app.html).

Resources on Parkinson disease subspecialty care via telemedicine can be accessed on the International Parkinson and Movement Disorders Society webpage (https://www.movementdisorders.org/MDS/About/Committees—Other-Groups/MDS-Study-Groups/Telemedicine-Study-Group.htm).

Authorship

This page was developed by Mark A. Hirsch, PhD, FACRM (*e-mail address:*Mark.Hirsch@atriumhealth.org); Pallavi Sood, PT, PhD; Art Hein, PT; Diana Chen Wong, OTD, OTR/L, CAPS; Patricia C. Heyn, PhD, FGSA, FACRM; and Erwin E. H. van Wegen, PhD. All authors contributed equally on behalf of the Neurodegenerative Diseases Networking Group, Alzheimer's Disease and Parkinsonism and Related

Movement Disorders Task Force of the American Congress of Rehabilitation Medicine.

Important notice

This information is not meant to replace the advice of a medical professional. This Information/Education Page may be reproduced for noncommercial use for health care professionals to share with patients and their care-partners. Any other reproduction is subject to approval by the publisher.

References

1. Global Burden of Disease Neurological Collaboration. Global, regional, and national burden of neurological disorders during 1990-2015: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol 2019;18:459–80.
2. Crispo JAG, Lam M, Le B, Shariff SZ, Ansell DR, Squarzolo M, Ouellette D, Thibault DP, Marras C, Willis AW, Seitz D. Survival and health care use after deep brain stimulation for Parkinson's disease. Can J Neurol Sci 2020;28:1–11.
3. Karachi C, Cormier-Dequaire F, Grabli D, et al. Clinical and anatomical predictors for freezing of gait and falls after subthalamic deep brain stimulation in Parkinson's disease patients. Parkinsonism Relat Disord 2019;62:91–7.
4. Parashos SA, Bloem BR, Browner NM, et al. What predicts falls in Parkinson disease?: Observations from the Parkinson's Foundation registry. Neurol Clin Pract 2018;8:214–22.
5. Keus SHJ, Munneke M, Graziano M, et al. European Physiotherapy guideline for Parkinson's disease. the Netherlands: KNGF/ParkinsonNet; 2014. www.parkinsonnet.com Accessed June 24, 2021 .
6. Lim I, van Wegen E, Jones D, et al. Identifying fallers with Parkinson's disease using home-based tests: who is at risk? Mov Disord 2008;23:2411–5.
7. Shen X, Wong-Yu ISK, Mak MK. Effects of exercise on falls, balance, and gaitability in Parkinson's disease: a meta-analysis. Neurorehabil Neural Repair 2016;30:512–27.