



Fall Risk Screening in Community Dwelling Older Adults

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Background/Purpose

Fall prevention for older adults has become a priority of public health as the population ages.¹

A pivotal component of fall prevention is to identify individuals at risk of falling through screening methods, such as standardized outcome measures that assess an individual's balance limitations.²⁻⁴

The purpose of this study was to determine the discriminative validity of the fall risk screening abilities of the Four-Square Step Test (FSST), Berg Balance Scale (BBS), Short Physical Performance Battery (SPPB), Gait Speed (10m and 4m), and the self-reported Activity Specific Balance Confidence (ABC) scale in community dwelling older adults.

The study also aimed to test the concurrent validity of these measures in community dwelling elderly.

Methods

Thirty individuals ≥ 65 years of age were recruited from community setting using convenience sampling.

Outcome measures administered to all the participant included: the FSST, BBS, SPPB, Gait Speed (10m and 4m), and the ABC scale using standardized guidelines.

Three physical therapy students obtained all the study data. They had undergone a standardized session to ensure interrater reliability and minimize systematic error in data collection.

Descriptive statistics for the outcome measures were calculated and Shapiro Wilk test examined the normality.

The concurrent relationships were examined between the fall risk measures by assessing Pearson Correlation Coefficient (r), where r values of > 0.70 , $0.41-0.70$, and ≤ 0.40 were considered indicating high, medium, and low relationships.

Discriminative validity of the measures were assessed by assessing the scores for the outcome measures for the groups that scored ≤ 10 versus > 10 on the SPPB.

Results

Table 1-- Descriptive Statistics of Participants

Group and Variable	Frequency (%) or Mean \pm SD
Number of Participants	33 (100%)
Age	75.12 \pm 7.14
Gender	
Male	6 (18.2%)
Female	27 (81.8%)
BMI	28.51 \pm 5.07
Comorbidity Count	1.91 \pm 1.55
Self-Reported Fall(s) in Past Year	23 (69.7%)
Diagnosis of Osteoporosis	25 (75.8%)
Tobacco Users	8 (24.2%)
Alcohol Users	3 (9.1%)

Table 2-- Correlation Between FSST Results and Other Physical and Self Report Outcome Measures

	FSST	BBS	SPPB	4m GS	10m GS	ABC
FSST (r)	1	-.51**	-.42*	-.60**	-.69**	-.33
Sig. (2-tailed)		.00	.01	.00	.00	.06
N	33	33	33	33	33	33

Table 3-- SPPB as an Accurate Discriminator of Individuals at Fall Risk

	SPPB Score $\leq 10/12$ Mean \pm SD	SPPB Score $\geq 11/12$ Mean \pm SD	P-value
Comorbidity Count	2.38 \pm 1.45	1.60 \pm 1.57	0.16
FSST, s	10.62 \pm 3.10	7.99 \pm 2.45	0.01
BBS	46.38 \pm 5.14	52.5 \pm 3.87	0.00
4m GS, m/s	0.91 \pm 0.18	1.14 \pm 0.20	0.00
10m GS, m/s	1.02 \pm 0.24	1.23 \pm 0.21	0.02
ABC, %	82.19 \pm 15.11	88.52 \pm 11.06	0.17

Discussion/Conclusion

Our results, albeit based on smaller sample, support the emerging evidence that suggests that SPPB is a valid test that is able to capture multiple physical performance domains and discriminate those with poorer physical health.

SPPB scores of $\leq 10/12$ can be considered as an indicative of poor physical functioning, impaired balance, poor gait speed and reduced perception of balance confidence.

Clinical Relevance

Clinicians should consider using the SPPB to screen the impairments in balance and risk for decline in community mobility in those presenting for fall risk assessment.

Since the tool examines multiple domains of physical performance, it may more efficiently capture patient performance levels than a battery of other tests.

References

1. National Institutes of Health (NIH). (2019). *World's older population grows dramatically*. [online] Available at: <https://www.nih.gov/news-events/news-releases/worlds-older-population-grows-dramatically> [Accessed 31 Dec. 2019].
2. Kenny, R., Romero-Ortuno, R. and Kumar, P. Falls in older adults. *Med*. 2017; 45(1): 28-33.
3. Ambrose, A., Paul, G. and Hausdorff, J. Risk factors for falls among older adults: A review of the literature. *Maturitas*. 2013; 75(1): 51-61.
4. Lusardi, et al. Determining risk of falls in community dwelling older adults. *J Geri PT*. 2017; 40(1): 1-36.
5. Veronese, et al. Association between short physical performance battery and falls in older people: The Progetto Veneto Anziani study. *Rejuven Res*. 2014; 17(3): 276-284.
6. Cleary, Skornjakov. Predicting falls in older adults using the four square step test. *Physiother Theory and Practice*. 2017; 33(10): 766-771.
7. Kyrvalen, et al. Associations between gait speed and well-known fall risk factors among community-dwelling older adults. *Physiother Res Int*. 2018 Oct; 24(1): e1743.
8. Moiz, et al. Activities-specific balance confidence scale for predicting future falls in Indian older adults. *Clin Int in Aging*. 2017; 12: 645-651.