

Project Title

Timed Up and Go (TUG) Reference Values and Predictive Cutoffs for Fall Risk and Disability in Singaporean Community-Dwelling Adults: Yishun Cross-Sectional Study and Singapore Longitudinal Aging Study

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Organisation(s) Involved

Health and Social Sciences, Singapore Institute of Technology, Singapore

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Aims

This article combined findings from 2 separate studies in Singapore to accomplish 2 objectives. The Yishun Study is a cross-sectional study and the aim was to (1) determine the reference values of the TUG with age and sex stratifications in a representative random sample of community-dwelling nondisabled adults aged 21 to 90 years (Study 1). Results from the Singapore Longitudinal Aging Study (SLAS) were used to (2) determine optimal TUG cutoff points for predicting the risk of disability in a population-based prospectively followed-up cohort study of older adults aged 55 years and older (Study 2).

Background

The “timed up and go” (TUG) test is a simple and widely used test of overall functional mobility. There is a paucity of TUG normative data among Asian individuals who differ in habitual gait speed and fall risk from Western population.

Methods

Study 1 collected TUG reference values and assessed physiological fall risk (PFR) using the Physiological Profile Assessment (PPA). Study 2 assessed association of TUG with disability with the Barthel Index and the Lawton scale at baseline and follow-up.

Results

From Study 1, mean TUG time for individuals aged 60 to 74 years was 9.80 seconds, shorter than values reported for Westerners of 12.30 seconds. It was significantly associated with high PFR [odds ratio (OR) 1.14, 95% confidence interval (CI) 1.03-1.27], 74.0% agreement, Cohen’s kappa = 0.314 (95% CI 0.238-0.390); area under the curve = 0.85 (95% CI 0.80-0.90). A TUG cutoff of 10.2 seconds discriminated high PFR from low PFR with 84.4% sensitivity and 72.6% specificity. In Study 2, the threshold for observing significantly increased risk of disability was ≥ 9.45 seconds for prevalent disability (OR 2.98, 95% CI 1.41-6.78), functional decline (OR 2.68, 95% CI 1.33-5.80), and incidental disability (OR 2.25, 95% CI 1.08-4.97).

Lessons Learnt

TUG reference values were established for community-dwelling non-disabled young and old Asian adult (21 to 90 years old) in Singapore. Slower TUG performance was significantly associated with higher physiological fall risk (cut-off of ≥ 10.2 s). Longer TUG time was associated with functional disability (threshold of TUG ≥ 9.45 s).

Conclusion

TUG reference values and cutoff predicting disability for community dwelling

older adults in Singapore are consistent with Asian data and lower than for Western individuals. TUG could be used to guide development and evaluation of risk screening of adverse health outcomes across the life span in Singapore.

Additional Information

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Project Category

Applied Research, Care Continuum

Keywords

Applied Research, Care Continuum, Singapore Institute of Technology, Geriatric Education and Research Institute, National University of Singapore, Fall Risk, Functional Disability, Timed Up and Go, Barthel Index, Lawton Scale

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INAUGURAL SINGAPORE ALLIED HEALTH CONFERENCE

Allied Health Professionals : Our Role in the Future of Healthcare

Timed Up and Go (TUG) Reference Values and Predictive Cut-Offs for Fall Risk and Disability in Singaporean Community-Dwelling Adults

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Background

- Functional mobility is essential for activities of daily living of older adults.
- The timed up and go (TUG) is a simple and widely used test of functional mobility.
Podsiadlo and Richardson 1991
- TUG is reliable, valid, well-correlated with the Berg Balance Scale, gait speed, and predictive of falls and disability in older people.
Khant et al. 2018; Sivakumar et al. 2018
- **HOWEVER**, there is a paucity of TUG reference data in Asian older populations.

Originality

- Large representative sample across adult age groups
- Random sampling methodology
- First published data in Singapore

Research Questions

- What are the reference values of TUG with age and sex-stratifications in a representative random sample of community-dwelling non-disabled adults aged 21-90 years?
- What are the cut-off values of TUG for predicting fall risk and disability among community-dwelling adults in an Asian population?

Design

Study 1: Yishun Study (YS)

- Cross-sectional study of 538 non-disabled, community-dwelling adults
- Physiological fall risk (PFR) determined using short physiological profile assessment (PPA)

Study 2- SLAS Study

- Longitudinal study of 1356 community-dwelling Singaporean older adults
- Instrumental activities of daily living (IADL) and basic activities of daily living (BADL)

Method

- TUG assessment as per established protocol

Podsiadlo and Richardson 1991

- PPA short version consisted of 5 validated measures
- PPA index score of 2 used as a cut-off for high falls risk (HFR) versus low falls risk (LFR)
- BADL and IADL assessed using the Barthel index and the Lawton scale



Ethics approval obtained from NHG Domain Specific Review Board and the NUS Institutional Review Board.

Analysis

- Study 1: Multivariate logistic regressions examined the association between TUG and physiological falls risk.
- Study 2: Multivariate logistic regressions estimated odds ratio of association between TUG and prevalent IADL and/or BADL disability, incident IADL and/or BADL disability and function decline.

Results

Reference values for Timed Up and Go performance

Men										
Age group (y)	21-30	31-40	41-50	51-60	61-65	66-70	71-75	76-80	≥81	Overall
Sample size (n)	28	26	21	22	28	24	28	26	23	226
TUG performance (s)	8.41	8.93	8.49	9.10	9.21	9.49	10.91	12.01	13.51	10.00

Women										
Age group (y)	21-30	31-40	41-50	51-60	61-65	66-70	71-75	76-80	≥81	Overall
Sample size (n)	32	35	38	37	32	35	32	34	37	312
TUG performance (s)	8.51	8.85	8.59	8.86	9.29	10.17	10.42	12.54	13.58	10.10

Results

- TUG performance significantly associated with high physiological fall risk (OR: 1.14, 95%CI 1.03-1.27, $p = 0.019$).
- TUG showed excellent ability in discriminating between HFR and LFR.
- TUG performance of 10.2s identified as the cut-off value to determine HFR.

Results

- TUG performance significantly associated with prevalent functional disability (per second OR: 1.10, 95%CI 1.05-1.16, $p < 0.01$).
- TUG performance significantly associated with functional decline (per second OR: 1.11, 95%CI 1.06-1.17, $p < 0.01$).

Conclusions

- TUG reference values were established for community-dwelling non-disabled young and old Asian adult (21 to 90 years old) in Singapore.
- Slower TUG performance was significantly associated with higher physiological fall risk (cut-off of ≥ 10.2 s).
- Longer TUG time was associated with functional disability (threshold of TUG ≥ 9.45 s).

Thank You



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