ACRM
AMERICAN CONGRESS OF REHABILITATION MEDICINE

Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2016;97:152-6

BRIEF REPORT

Use of a Short-Form Balance Confidence Scale to Predict Future Recurrent Falls in People With Parkinson Disease

Michael H. Cole, PhD,[a] Jodi Rippey, BSc,[a] Geraldine A. Naughton, PhD,[b] Peter A. Silburn, PhD, FRACP[c]

From the [a]School of Exercise Science, Australian Catholic University, Banyo, Queensland; [b]School of Exercise Science, Australian Catholic University, Fitzroy, Victoria; and [c]Asia-Pacific Center for Neuromodulation, Center for Clinical Research, The University of Queensland, Brisbane, Queensland, Australia.

Abstract

Objectives: To assess whether the 16-item Activities-specific Balance Confidence scale (ABC-16) and short-form 6-item Activities-specific Balance Confidence scale (ABC-6) could predict future recurrent falls in people with Parkinson disease (PD) and to validate the robustness of their predictive capacities.

Design: Twelve-month prospective cohort study.

Setting: General community.

Participants: People with idiopathic PD (N=79).

Interventions: Clinical tests were conducted to assess symptom severity, balance confidence, and medical history. Over the subsequent 12 months, participants recorded any falls on daily fall calendars, which they returned monthly by reply paid post.

Main Outcome Measures: Logistic regression and receiver operating characteristic analyses estimated the sensitivities and specificities of the ABC-16 and ABC-6 for predicting future recurrent falls in this cohort, and "leave-one-out" validation was used to assess their robustness.

Results: Of the 79 patients who completed follow-up, 28 (35.4%) fell more than once during the 12-month period. Both the ABC-16 and ABC-6 were significant predictors of future recurrent falls, and moderate sensitivities (ABC-16: 75.0%; ABC-6: 71.4%) and specificities (ABC-16: 76.5%; ABC-6: 74.5%) were reported for each tool for a cutoff score of 77.5 and 65.8, respectively.

Conclusions: The results have significant implications and demonstrate that the ABC-16 and ABC-6 independently identify patients with PD at risk of future recurrent falls.

Archives of Physical Medicine and Rehabilitation 2016;97:152-6

Parkinson disease (PD) is characterized by complex symptoms that impair physical function and increase the risk of recurrent falls.[1] Nearly 65% of people with PD report falling at least once each year, whereas up to 50% experience recurrent falls.[2-4] The increased prevalence of falls is compounded by impaired postural responses[5] that increase the risk of fall-related injuries, injury-related deaths, and hospitalization.[6] Although fall-related injuries often receive considerable attention, the psychological consequences of falling are equally disabling and cannot be overlooked.[7] Specifically, frequent falls contribute to reduced balance confidence and increased fear of future falls, which restricts one's physical activities and ultimately reduces independence and quality of life.

The 16-item Activities-specific Balance Confidence scale (ABC-16) has been widely used to assess balance confidence in people with PD, but the need to accurately and rapidly assess patient risk in clinical practice often requires more time-efficient tools. Despite being shorter, the 6-item Activities-specific Balance Confidence scale (ABC-6) has properties similar to those of the ABC-16 and, therefore, may be useful in assessing balance confidence in people with PD.[8] Although the Chinese translated Activities-specific Balance Confidence scale (ABC-C)

Supported by an Australian National Health and Medical Research Council Early Career Researcher Fellowship (project no. GNT1016481) and research funding provided by the Australian Catholic University (project no. 2013000570). The funding bodies did not contribute to data collection or data analysis and played no part in the decision to prepare and publish this manuscript.

Disclosures: none.

0003-9993/15/$36 - see front matter © 2016 by the American Congress of Rehabilitation Medicine
http://dx.doi.org/10.1016/j.apmr.2015.07.027

Table 1 Demographic data, balance confidence, and disease-specific scores for the participants with PD and the recurrent faller and nonrecurrent faller subgroups

Characteristic	All Patients (N=79)	Recurrent Faller (n=28)	Nonrecurrent Faller (n=51)	Test	*P*
Demographic characteristics					
Age (y)	68.1±0.9	69.5±1.6	67.3±1.1	1	.250
Sex: male	51 (64.6)	20 (71.4)	31 (60.8)	2	.344
Height (cm)	168.2±1.0	167.2±1.7	168.8±1.2	1	.451
Mass (kg)	74.3±1.8	70.3±2.9	76.5±2.2	1	.097
Body mass index (kg/m^2)	26.1±0.5	25.1±0.9	26.7±0.7	1	.134
Fall history and balance confidence					
ABC-16	77.5±1.9	67.9±3.1	82.8±2.1	3	<.001
ABC-6	67.2±2.6	55.4±4.0	73.7±3.0	3	<.001
Previous falls (12mo)	3.3±1.4	8.5±3.8	0.5±0.1	3	<.001
Neurological examination					
Disease duration (y)	6.1±0.5	8.4±1.0	4.8±0.5	3	.006
Levodopa (mg/d)	655.7±47.5	876.7±83.3	534.4±50.7	3	.001
Dopamine agonists	30 (38.0)	12 (42.9)	18 (35.3)	2	.508
Catechol-*O*-methyl transferase inhibitors	28 (35.4)	13 (46.4)	15 (29.4)	2	.130
Monoamine oxidase inhibitors	12 (15.2)	4 (14.3)	8 (15.7)	2	.868
Benzodiazepine	4 (5.1)	4 (14.3)	0 (0.0)	2	.006
No antiparkinsonian medication	5 (6.3)	0 (0.0)	5 (9.8)	2	.087
UPDRS I	3.2±0.2	3.4±0.4	3.0±0.2	3	.341
UPDRS II	11.3±0.6	14.0±1.1	9.8±0.6	3	.003
UPDRS III	20.2±1.0	25.1±1.5	17.6±1.2	1	<.001
UPDRS IV	3.9±0.3	5.0±0.7	3.4±0.3	3	.035
UPDRS total	34.7±1.5	42.5±2.5	30.4±1.6	1	<.001
PIGD score	4.7±0.4	6.3±0.7	3.7±0.3	3	.003
Freezing of Gait Questionnaire	5.8±0.6	9.1±1.0	4.0±0.5	3	<.001
Hoehn and Yahr stage scale	1.9±0.1	2.4±0.1	1.6±0.1	3	<.001
Schwab and England Activities of Daily Living Scale	80.9±1.1	74.6±1.8	84.3±1.1	3	<.001

NOTE. Values are mean ± SEM or as n (%).
Abbreviations: PIGD, postural instability and gait disability; Test 1, independent samples *t* test; Test 2, χ^2 test; Test 3, Mann-Whitney *U* test.

has been shown to independently predict future recurrent falls in people with PD,[7] it is unclear whether the ABC-16 and ABC-6 are suitable for screening fall risk in patients with PD. This prospective study aimed to assess whether the ABC-16 and ABC-6 were capable of predicting future recurrent falls in people with PD and to validate the robustness of their predictive capacities.

Methods

Study population

Seventy-nine people with idiopathic PD based on the UK Brain Bank Criteria[9] were recruited from neurology clinics and preexisting patient databases between August 2011 and June 2013. Participants were excluded if they had (1) recent surgery; (2) a recurrent history of musculoskeletal injury; (3) an inability to walk without assistance; (4) significant visual or cognitive impairments; or (5) received deep brain stimulation. Participants gave written informed consent in accordance with the Declaration of Helsinki, and the protocol was approved by the Australian Catholic University's Human Research Ethics Committee (approval no. Q2011 04).

List of abbreviations:

ABC-6 6-item Activities-specific Balance Confidence scale
ABC-16 16-item Activities-specific Balance Confidence scale
ABC-C Chinese translated Activities-specific Balance Confidence scale
PD Parkinson disease
ROC receiver operating characteristic
UPDRS Unified Parkinson's Disease Rating Scale

Clinical assessment

Participants completed questionnaires and clinical assessments to assess their medical history, symptom severity, and balance confidence. Specifically, symptom severity was assessed using the Freezing of Gait Questionnaire, Unified Parkinson's Disease Rating Scale (UPDRS), Hoehn and Yahr stage scale, and Schwab and England Activities of Daily Living Scale. The UPDRS is a universally accepted clinical test comprising 4 subscales that assess (1) changes in mentation, behavior, or mood; (2) difficulties with activities of daily living; (3) impairments in motor function; and (4) therapeutic complications. The Hoehn and Yahr stage scale assesses the stage of PD on the basis of the severity and