

Original Research Article

A study of timed get up and go scores as falls risk assessment in elderly in a tertiary care centre

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ABSTRACT

Background: Early detection of falls risk in the community dwelling elderly helps to take preventive measures to avoid falls and hence decrease morbidity associated with falls. Falls are a serious threat to independent living and self-confidence of the elderly. Using simple tools to determine risk of falls helps in early detection and prevention of falls. Aims and objectives of the study was to establish TUG data among patients attending the geriatric clinic at MGM hospital, Kamothe and to determine risk of falls in these patients with respect to their systemic involvement.

Methods: A prospective observational study of 100 geriatric age group patients were studied for their TUG scores and classified based on systems involved. TUG was performed using standard protocol and scores were stratified based on gender, age and diagnosis. Participants were required to perform TUG and were instructed to rise from an armless chair walk 3 meters and turn around at the chalk mark, walk back, and sit. They were instructed to walk at a normal pace without walking aids and shoes. Time was recorded when participants' buttocks were lifted off the chair to stand and stopped when the buttocks touched the seat when returning to sitting position.

Results: The results showed that the average TUG score of this cohort of 100 patients attending our geriatric outpatient clinic was 13 sec. 60 Males and 40 females were analyzed of which 38 patients had less than 12 s as TUG score and 62 patients had more than or equal to 12 sec as TUG score. Maximum number of patients undergoing the TUG test had musculoskeletal complaints. Yet patients with respiratory conditions had the highest mean TUG score of 14 sec and patients with abdominal and CNS conditions had lowest mean TUG scores.

Conclusions: This study of TUG score of cohort of 100 patients showed that average TUG score was 13 sec which was higher than 12 second mark which indicates that these patients who did not have any previous fall had a risk of future falls and hence a requirement of an in depth mobility assessment and early intervention.

Keywords: Elderly, Fall risk, Geriatric outpatient department, Timed get up and go score

INTRODUCTION

Falls are the main cause of injury and activity limitation in geriatric age group patients. As a result, there is significant personal, social and economic burden. Studies show approximately 30% of community dwelling people aged 65 years and over will fall each year.¹ Falls has been accounted for 40% of all injury deaths and lead to 20-

30% of mild to severe injuries ranging from soft tissue injuries to fractures in the elderly.²

Falls can result due to intrinsic and extrinsic causes. Some of the intrinsic risk factors are medical and neuropsychiatric conditions, impaired vision and hearing, age related changes in neuromuscular function, gait, postural reflexes. Some of the extrinsic risk factors are medications, improper assistive devices, and

environmental hazards. Gait instability is one of the major risk factor for falls. Majority of screening programs to identify those at risk of falls include an assessment of gait and balance.³

There are several guidelines for assessing fall risk. The guidelines from the American and British Geriatric Societies (AGS/BGS update 2011) and the English National Institute for Health and Care Excellence (NICE) proposed a combination of questions about history of falls in the past twelve months and difficulties in gait or balance. This was followed by simple functional tests assessing gait and balance (e.g. Timed Up and Go test (TUG), Performance-Oriented Mobility Assessment, and Berg Balance Test).⁴

There are three sequential stages for fall prevention in community-dwelling older individuals they are: screening for high fall risk, assessment of multiple risk factors for those at high risk, and implementation of a tailored intervention.⁵

Many screening tools have been proposed in the literature.⁶ The Timed Up and Go test has limited ability to predict falls in community dwelling elderly.⁷ While History of falls is a strong risk indicator for future falls, it cannot be considered alone for prevention of future falls.⁸

As per the International Academy on Nutrition and Aging (IANA) Task Force. Gait speed assessed at usual pace helped to identify community-dwelling older people at risk of adverse outcomes.⁹ As per studies conducted by Viccaro LJ et al, gait speed helps predict most geriatric outcomes, including falls, just like TUG.¹⁰ The Timed Up and Go test (TUG) helps assist clinicians to identify patients at risk of falling. TUG scores are used to test basic mobility skills in the geriatric age group. The test has been used in many other populations, including people with arthritis, stroke, and vertigo. It can be used as a screening test. also studies conducted by Guralnik JM et al, showed that that performance measures can help characterize older persons across a broad spectrum of lower extremity function.¹¹ Cattelani L et al, used the FRAT up a web based fall assessment risk tool for community dwelling older individuals older than 65 years of age. As per their study this tool showed results of fall risks comparable to externally validated state-of-the-art tools.¹²

As per studies conducted by Podsiadlo et al, the TUG scores help predict the patient's ability to go outside alone safely. They also suggest that the timed "Up and Go" test is a reliable and valid test for quantifying functional mobility that may also be useful in following clinical change over time.¹³

Studies conducted by Schoene D et al, showed that while TUG is not useful for discriminating fallers from non-fallers in healthy, high-functioning older people it is of

more value in less-healthy, lower-functioning older people.¹⁴

Although TUG test is simple, its performance requires integration of many systems and can be considered as complex more so in older adults with cognitive impairments.¹⁵

The TUG (Timed Up and Go) test was developed in 1991 as a modified timed version of the Get up and Go test.¹⁶ As per guidelines published by the American Geriatric Society and the British Geriatric Society the TUG test is recommended as a routine screening test for falls. The National Institute of Clinical Evidence (NICE) guidelines also advocate the use of TUG test for screening of falls and hence prevention of falls.¹⁷ As per Centre for Disease Control [CDC] a greater than or equal to 12 seconds TUG score is considered as risk for future falls. Hence patients having a TUG score greater than or equal to 12 seconds need to undergo further tests and indepth analysis to prevent future falls.¹⁸

METHODS

A prospective observational study of 100 geriatric age group patients were studied for their TUG scores and classified based on systems involved.

Inclusion criteria

- Patients attending geriatric OPD
- Patients willing to undergo the TUG test
- People above 65 years of age
- Males and females

Exclusion criteria

- Patients unable to comprehend and follow instructions.
- Patients having pain in any segment greater than 2 on a 10-point verbal analogue scale.
- Patients who had recent fractures of vertebral or lower limbs or recent lower extremity surgery (in the past 6 months).
- Patients not willing to participate.

TUG was performed using standard protocol and scores were stratified based on gender, age and diagnosis.

The study period for this study was 01 December 2018 to 30th November 2019.

Participants were first required to give a written and informed consent for conduction of the study. They were then asked to perform TUG and were instructed to rise from an armless chair walk 3 meters and turn around at the chalk mark, walk back, and sit. They were instructed to walk at a normal pace without walking aids and shoes. Time was recorded when participants' buttocks were

lifted off the chair to stand and stopped when the buttocks touched the seat when returning to sitting position.

The data obtained was analyzed using STATA software version 14.0.

RESULTS

TUG scores of 100 patients were analyzed based on age, sex and systemic involvement. There was a total of 60 males and 40 females whose TUG scores were analyzed representing 60% of the cohort and 40% of the cohort respectively (Figure 1).

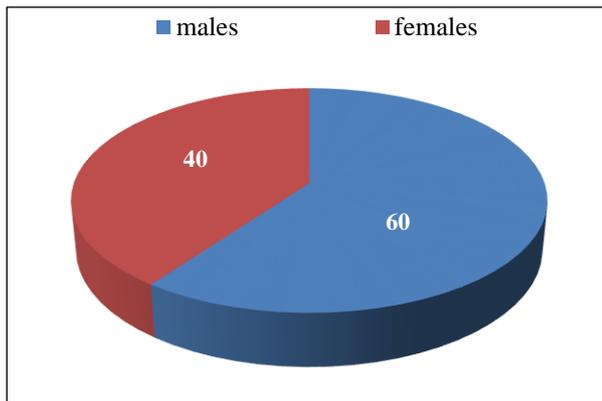


Figure 1: Gender distribution of patients.

12 seconds being the cut off for TUG score of elderly individuals living in the community. There were 38 individuals had a TUG score below 12 seconds and 62 individuals had a TUG score above 12 seconds (Figure 2).

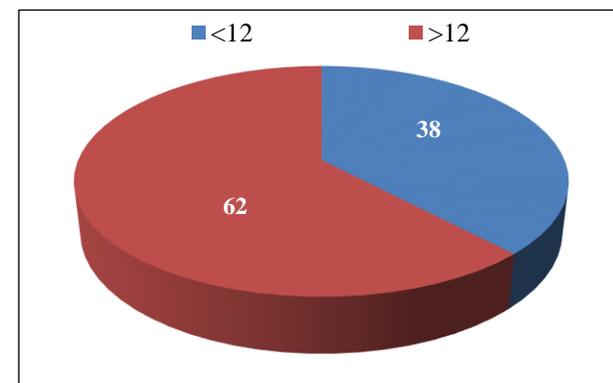


Figure 2: Cumulative TUG score-based distribution of patients.

Number of females with less than 12s of TUG score was 14 and above 12s was 26. While number of males with a TUG score below 12s was 24 and that above 12s was 36 (Table 1).

The results of gender vs TUG score were analyzed using Pearson's CHI square test with p=0.682 which was insignificant.

Table 1: Gender and age-based distribution of TUG scores.

Age	Gender	TUG<12	TUG≥12
60-69	Male	14	25
	Female	11	15
70-79	Male	8	8
	Female	3	8
>80	Male	2	3
	Female	0	3

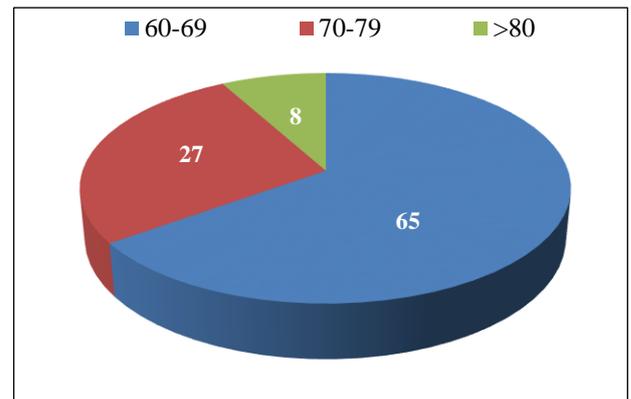


Figure 3: Age wise distribution of patients.

Table 2: Age wise distribution of TUG scores.

Age	Minimum	Maximum	Mean
60-69	7	20	13
70-79	8	25	13
>80	13	20	19

In this study authors had 65 patients in the age range of 60-69 years, 27 patients in the age range of 70-79 years and 8 patients in the age range of greater than 80 years (Figure 3). The average TUG scores for these patients showed that with increasing age the TUG score increased hence increasing risk of falls (Table 2).

Results of Age Vs TUG score were analyzed using Fischers Exact test =0.77. This is insignificant.

Patient's age ranged from minimum being 60 and maximum being 91 years and having an average 70.5 years of age and average TUG score of 13 seconds. TUG scores for 100 patients were analyzed with minimum being 7 sec and maximum being 25 sec. The average TUG score was 13 seconds

There were five patients (Figure 5) with cardiac conditions that were considered for the TUG test. Minimum being 11 sec and maximum 18 sec with average being 13 seconds (Figure 4). 11 patients (Figure 5) with respiratory conditions performed the TUG test with minimum being 8sec and maximum being 16 sec and average 14sec (Figure 4).

Five patients (Figure 5) with abdominal conditions were considered for the tug test with minimum 10secs and maximum 16 secs and averaging at 12 sec (Table 3).

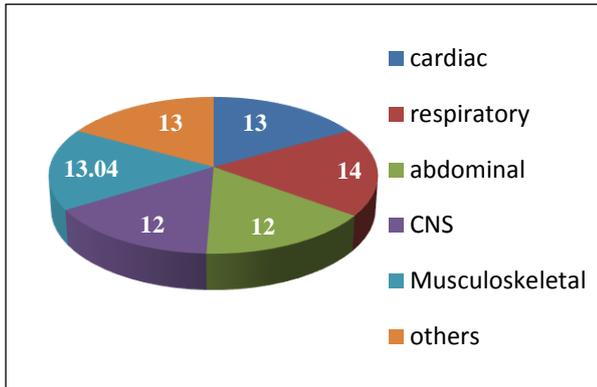


Figure 4: Systemic involvement VS average TUG scores.

The 23 patients (Figure 5) with CNS conditions were considered for this test with 7sec being minimum TUG score and 25secs being maximum, averaging at 12 sec (Table 3).

The 33 patients (Figure 5) with musculoskeletal conditions underwent the test with 7.5sec being minimum tug score and 17.5 secs being maximum, averaging at 13.04 sec (Table 3).

Finally, 23 patients (Figure 5) with other conditions /conditions under evaluation were considered with minimum tug score being seven secs and maximum 29 secs and with an average score of 13 seconds (Table 3).

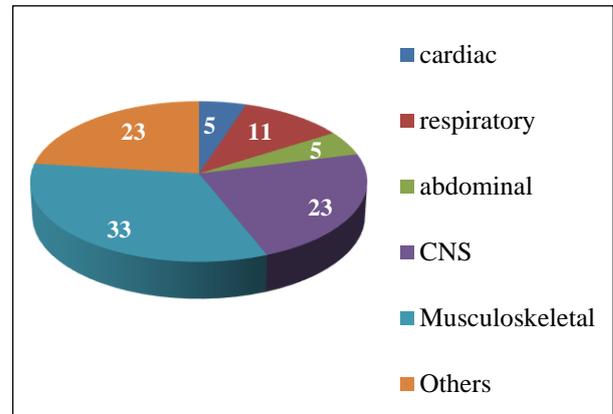


Figure 5: Systemic involvement Vs number of patients.

Maximum number of patients undergoing the TUG test had musculoskeletal complaints. Yet patients with respiratory conditions had the highest mean TUG score of 14 sec and patients with abdominal and CNS conditions had lowest mean TUG scores.

Table 3: Maximum, minimum and mean TUG scores based on systemic involvement.

Diagnosis	Number of patients	Minimum time [SEC]	Maximum time [SEC]	Mean time [SEC]
Cardiac	5	11	18	13
Respiratory	11	8	16	14
Abdominal	5	10	16	12
CNS	23	7	25	12
Musculoskeletal	33	7.5	25	13.04
Others	23	7	22	13

DISCUSSION

The present study of assessing fall risk in geriatric patients using TUG score showed that men in this cohort had a higher chance of falls as compared to women. As Age advances, TUG scores increase indicating a higher chance of falls in elderly. Also, as per this cohort patients with respiratory conditions had the highest mean TUG score indicating that perhaps patients suffering from respiratory conditions had a higher chance of falls.

A recommended practical cut-off value for the TUG to indicate normal versus below normal performance is 12 sec.¹⁸ In this study authors evaluated 60 males and 40 females all without use of assistive devices and no history of falls which showed the average TUG score of 60-69

age group was 13 sec, 70-79 age group was 13sec and >80 years was 19 sec.

In comparison a study conducted by Lusardi, M.M. showed that in a group of 76 patients TUG scores were evaluated. with 22 males and 56 females. of which 20 people used assistive devices. The average TUG scores in the 60-69 years age group [without assistive devices] was 7.9 sec, 70-79 years age group [without assistive devices] was 7.7 sec, 80-89 years age group [without assistive devices] was 13.6 sec.¹⁹

Thus, indicating that with increasing age, TUG scores increase, resulting in increased chances of falls. This correlated with this study which also showed that TUG scores increase with age.¹⁸

The difference between the two studies may be attributed to the different races, for example it was found that Japanese adults and those residing in Western Europe countries had faster walking speed in comparison to people from non-industrialized countries such as Middle East, Latin America and Asia.²⁰

Authors also segregated patients based on their diagnosis into systemic involvement and analyzed their TUG scores. Based on this analysis authors found that patients with while maximum patients undergoing this test had musculoskeletal complaints yet patients with respiratory complaints had the maximum TUG scores.

The average TUG score for females 13.04 sec and that for males was 13.26 sec. A study conducted by Bischoff et al, showed that community dwelling older women between ages 65-85 years of age should be able to perform the TUG test in 12 sec or less.¹⁸ Hence indicating that women in this cohort needed to undergo further tests and evaluations to prevent further falls.

The limited predictive value of TUG is because TUG is a single test which reflects strength balance and mobility, risk of falling has been shown to depend on multiple intrinsic and extrinsic factors. The TUG does not encompass these risk factors. Hence literature has focused on addition of a second manual or cognitive task to improve its predictive value.

Physiotherapists must use age-related data when interpreting patient data TUG score. Hence these clinical tests need to be performed with larger sample sizes in order to serve as a reference for patient comparisons.²¹

Falls risk screening tools are an important element for falls prevention in the community. It is imperative to identify patients at high risk for falls and to facilitate the effective delivery of appropriate interventions to such patients. Inaccuracy of falls screening tools results in inappropriate distribution of resources, contributing to varying degrees of success and failure of falls prevention strategies. Hence it is essential to establish the accuracy of such tools and identify alternative tools that may help to identify patients at risk of falling.²²

To date three systematic reviews have examined the clinical utility of the TUG to discriminate between those at low and high risk of falling.^{23,24} The most recent systematic review showed that the pooled mean difference in time taken to complete the TUG between fallers and non-fallers depended on the baseline functional status of the cohort of patients under investigation. That is, there was a mean difference of 0.63 seconds (95% CI 0.14-1.12 seconds) in the performance of the TUG for high-functioning versus a difference of 3.59 seconds (95% CI= 2.18-4.99 seconds) for those in institutional settings. The aim of his systematic review with meta-analysis conducted by Emma Barry et al, was to examine the predictive value of the test to identify

individuals at risk in falling in the community using the frequently cited cut-off of ≥ 13.5 seconds.¹⁴

Despite evidence indicating the limited ability to predict falls, the TUG test continues to be mentioned in clinical guidelines as a potential tool to identify fallers.²¹ This is because it is easy and quick to perform the test and does not require specialist equipment. Yet, the evidence to date is that it has limited predictive ability and should not be used in isolation to identify community-dwelling older people at increased risk of falls. Hence clinicians who assess the elderly for risk of falling should do so in a comprehensive manner by taking into account the multi-factorial nature of falls rather than relying on a single test

Limitation of the study was performing only TUG scores may not help in predicting falls in elderly accurately. The study may have to be done with a greater population and also by using multiple scoring systems to determine fall risk accurately. A convenience sample was used and hence individuals who volunteered to participate in the study may not be representative of community dwelling older adults.

CONCLUSION

Hence, authors can conclude that the cohort under study had a risk of future falls since the average TUG scores of the 100 patients was 13.15 seconds (>12 seconds which is the cut off for community dwelling older individuals). Hence these patients with a TUG score greater than 12 sec need to undergo further in-depth analysis of mobility to avoid future falls.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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