

Risk Factors for Falling Among Community-Based Seniors Using Home Care Services

Paula C. Fletcher¹ and John P. Hirdes²

¹Department of Kinesiology & Physical Education, Wilfrid Laurier University, Waterloo, Ontario, Canada.

²Department of Health Studies & Gerontology, University of Waterloo, and Canadian Collaborating Centre—interRAI, Homewood Research Institute, Guelph, Ontario, Canada.

Background. Despite the plethora of information concerning risk factors for falls, limited research efforts have focused on the issue of the differences in risk factors for falls based on fall status, or more specifically one-time versus chronic/recurrent fallers. Given that multiple falls have been found to be associated with negative outcomes, such as an increased risk of institutionalization, more research in this area is warranted.

Methods. The purpose of this investigation was to determine the risk factors for nonfallers versus fallers (1+ falls), and for nonfallers/one-time fallers versus recurrent fallers (2+ falls). All participants ($N = 2304$) in this study were receiving home care services from 10 community-based agencies (Community Care Access Centres) in Ontario, Canada. The Minimum Data Set—Home Care (MDS-HC) is an assessment instrument that covers several key domains, such as service use, function, health, and social support. Nurses trained to administer the MDS-HC assessed each of the participants within their homes.

Results. Of the 2304 participants in the study, 27% fell one or more times, and 10% experienced multiple falls (2+ falls). In the two final logistic regression models for risk of falling (0 falls vs 1+ falls) and multiple falling (0 falls/1 fall vs 2+ falls), the independent variables that remained significant included gender, gait, environmental hazards, and the Changes in Health, End Stage Disease and Signs and Symptoms of Medical Problems Scale. Also significant in the model for multiple falls was the Cognitive Performance Scale, Parkinson's disease, and perceived health status.

Conclusions. Overall, distinguishing individuals into different fall status classifications is important from a clinical perspective, as it is the recurrent faller who would benefit to the greatest extent from fall prevention efforts and from the negative outcomes associated with multiple falls (i.e., mortality). One of the most significant barriers in determining risk factors for falls is the lack of consistency in the variables/tools used in the research. As such, utilizing a standardized tool, such as the MDS-HC, would assist researchers in making comparisons between different settings.

FALLING results in substantial disability, morbidity, and mortality among seniors. For example, falling is the leading cause of injury admissions to acute care hospitals and in-hospital deaths (1,2). Each year, approximately one third of seniors experience a fall, (3–5), although the majority of falls do not lead to serious injury, hospitalization, or death (6,7). However, many elderly individuals experience complications, including restricted activity, soft tissue injuries, or fractures (8–11) as a direct result of the fall event.

The literature consistently identifies multiple risk factors for falling among the community-based elderly population, including having a history of previous falls (4,12), being functionally impaired (3,7,11,13), being of advanced age (3,4,13), being female (4,14–16), using various medications or multiple medications (4,17–22), having specific conditions, diseases, or physiological limitations (3–5,23,24) and comorbidity (16), having cognitive impairments (4,16,25), having factors contributing to postural instability and gait impairments (7,16,26,27), performing activities such as bed transfers (3), climbing stairs (28,29), and night urination (24,30), and environmental influences or engaging in routine activities (i.e., walking on stairs) (13,31,32).

Despite the volume of information concerning these risk factors, few studies have dealt with the issue of the differences in risk factors for falls based on fall status, or more

specifically one-time versus chronic/recurrent fallers. Nevitt and colleagues (25) suggested that risk factors for one-time fallers appeared to be less robust than for chronic fallers. Further, single falls were generally less predictable and may have been the result of an accident (e.g., environmental hazard) or an overwhelming incident (e.g., myocardial infarction), whereas multiple falls may have been more indicative of intrinsic factors (e.g., physiological predisposition to falling, chronic disease, physiological disability) (25,33). After completing a one-year prospective study to determine the risk factors for falling using a sample of community-based seniors, Tinetti and colleagues (5) concluded that the risk factors for multiple fallers as compared to one-time fallers were the same; however, the magnitude of the associations were stronger for recurrent fallers. Use of sedatives, cognitive impairments, lower-extremity disability, palmomental reflex, foot problems, and number of balance-and-gait abnormalities were significant predictors of falls, and the risk of falling increased linearly with the number of these risk factors present (5).

Graafmans and colleagues (34) found that mobility impairments and dizziness were associated with falls (1+ falls) and recurrent falls (2+ falls); however, history of stroke, poor mental state, and postural hypotension were associated with being a recurrent faller only. Lord and col-

leagues (27) found five factors that significantly distinguished recurrent fallers from nonfallers/one-time fallers: sway, proprioception in the lower limbs, visual contrast sensitivity, quadriceps strength, and reaction time. However, this analysis was restricted to physiological factors associated with falls. Other studies of different patterns of falls focused only on certain types of variables (e.g., balance [35] or medications [19]) or failed to examine multivariate models (36). Therefore, they failed to provide comprehensive information about risk factors for recurrent fallers from a multifactorial perspective.

Based on information to date, one-time fallers and multiple/recurrent fallers appear to represent two distinct groups. For example, it would appear that single falls are often chance events that may not be modifiable through intervention, whereas multiple falls would seem to be characteristic of a group of older and more frail seniors with a greater number of comorbid conditions or physiological impairments. Given that multiple falls have been found to be associated with negative outcomes, such as an increased risk of institutionalization (37), more research in this area is warranted. This investigation aims to determine the risk factors for nonfallers versus fallers (1+ falls) and for nonfallers/one-time fallers versus recurrent fallers (2+ falls) using data from a comprehensive assessment completed by home care professionals.

METHODS

Subjects and Data Collection Measure

All participants ($N = 2304$) in this study were receiving home care services from 10 community-based agencies (Community Care Access Centres [CCACs]) in Ontario, Canada. Each of the CCACs utilized the home care version of the Resident Assessment Instrument on a pilot basis. The Resident Assessment Instrument–Home Care (RAI-HC) is a comprehensive and standardized assessment tool used to evaluate the needs and ability levels of older adults utilizing home care services. The RAI-HC consists of two core elements: the Minimum Data Set–Home Care (MDS-HC) and the Clinical Assessment Protocols (CAPs). The MDS-HC is the screening portion of the instrument, which serves as a brief assessment instrument covering several key domains, such as service use, function, health, and social support (Table 1). In addition, the MDS-HC identifies individuals who

Table 1. Domain Areas Assessed in the MDS-HC

Demographics	Disease diagnoses
Referral	Health conditions
Cognition	Preventive health measures
Communication	Nutrition/hydration
Vision	Dental status
Mood and behavior	Skin condition
Social functioning	Environmental assessment
Informal support	Service utilization
ADLs and IADLs	Medications
Continence	

Note: MDS-HC = Minimum Data Set–Home Care; ADLs = activities of daily living; IADLs = instrumental activities of daily living.

Table 2. Clinical Assessment Protocols (CAPs) Triggered by the MDS-HC

Functional Performance	Continence
ADL rehabilitation potential	Bowel management
Health promotion	Urinary incontinence and indwelling catheters
IADLs	Service Oversight
Institutional risk	Adherence
Sensory Performance	Medication management
Communication disorders	Preventive health care measures
Visual function	Reduction in formal services
Health Problems/Syndromes	Brittle support system
Cardiorespiratory	Palliative care
Falls	Psychotropic drugs
Oral health	Environmental assessment
Skin and foot conditions	
Dehydration	
Nutrition	
Pressure ulcers	
Pain	

Notes: MDS-HC = Minimum Data Set–Home Care; ADL = activity of daily living; IADLs = instrumental activities of daily living.

may benefit from more extensive evaluation and care planning through 30 problem-oriented Clinical Assessment Protocols or CAPs (Table 2) (38,39). Prior to data collection, the nurses were trained to administer the MDS-HC and subsequently assessed each of the participants in his or her home.

The MDS-HC was developed by investigators from Canada, France, Italy, Japan, Netherlands, Switzerland, the United Kingdom, and the United States. The reliability and validity of the instrument were established through a five-country study that included Canada and the United States (39). Studies of the use of the MDS-HC for preventive home screening are currently underway in Canada and in 10 European countries. In short, the MDS-HC provides a comprehensive assessment of the full range of client needs, and it directly supports the development of person-specific care plans. The MDS-HC takes approximately 45 to 60 minutes to complete.

The independent variables representing the risk factors for falls have been grouped into the following sections: (i) sociodemographic and social relationship variables (age, gender, marital status, education, living arrangements, change in social activities, amount of time alone during the day); (ii) measures of frailty (various chronic diseases, perceived health status, cognition or Cognitive Performance Scale [CPS] or Changes in Health, End Stage Disease and Signs and Symptoms of Medical Problems [CHESS] Scale); and (iii) exposure to risk variables (gait, environmental hazards, various medications). The Cognitive Performance Scale, a measure that describes cognitive status, is based on four items from the MDS-HC: short-term memory, cognitive decision making, making self understood, and dependent eating. The CHESS Scale, which is indicative of the degree of frailty or medical instability, utilizes a combination of the following items dealing with changes in health (activities of daily living and cognitive decline), end-stage disease, and signs and symptoms of medical conditions (i.e.,

edema, shortness of breath, weight loss, dehydration, loss of appetite, diarrhea, vomiting). Scores range from 0 (indicating no instability) to a high of 5.

The dependent variable was fall status. Specifically, individuals were asked whether they had fallen in the past 90 days. The outcome variable was dichotomized in two ways, as two analyses were completed: (i) 0 falls versus 1 or more falls and (ii) 0 falls/1 fall versus 2 or more falls.

Data Analysis

Logistic regression was utilized to analyze the data with fall status as the dependent variable and other MDS-HC variables as the independent variables. Stepwise methods were not used in the logistic regression analyses. Rather, a variety of models were examined in order to rule out order effects prior to specification of the final model. Only the independent measures found to be significant at the bivariate level ($p < .05$) were examined in multivariate models. The final logistic regression models were used to estimate the adjusted odds ratios for the main and interactive effects for the measures investigated.

Table 3. Percentage (Frequency) Distributions of Sociodemographic Variables and Social Relationship Variables Utilizing the MDS-HC

Variable	Percentage (Frequency)
Age	
65–69 years of age	7.8 (179)
70–74 years of age	13.9 (321)
75–79 years of age	23.1 (531)
80–84 years of age	25.7 (591)
85 years of age and older	29.6 (682)
Gender	
Women	71.8 (1653)
Men	28.3 (651)
Marital Status	
Never married	6.0 (138)
Married	33.2 (762)
Widowed	55.6 (1276)
Other	5.1 (118)
Education	
Elementary/no schooling	33.8 (773)
Secondary/some secondary	43.4 (992)
Technical/trade or some post secondary	16.6 (379)
Diploma/university/graduate degree	6.2 (141)
Living Arrangements (at Referral)	
Lived alone	47.7 (1048)
Lived with spouse only	28.8 (634)
Other	23.5 (517)
Change in Social Activities	
No decline	69.7 (1598)
Decline, not distressed	20.8 (476)
Decline, distressed	9.6 (220)
Amount of Time Alone During Day	
Never or hardly ever	33.3 (766)
About one hour	11.3 (261)
Long periods of time (i.e., all morning)	30.6 (703)
All of the time	24.8 (571)

Note: MDS-HC = Minimum Data Set–Home Care.

Table 4. Percentage (Frequency) Distributions of Measures of Frailty Utilizing the MDS-HC

Variable	Percentage (Frequency)
Stroke	
No stroke	84.9 (1952)
Stroke	15.1 (347)
Heart Disease	
No heart disease	82.3 (1893)
Heart disease	17.7 (406)
Hypertension	
No hypertension	62.9 (1447)
Hypertension	37.1 (852)
Parkinson's Disease	
No Parkinson's disease	95.6 (2200)
Parkinson's disease	4.4 (101)
Alzheimer's Disease	
No Alzheimer's disease	93.9 (2158)
Alzheimer's disease	6.1 (141)
Arthritis	
No arthritis	52.5 (1208)
Arthritis	47.5 (1091)
Osteoporosis	
No osteoporosis	88.4 (2032)
Osteoporosis	11.6 (267)
Hip Fracture	
No hip fracture	95.7 (2201)
Hip fracture	4.3 (987)
Glaucoma or Cataracts	
No glaucoma or cataracts	78.0 (1798)
Glaucoma or cataracts	22.0 (506)
Vision	
Adequate vision	71.9 (1656)
Impaired moderately	24.4 (562)
Severely impaired	3.7 (86)
Perceived Health Status	
Perceived good health	69.2 (1594)
Perceived poor health	30.8 (710)

Note: MDS-HC = Minimum Data Set–Home Care.

RESULTS

Univariate Results

The univariate distributions have been summarized in Tables 3 through 6. Table 3 provides results for the sociodemographic and social variables. The majority of the 2304 participants sampled were between the ages of 75 and 79 years of age (23%), 80 to 84 years of age (26%), or 80 years of age and older (30%) (Table 3). Women comprised 72% of the sample, while 28% were men. With respect to marital status, 56% and 33% were widowed and married, respectively. Approximately 77% of the sample had obtained a secondary education or less. Forty-eight percent of the sample lived alone, while 29% lived with their spouses. Seventy percent of the participants had not had a change in their social activities during the past 90 days, while 21% reported a decline in their social activities but they were not distressed by the change. An additional 10% were distressed by the changes that had occurred in their social activities (Table 3).

Univariate distributions for measures of frailty have been summarized in Table 4. The majority of the sample (69%) reported perceiving their health to be good. With respect

Table 5. Percentage (Frequency) Distributions of Exposure to Risk Measures Utilizing the MDS-HC

Variable	Percentage (Frequency)
Gait*	
Not impaired	46.5 (1070)
Impaired	53.5 (1232)
Environmental Hazards†	
0 environmental hazards	88.4 (2046)
1 environmental hazard	7.69 (177)
2 or more environmental hazards	3.47 (80)
Antipsychotic/Neuroleptic Medications	
Non use	95.0 (2184)
Use	5.0 (114)
Anxiolytic Medications	
Non use	83.1 (1913)
Use	16.9 (388)
Antidepressant Medications	
Non use	81.8 (1880)
Use	18.2 (418)
Hypnotic Medications	
Non use	96.0 (2204)
Use	4.0 (92)

Note: MDS-HC = Minimum Data Set–Home Care.

*In the MDS-HC Section on unsteady gait, the following information is provided: "A gait that places the client at risk of falling. Unsteady gaits take many forms. The client may appear unbalanced or walk with a sway. Other gaits may have uncoordinated or jerking movements. Examples of unsteady gaits may include fast gaits with large, careless movements; abnormally slow gaits with small shuffling steps; or wide-based gaits with halting, tentative steps."

†In the section on "Environmental Hazards," the assessor is asked to check any of the following that make the home environment hazardous: lighting in evening (including inadequate or no lighting in living room, sleeping room, kitchen, toilet, corridors); flooring and carpeting (e.g., holes in floor, electric wires where client walks, scatter rugs); bathroom and toilet room (e.g., nonoperating toilet, leaking pipes, no rails though needed, slippery bathtub, outside toilet); kitchen (e.g., dangerous stove, inoperative refrigerator, infestation by rats or bugs); heating and cooling (e.g., too hot in summer, too cold in winter, wood stove in a home with an asthmatic); access to home (e.g., difficulty entering/leaving home); access to rooms in house (e.g., unable to climb stairs).

to medical conditions, the most frequently reported consisted of arthritis (48%), hypertension (37%), glaucoma or cataracts (22%), heart disease (18%), and stroke (15%). Less frequently occurring conditions included osteoporosis (12%), Alzheimer's disease (6%), Parkinson's disease (4%), fractures of the hip (4%), and impaired (24%) or severely impaired (4%) vision.

Measures of exposure to risk variables are summarized in Table 5. About 54% of the sample were categorized as having a gait impairment, while 12% had one or more environmental hazards within their homes. With respect to medication, anxiolytics (17%) and antidepressants (18%) were used more frequently than hypnotics (4%) and neuroleptics (5%).

The distribution for the dependent variables employed within the logistic regression analyses is summarized in Table 6. For the analysis of nonfallers versus fallers (1+ falls), 73% of the sample were classified as nonfallers, while 27% were deemed fallers. For the second logistic analysis, 90% of the sample experienced no falls or one fall, while 10% experienced multiple falls (2+ falls).

Table 6. Percentage (Frequency) of Fall Status, Utilizing the MDS-HC

Variable	Frequency (Percentage)
Falls	
No falls	73.0 (1679)
1 or more falls	27.0 (621)
Falls	
0 or 1 falls	89.7 (2063)
Multiple falls (2 or more falls)	10.3 (237)

Notes: The MDS-HC defines a fall as "an unintentional change in position where the elder ends up on the floor or ground. A fall may result from intrinsic or extrinsic causes or both." MDS-HC = Minimum Data Set–Home Care.

Multivariate Results

In the final logistic regression model for risk of falling (0 falls vs 1+ falls), the independent variables that remained significant included gender, gait, environmental hazards, and the CHESS Scale (Table 7). No interaction terms were significant in the final model. Specifically, being male was associated with an increased risk of falling as indicated by an odds ratios of 1.31. Individuals with impaired gait were also more likely to experience falling (odds ratio [OR] = 2.50). Seniors who had one or more environmental hazards within their homes were 1.20 times more likely to experience a fall, and those with higher scores on the CHESS Scale (OR = 1.20) were at greater risk of falling, a difference of 5 points on the CHESS, representing the highest and lowest possible scores, resulting in an OR of about 2.50.

The risk factors significant in the second logistic model, namely nonfallers/one-time fallers versus recurrent fallers (2+ falls), included the same four variables in the first model (Table 7). Also significant in this model were CPS,

Table 7. Multiple Logistic Regression Models for Risk of Falling

Independent Variables	Model One Odds Ratios (Confidence Intervals) for Fallers (1+ falls)	Model Two Odds Ratios (Confidence Intervals) for Multiple Fallers
Gender		
Female	1.00	1.00
Male	1.31 (1.07, 1.62)*	1.45 (1.08, 1.95)*
Gait		
Not impaired	1.00	1.00
Impaired	2.50 (2.05, 3.07)†	2.80 (2.01, 3.89)†
Count of		
Environmental Hazards	1.20 (1.01, 1.43)‡	1.35 (1.04, 1.59)‡
CHESS Scale		
(single-point increment)	1.20 (1.11, 1.31)†	1.29 (1.15, 1.47)†
Cognitive Performance Scale		
(single-point increment)		1.13 (1.02, 1.25)*
Parkinson's Disease (PD)		
Do not have PD		1.00
Have PD		2.47 (1.50, 4.07)†
Health Status		
Good health		1.00
Poor health		1.35 (1.01, 1.82)‡

Note: CHESS = Changes in Health, End Stage Disease and Signs and Symptoms of Medical Problems.

‡*p* < .05; **p* < .01; †*p* < .001.

Parkinson's disease, and perceived health status. Men were 1.45 times more likely to be at risk for multiple falls than women. Individuals with impaired gait were also more likely to experience 2+ fall events (OR = 2.80). Having environmental hazards within the home increased risk of recurrent falls by 1.35 times, whereas higher scores on the CHESS Scale increased fall risk by 1.29 per single unit increment. Clients with Parkinson's disease and impaired cognition scores were also more likely to fall two or more times, as indicated by odds ratios of 2.47 and 1.13, respectively. A six-point differential on the CPS, again representing extreme scores, results in a 2.08 increase in the odds of multiple falls. Lastly, those with poor self-rated health had an increased risk of multiple falls by 1.35 times. There were no significant interaction terms in either of the final logistic regression models.

DISCUSSION

This study examined two different outcome measures for fall events among home care clients: no falls versus one or more falls, and no falls/less than one fall versus recurrent falls (2+ falls) (Table 7). Categorization and analyses of falls in this manner is consistent with the literature (34,40). Differentiating "one-time fallers" and "recurrent fallers" is important from a clinical viewpoint as the latter group is more likely to be targeted and to benefit from preventive efforts (34). Analyses revealed four variables that were significant in both models, namely gender (males), impaired gait, presence of environmental hazards within the home, and higher scores on the CHESS Scale for medical instability. However, three other factors were significant predictors of multiple falls: impaired cognition, Parkinson's disease, and poor self-rated health.

The present findings differ from the majority of research concerning gender. Men were 1.31 times and 1.45 times more likely to be at risk for a fall or recurrent falls, respectively. The bulk of literature suggests that women have an increased risk of falling in comparison to men (3,4,13–16,21,41,42); however, there have been speculations that increased falls among women may be the result of the reluctance of men to report falling, the result of variables not examined (i.e., differences in gait, knee action) (15,42), or factors associated with being female gender, like osteoporosis (43,44) or medication use (i.e., psychotropic medications) (15,21). Other research suggests that more women may be injured by a fall, but more men die from fall-related injuries (45). This may be related to the fact that men not only take more risks, but also experience more traumatic injuries. It is conceivable that this group of male fallers receiving home care services may represent a distinct group as compared to other men in the fall literature. For example, the men within this study may be receiving home care services as a direct result of injurious falls, or this study may include men who are able to remain in the home with the support of their spouses and home care services. Similar opportunities may not be available to women who experience injurious falls. Alternatively, unpublished results also using this data revealed that women were more fearful of falling than men (Fletcher & Hirdes, unpublished data, 2002). As such, it is possible that women feared that they may fall so

they restricted their activity and thus experienced fewer falls. Another possibility is the men in this group were more severely impaired or widowed and thus required more home care than the women within this group; however, there were no significant interaction terms between gender and the CHESS or marital status. Regardless, more research in this area is needed to ascertain whether community-based men receiving home care experience more falls than women, whether the group in question is distinct from other groups of community-based seniors, or whether men experienced more falls than women because women restrict their activity because of their fear of falling.

Individuals with impaired gait were also found to be associated with an increased risk of falls and recurrent falls. For example, individuals with impaired mobility were 1.65 times more likely to experience a fall, as compared to those with no impairments in mobility (42). Wickham and colleagues (46) determined that seniors with impaired mobility were 2.0 times more likely to experience a fall. Other support for the relationship between impaired mobility and fall risk, as measured by impairments in balance and gait, were found to be associated with falls (3,4,14,18), multiple falls (25,27), serious injuries resulting from falling (16,28), and mortality associated with falls (13). Given the significant influence that impaired gait, balance, and mobility have on elderly adults, it would seem essential that preventive interventions include a component that restores, improves, or maintains the balance control system.

Environmental hazards may not always be used as predictors or risk factors in fall research, but rather are defined as causal agents or contributing factors in the fall event. Therefore, they may not be entered as risk factors in multivariate models. However, the contribution of environmental hazards is an important consideration related to the need for environmental modifications in prevention efforts (47–50). Campbell and colleagues (51), Connell (52), and Hindmarsh and Estes (53) found that environmental hazards contribute to falls among seniors, which is consistent with the findings for falls and recurrent falls in this research.

The CHESS Scale, which measures changes in health and medical signs and symptoms, was also a significant predictor of falls and recurrent falls. This measure is a relatively new scale and has not been used in other falls research. However, many of the key components inherent in the scale itself have been established as risk factors for falls (e.g., incontinence [24,25,30,42], activities of daily living [54], and cognition [10]). Future work in the predictive value of the CHESS Scale is warranted given that it is a standard component of the MDS-HC, which is now being adapted by home care agencies in several U.S. states and Canadian provinces.

Impaired cognition and Parkinson's disease were two of the risk factors that distinguished fallers from recurrent fallers. Individuals with impairments in cognitive status as measured by the CPS were more likely to experience two or more falls, but not one or more falls. Cognitive impairment has been linked to increased risk of falling (5,11,55) and recurrent falling (5,34). Graafmans and colleagues (34) reported that individuals with compromised mental status were 2.4 times more likely to experience recurrent falls. In

addition, impairments in cognition may be indicative of the early stages of dementia, and, as such, multiple falls may be a sign that intervention is required. Parkinson's disease, a progressive degenerative neurologic disorder, was also predictive of recurrent falls, but not one or more falls. Lipsitz and colleagues (40) showed that Parkinsonism was one of the causes of recurrent falls in frail, community-based seniors. Ambulating safely through one's environment requires physical stability and sound mental capacity to react to hazardous conditions. As such, the contribution that cognition and Parkinson's disease have on fall status is not surprising.

Poor self-rated health is the remaining significant variable in the final model for recurrent falls. Studies by Vellas and colleagues (32) and Stalenhoef and colleagues (56) provide confirmatory evidence of the predictive value of health status for falls, injurious falls, or recurrent falls. Perceived measures of health may be useful in identifying those at risk of falling, or more specifically recurrent falling, particularly when clinical assessments may be too expensive or difficult to conduct (32). More research in determining whether perceived poor health has predictive value in and of itself or is a surrogate measure of other conditions such as various chronic conditions, physiological impairments, or use of certain medication is warranted.

Underreporting of falls is one limitation that may have affected the present results. The number of falls may have been underreported because of problems with recall (18) given the retrospective design of the study. Tideiksaar (57) suggests that reliance on self-reporting may also be problematic if seniors do not want to admit they have experienced a fall because they (i) attribute the fall to consequences of normal aging; (ii) deny the fall because it reminded them of increasing frailty and dependency; or (iii) fear that reporting it would lead to restriction of activities or to institutionalization. Further, the cross-sectional nature of the study may also limit the conclusions that can be drawn from the multivariate analyses, as cross-sectional designs do not allow researchers to establish a temporal order for factors associated with the fall event.

The risk factors found to be significant in the final logistic regression models for one or more falls and recurrent falls (2+ falls) are consistent with previous falls research with seniors, with the exception of the two scales inherent in the MDS-HC and the male gender finding. Distinguishing individuals into different fall status classifications is important from a clinical perspective, as it is the recurrent fallers that would benefit to the greatest extent from fall prevention efforts, and from the negative outcomes associated with multiple falls (i.e., mortality) (58). One of the most significant barriers in the area of determining risk factors for falls is the lack of consistency in the variables/tools used in the research. As such, utilizing a standardized tool, such as the MDS-HC, would assist researchers in making comparisons between different settings. Currently, five Canadian provinces/territories, seven states, and Veterans Affairs in the United States are either in the process of implementing or are utilizing the MDS-HC as their home care assessment instrument. Further, an assessment instrument, like the MDS-HC, provides thorough comprehensive health information

about clients and indicates those who may benefit from more extensive evaluation and/or care planning.

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Address correspondence to Paula C. Fletcher, PhD, Department of Kinesiology and Physical Education, Wilfrid Laurier University, Waterloo, Ontario N2L 3C5 Canada. E-mail: pflatche@wlu.ca

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