

Effectiveness of the “Timed Up and Go” (TUG) and the Chair Test as Screening Tools for Geriatric Fall Risk Assessment in the ED

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Published In/Presented At

Chow, R. Lee, A. Kane, B. Jacoby, J. Barraco, R. Dusza, S. Meyers, M. Greenberg, M. (2019, March). *Effectiveness of the “Timed Up and Go” (TUG) and the Chair Test as Screening Tools for Geriatric Fall Risk Assessment in the ED*. Poster Presented at: 2019 SELECT Capstone Posters and Presentations Day. Kasych Family Pavilion, Lehigh Valley Health Network, Allentown, PA.

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Background

Falls remain one of the top 20 most expensive medical conditions with hospital costs averaging over \$30,000 per encounter; in 2015, alone, the costs for falls for those aged 65 and above to Medicare totaled \$31 billion.

Recent research efforts of fall interventions in older adults have identified many differences in risk factors associated with sex in determining geriatric fall risks—in one example, a recent longitudinal study in Age and Aging found that age, depressive symptoms, and performance on standing balance tests were separate determinants for men, while incontinence and frailty increased fall risks in women. Contrary to these reported differences, fall risks are clinically assessed the in the same manner for both sexes. More research is required to identify and validate sex differences in fall risk, so that practitioners may be better equipped to assess them.

The Emergency Department (ED) may be an ideal place to recognize these factors and initiate a pathway for early multidisciplinary interventions. However, there continues to be a need for streamlined screening protocols in the ED for the geriatric population.

Problem Statement

To evaluate the effectiveness of the “Timed Up and Go” (TUG) and the Chair test as screening tools in the Emergency Department (ED), stratified by sex.

Methods

- Prospective cohort study at a Level 1 Trauma center.
- Subjects performed the TUG and Chair tests.
- At six months, subjects were contacted for phone follow-up and asked to self-report interim falling.

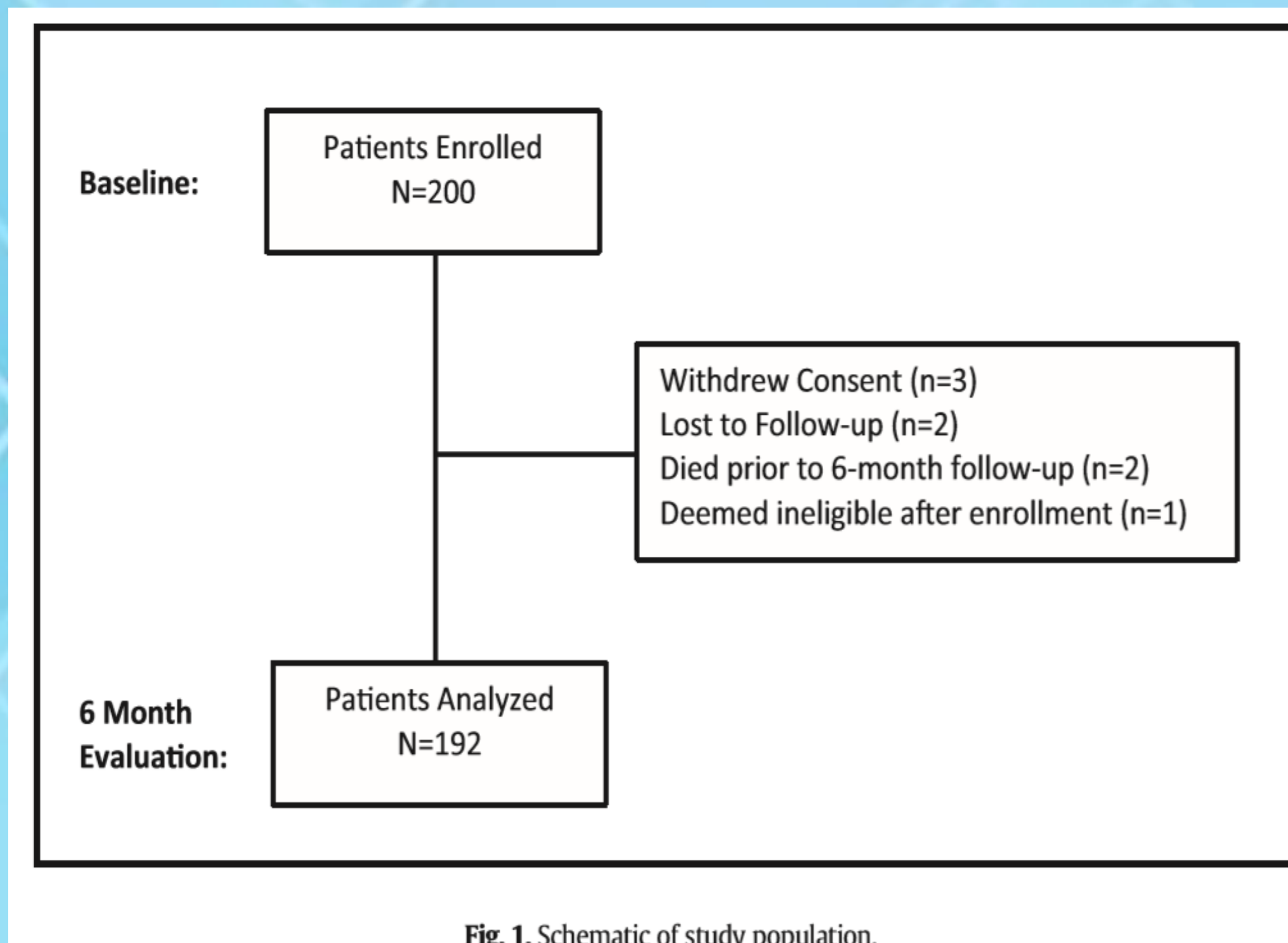


Fig. 1. Schematic of study population.

Results

TUG test: 71.4% (n=137) screened positive

Chair test: 77.1% (n=148) scored below average

Six-month evaluation:

- 51 (26.6%) study participants reported at least one fall
- Females reported non-significant higher fall prevalence (29.7 % versus 22.2%, p=0.24).

Table 1
Baseline characteristics of the study population, stratified by participant gender (n = 192).

	Overall n = 192	Male n = 81	Female n = 111	p-Value
Age, mean (SD)	74.4 (7.4)	75.0 (7.9)	74.0 (7.1)	0.34
Self-assessed health				
Poor	6 (3.1)	2 (2.5)	4 (3.6)	0.88
Fair	33 (17.2)	16 (19.8)	17 (15.3)	
Good	82 (42.7)	35 (43.2)	47 (42.3)	
Very good	51 (26.6)	21 (25.9)	30 (27.0)	
Excellent	20 (10.4)	7 (8.6)	13 (11.7)	
Use assistive device regularly				
No	138 (71.9)	60 (74.1)	78 (70.3)	0.56
Yes	54 (28.1)	21 (25.9)	33 (29.7)	
Fall in past year				
No	59 (30.7)	25 (30.9)	34 (30.6)	0.97
Yes	133 (69.3)	56 (69.1)	77 (69.4)	
Tug test				
Elevated falls risk	137 (71.4)	60 (74.1)	77 (69.4)	0.48
Normal falls risk	55 (28.7)	21 (25.9)	34 (30.6)	
Chair test				
Below average	148 (77.1)	66 (81.5)	82 (73.9)	0.22
At or above average	44 (22.9)	15 (18.5)	29 (26.1)	

Table 2
Diagnostic accuracy and predictive measures for TUG and CHAIR test, stratified by participant sex.

Group	Exam	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Positive likelihood ratio	Negative likelihood ratio
Overall	TUG Test	70.6%	28.4%	26.3%	72.7%	0.98	1.04
	Chair Test	78.4%	23.4%	27.0%	75.0%	1.02	0.92
Female	TUG Test	66.7%	29.5%	28.6%	67.6%	0.95	1.10
	Chair Test	78.8%	28.2%	31.7%	75.9%	1.10	0.75
Male	TUG Test	77.8%	27.0%	23.3%	81.0%	1.07	0.82
	Chair Test	77.8%	17.5%	21.2%	73.3%	0.94	1.27

Discussion

- Limitations:
 - Elderly population already at risk of falling
 - Non-English speakers excluded
- Comprehensive approach including environmental factors associated with each gender
- Lack of established international cut-offs for TUG test
- History of falls

Conclusions

- No sex specific significant differences screening performance.
- Neither test performed well as a screening tool for future falls in the elderly in the ED setting.

REFERENCES

1. E.B. Burns, J.A. Stevens, R.L. Lee, The direct costs of fatal and non-fatal falls among older adults—United States, *J Safety Res* 58 (2016) 99–103.
2. C.R. Gale, C. Cooper, A. Aihie Sayer, Prevalence and risk factors for falls in older men and women: the English longitudinal study of ageing, *Age Ageing* 45 (6) (2016) 789–794.
3. V.C. Chang, M.T. Do, Risk factors for falls among seniors: implications of gender, *Am J Epidemiol* 181 (7) (2015 Apr 1) 521–531.
4. A. Ibrahim, D.K.A. Singh, S. Shahar, M.A. Omar, Timed up and go test combined with self-rated multifactorial questionnaire on falls risk and sociodemographic factors predicts falls among community-dwelling older adults better than the timed up and go test on its own, *J Multidiscip Healthc* 10 (2017 Oct 26) 409–416.
5. M. Sandlund, D.A. Skelton, P. Pohl, C. Ahlgren, A. Melander-Wikman, L. Lundin-Olsson, Gender perspectives on views and preferences of older people on exercise to prevent falls: a systematic mixed studies review, *BMC Geriatr* 17 (1) (2017 Feb 17) 58.
6. Centers for Disease Control, Take a stand on falls, in: <https://www.cdc.gov/features/older-adult-falls/index.html>, [Accessed 02/23/2018].
7. L.D. Gillespie, W.J. Gillespie, M.C. Robertson, S.E. Lamb, R.G. Cumming, B.H. Rowe, Interventions for preventing falls in elderly people, *Cochrane Database Syst Rev* (4) (2003), 2009;(2):CD000340. (Update in: *Cochrane Database Syst Rev*).
8. C.R. Carpenter, M.S. Avidan, T. Wildes, S. Stark, S.A. Fowler, A.X. Lo, Predicting geriatric falls following an episode of emergency department care: a systematic review, *Acad Emerg Med* 21 (10) (2014 Oct) 1069–1082.
9. Centers for Disease Control, Assessment, “Timed up and go”, in: https://www.cdc.gov/steady/pdf/TUG_Test-print.pdf, [Accessed 02/23/2018].
10. Centers for Disease Control, Assessment, “30-second chair stand”, in: https://www.cdc.gov/steady/pdf/30_Second_Chair_Stand_Test-print.pdf, [Accessed 02/23/2018].
11. A. Ibrahim, D.K.A. Singh, S. Shahar, “Timed up and go” test: age, gender and cognitive impairment stratified normative values of older adults. *Ginsberg SD, PLoS ONE* 12 (10) (2017), e0185641.