

Group differences in fall risk assessment between non-fallers, single fallers, and recurrent fallers in community dwelling older adults.



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BACKGROUND & SIGNIFICANCE

The Center for Disease Control and Prevention report that each year 2.5 million older adults are seen by emergency personnel for fall related injuries^{1,2} while falls contribute to 50% of injury-related hospitalizations among those 65 years and older.³ In 2015, direct medical costs for falls grossed \$637.5 billion for fatal injuries and \$31.3 billion for non-fatal injuries.⁶ With our growing population of older adults and rising healthcare costs, understanding falls and its risk factors has become vital to reduce risk and health care costs. Current evidence has examined the differences between non-fallers and recurrent fallers or non-fallers and fallers, but few have looked at the single faller in comparison to both the non-faller and recurrent faller. This study aims to see how the single faller may differ from the non-faller and recurrent faller, as their fall risk may be more situationally or environmentally based than biological, physical, or functional. Understanding the single faller may help to better identify risk factors that differentiates this group. Previous history of falls is the largest predictor of future falls.^{4,5} By understanding and possibly stopping the first fall, fall risk can be reduced. Many studies examine cognition and fall risk in individuals that already have cognitive impairments; however, the studies have not looked at gait speed and fall risk in the cognitively intact population.

PURPOSE

The purpose of this study was to examine group differences in performance and self-report measures distinguishing non-fallers, single fallers, and recurrent fallers in community dwelling older adults over the age of 60.

METHODS & MATERIALS

Fifty-seven community dwelling older adults over the age of 60 in The Villages, Florida completed the following assessments: Mini Mental State Examination (MMSE), Activities-specific Balance Confidence (ABC) Scale, Falls Efficacy Scale-International (FES-I), 30 Second Chair Stand, Functional Reach (FR), and gait speed (comfortable and fast) using the GAITRite® system. Participants reported the number of falls over 12 months. A one-way analysis of variance (ANOVA) examined differences between non-, single, and recurrent fallers on each measure. Post-hoc analyses through the Tukey test were performed as indicated by significant omnibus results to determine further differences among the three groups mentioned above. Significance was set at 0.05.

Participants were excluded if they had presence of Parkinson's disease, brain tumor, traumatic brain injury; inability to complete testing protocol; a score of less than 24/30 on the Mini Mental State Examination (MMSE); conditions of the inner ear, brain stem or cerebellum that would cause dizziness or falls; use of medications known to increase fall risk (e.g., CNS/psychoactive or medications that caused sedation, confusion, hypotension); or visual impairments that affected ability to complete activities of daily living

RESULTS

Table 1. Participant Characteristics

Characteristic	Group (N=57)	Non-Faller (n=37)	Single Faller (n=9)	Recurrent Faller (n=11)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
MMSE	28.05 (1.38)	28.62 (1.16)	27.44 (1.13)	26.64 (1.03)
Comfortable Gait Speed (cm/s)	117.19 (28.04)	125.71 (20.95)	113.49 (30.91)	91.56 (32.60)
Fast Gait Speed (cm/s)	161.05 (44.42)	173.26 (34.58)	159.86 (51.34)	120.97 (48.16)
Falls Efficacy Scale	24.63 (8.35)	22.81 (6.94)	25.67 (10.03)	29.91 (9.65)
ABC Scale	82.51 (17.61)	86.29 (15.12)	77.78 (20.16)	73.69 (20.72)
30-Second Chair Stand	11.61 (4.01)	12.89 (3.35)	10.11 (4.46)	8.55 (3.91)
Functional Reach Score	30.98 (8.32)	32.13 (7.83)	31.90 (7.40)	26.39 (9.70)

Table 2: Group Differences

Variable	F	p
MMSE	14.525	.000*
Comfortable Gait Speed	7.963	.001**
Fast Gait Speed	7.171	.002**
Falls Efficacy Scale	3.415	.040***
ABC Scale	2.711	.076
30-Second Chair Stand	6.959	.002**
Functional Reach Score	2.170	.124

Note. * post hoc identified difference in non- and single faller p<.05 and non- and recurrent faller p<.01
** post hoc identified difference in non- and recurrent faller p<.01
*** post hoc identified difference in non- and recurrent faller p<.05

Table 3: Group Differences MMSE Controlled

Variable	F	p
Comfortable Gait Speed	1.877	.163
Fast Gait Speed	1.639	.204
Falls Efficacy Scale	.292	.748
ABC Scale	.035	.965
30-Second Chair Stand	2.676	.078
Functional Reach Score	.701	.501

RESULTS

Of the fifty-seven participants, thirty-eight (68%) were categorized as non-fallers, nine (15.8%) as single fallers, and eleven (19.3%) as recurrent fallers. Overall, significant group differences were found for several physical performance measures including fast gait speed, ($F(2,54)=7.17, p<.01$) comfortable gait speed ($F(2,54)=7.96, p<.01$), and 30-second Chair Stand ($F(2,54)=6.96, p<.01$), indicating that there are differences in both physical and psychological measures that distinguish between non-fallers, single fallers, and recurrent fallers. Mixed results were found regarding fear of falling with significant group differences on the FES ($F(2,54)=3.42, p=.04$), but only marginal significance for the ABC Scale ($F(2,54)=2.71, p=.08$). I, indicating that there are differences in both performance-based and self-report measures that distinguish between non-fallers, single fallers, and recurrent fallers. There were no significant group differences for the Functional Reach Score. Additionally, significant group differences were noted for cognitive function examined through the MMSE ($F(2,54)=14.53, p<.01$). When statistically controlling for cognitive status, All functional measures (comfortable and fast gait speed, 30-second chair stand) along with the FES-I no longer displayed significant group differences when controlling for cognitive status.

CONCLUSION

This study revealed group differences in fall risk assessments between non-fallers and recurrent fallers as well as non-fallers and single fallers but no differences were found between single fallers and recurrent fallers. This suggests that non-fallers and single fallers may be either more similar or different on variables that were not examined in this study and thus more difficult to differentiate in the clinical setting. Findings also suggest that cognitive status plays an important part in both fall risk and gait speed in cognitively unimpaired older adults. Further research needs to be conducted to establish the relationship between cognition, falls, and gait speed in unimpaired older adults.

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