

# The Timed Up and Go Test: Unable to predict falls on the acute medical ward

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Prevention of falls amongst older people is a high priority in health care. The aim of this study was to evaluate the ability of the Timed Up and Go Test to predict those older people who will fall whilst admitted to an acute hospital. The medical records of 160 older patients who were admitted to the medical ward of a large regional hospital were accessed retrospectively. The Timed Up and Go Test, used in isolation, was unable to identify those patients who were likely to fall. However the co-morbidity of incontinence was identified as a falls risk factor (OR = 8.7,  $p = 0.001$ ). The Timed Up and Go Test alone does not possess predictive validity for acutely unwell older patients. It is therefore recommended that it not be used to identify those people who may fall. [Lindsay R, James EL and Kippen S (2004): The Timed Up and Go Test: Unable to predict falls on the acute medical ward. *Australian Journal of Physiotherapy* 50: 249–251]

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## Introduction

The impact on health care resources created by Australia's ageing population can be expected to be felt for decades to come, as longevity is often accompanied by substantially declining health and increasing chronic illness and disability (Hill et al 2000). One area of particular concern is falls that can result in fracture, extended hospital stays, complications requiring diagnostic procedures and/or surgery, loss of confidence and fear of further falls (Byers et al 1990, Hill et al 2000). Falls risk does not decrease on admission to hospital. Approximately 40% of older people fall whilst in hospital, more than in the community or in residential aged care facilities (Hill et al 2000).

Clinical assessment of a patient to identify individual falls risk is usually performed soon after admission to hospital. Part of this may be a mobility assessment used in conjunction with other clinical tools such as paper-based falls risk assessments and specific balance tests such as the Berg Balance Scale (Berg et al 1992). A mobility assessment forms part of a falls risk assessment as impaired mobility has been identified as a falls risk factor in this population (Salgado et al 1994). A mobility assessment tool commonly used in the hospital setting is the Timed Up and Go Test.

The Timed Up and Go Test is a modified version of a previously established tool, the Get Up and Go Test (Mathias et al 1986). The Timed Up and Go Test is a test of basic mobility function that is appealing in its simplicity and objective nature. It involves the participant getting up out of a chair, walking 3 m, turning, walking back to the chair and sitting down. Limited equipment and training are required and it can be performed at the hospital bedside. Previous research suggests that the Timed Up and Go Test has some predictive ability in community dwelling people (predicting ability to walk outside alone) and it is suggested that it may have some capacity to predict function in other settings (Podsiadlo and Richardson 1991) but this is yet to be established in an acutely hospitalised population. Since the Timed Up and Go Test has been deemed a reliable measure of balance and functional mobility when compared to other tests

of balance and function (Podsiadlo and Richardson 1991) it has potential for assessing falls risk in the hospital setting objectively.

The aim of this study was to establish the effectiveness of the Timed Up and Go Test in identifying those elderly patients who would fall whilst in hospital. If found to be useful the Timed Up and Go Test may be used as a screening tool to identify those patients that require a more comprehensive multidisciplinary assessment, as has been recommended as best practice by previous systematic reviews (Hill et al 2000).

## Method

**Subjects** The study sample included all patients admitted to the medical ward at the Bendigo Health Care Group (BHCG) who were referred to the physiotherapist for a mobility assessment within the study period and who met the following inclusion criteria: aged 65 years or older, able to perform Timed Up and Go Test independently or with assistance, with or without a gait-aid, and able to understand verbal commands in English. Patients who were discharged and readmitted within the study period, and patients with confusion or dementia that interfered with their ability to complete the test were excluded. Patients were assessed at varying times following their admission to the ward, but always within 24 hours of being referred to physiotherapy. Discharge assessments were completed no more than 24 hours prior to the discharge occurring.

One hundred and sixty-six subjects were required to allow logistic regression analysis, assuming 10% of subjects would fall (Evans et al 1998), and to assure sufficient power (80%) to detect an odds ratio of 2.0 (i.e. a Timed Up and Go Test score at which patients are twice as likely to fall than those with a lower score) (Hsieh 1989).

**Measurement tools** A data collection tool was developed to record patient data directly from patient records. Variables collected were:

- Date of admission, gender, age, and admission diagnosis
- Relevant co-morbidities. Co-morbidities were deemed

relevant if they had been identified in previous publications as being related to falls (Hill et al 2000)

- Timed Up and Go Test scores on initial assessment by a physiotherapist and prior to discharge
- Level of assistance required to complete the Timed Up and Go Test (independent, minimal, moderate, or maximal assistance)
- Gait aid required to complete Timed Up and Go Test
- Details regarding patient falls during the admission
- Physiotherapy interventions that the patient received: gait-aid, strengthening program, on-ward walking program
- Discharge destination and whether the patient re-presented to the hospital within one week of discharge with mobility related issues.

These data were deemed necessary to identify potential confounders that may affect both Timed Up and Go Test results and whether the patient fell. It was assumed that the Timed Up and Go Test score was derived using the testing protocol described by Podsiadlo and Richardson (1991) and in which all physiotherapy staff at the study hospital were trained. The Timed Up and Go Test has been found to possess both good inter- and intra-rater reliability (Podsiadlo and Richardson 1991, Lundin-Olsson et al 1998, Hansen et al 1999, Shumway-Cook et al 2000). Data related to falls during an admission were collected directly from the incident database that records all falls that occur involving staff, patients, and visitors.

**Procedure** A retrospective audit of medical records was used. An audit period of four months was chosen for the anticipated size of the sample. Data were recorded on the data collection tool and a photocopy of the Mobility Assessment form (MR40C) was obtained to complete data collection without use of the identification sticker. A research assistant (a physiotherapist) audited 10% of the medical records at the time of data collection to ensure accuracy of collection. An independent random data audit was conducted to assess the accuracy of data entry.

Ethical approval was granted by The Bendigo Health Care Group and La Trobe University, Bendigo.

**Data analysis** Pearson's product-moment correlation coefficient was used to determine the association between continuous variables (e.g., age in years and Timed Up and Go Test score in seconds). The independent samples t-test or one-way between-group ANOVA, or their non-parametric equivalents, were used to compare the means of continuous variables. Yates continuity corrected chi-squared test was used to calculate the relationship between two categorical variables (e.g., gender and whether the patient fell). The strength of the relationship between study variables and falling was quantified by odds ratios and 95% confidence intervals estimated with forward stepwise logistic regression. This allowed all the variables associated with falling, including the main variable of interest, the Timed Up and Go Test, to be assessed together and the strongest predictors of falling to be identified. The variables entered into the model included: age, gender, admission diagnosis, co-morbidities (the presence of vertigo, pain, the taking of three or more medications, arthritis, depression, incontinence and visual problems), Timed Up and Go Test score on admission, level of assistance required to complete the Timed Up and Go Test,

the use of a gait-aid, and physiotherapy intervention during admission.

## Results

Data were collected from 160 patient medical records. Of these patients 105 were female and 55 were male. The mean age was 81 years (range 65–99 years). Admission diagnosis was divided into eight categories for data collection with 36% of patients admitted with a general medical condition, 21% with a heart condition, 14% with a stroke, and 13% with decreased mobility. Decreased mobility was an admission diagnosis documented by admitting medical doctors. This diagnosis may have included those people admitted with falls or an abnormal gait pattern. Co-morbidities were also divided into eight categories. Patients may have possessed more than one of the co-morbidities at the time of assessment. Fifty-nine per cent (59%) of patients were taking more than three medications, 31% were experiencing pain, 29% had arthritis, 18% were confused, 15% had a visual impairment, 13% were incontinent, and 11% were experiencing vertigo or dizziness.

The mean Timed Up and Go Test score on initial assessment was 45.7 seconds (SD 36.4,  $n = 100$ ). There was no statistically significant relationship between age ( $p = 0.91$ ), gender ( $p = 0.25$ ), or diagnosis ( $p = 0.39$ ) and Timed Up and Go Test. There was, however, a statistically significant relationship between the use of a gait-aid and Timed Up and Go Test score ( $p = 0.001$ ). If subjects used a walking frame, their Timed Up and Go Test score was statistically significantly slower than those who used a stick or no aid. The mean Timed Up and Go Test score for a subject who used a frame was 59.9 seconds (SD 42.4,  $n = 37$ ).

Of the 160 study subjects, 11% ( $n = 17$ ) experienced a fall whilst admitted. None of the patients who fell had been admitted with the documented diagnosis of decreased mobility by the admitting doctor.

No statistically significant relationship was found between Timed Up and Go Test on initial assessment and risk of falling ( $p = 0.61$ ,  $n = 141$ ). There was also no relationship between age ( $p = 0.85$ ,  $n = 160$ ), use of a gait-aid ( $p = 0.38$ ,  $n = 158$ ), or level of assistance required to complete the Timed Up and Go Test ( $p = 0.22$ ,  $n = 100$ ) and risk of falling. When all the admission diagnoses and co-morbidities, as possible predictors of falling, were assessed via logistic regression, a statistically significant relationship between the presence of incontinence and falling was identified ( $p = 0.001$ , OR = 8.7, 95% CI 2.5 to 30.3). Patients with incontinence were nine times more likely to fall than those without. A trend was identified between the diagnosis of cancer and falling ( $p = 0.09$ ), although this was not statistically significant and was therefore not included in the logistic regression model.

## Discussion

The Timed Up and Go Test, used in isolation, was not able to identify those patients who fell whilst admitted to hospital. However, incontinence was identified as a falls risk factor. This is consistent with previous research that cited altered elimination patterns (Hendrich et al 1995) or incontinence (Ashton et al 1989) as a significant risk factor for falling. Increased falls risk may arise with the sense of urgency associated with special toileting needs and with the exacerbation of continence problems by diuretics. These medications are often altered whilst a patient is acutely unwell, with the resultant effect being rapid changes in the

medical and continence status of the patient. Evans et al (1998) suggests nursing interventions that may decrease falls due to continence problems (Evans et al 1998) including placing patients with urgency closer to the toilets and toileting at-risk patients regularly.

Due to the poor predictive ability of the Timed Up and Go Test, we suggest it not be used to assess falls risk. These data perhaps provide support for a multidisciplinary approach to falls risk assessment (Hill et al 2000) and do not support the use of the Timed Up and Go Test alone as a screening tool to identify older patients who will fall during an acute medical ward admission.

Patients on the medical ward were found to be slower in performing the Timed Up and Go Test than reports of those in the community (Posiadlo and Richardson 1991, Thigpen et al 2000, Steffan et al 2002, Wall et al 2000), but this did not indicate an increased falls risk.

A limitation of this study is that data were collected in only one institution. The exclusion of patients with an altered mental state may also have decreased the usefulness of these results, given that this group is at increased risk of falling (Evans et al 1998). Other limitations were that due to the nature of the study, a retrospective medical records audit, the researcher had no control over the completeness or quality of data recording. This study design did however avoid the Hawthorne effect and experimenter effects including active behaviour (Portney and Watkins 1993). Active behaviour involves the subtle manipulation of variables by the experimenter to affect outcomes. Another shortcoming was that the incident database used to document the circumstances of the falls suffered by the sample provided limited information regarding the intrinsic and extrinsic factors surrounding the falls.

The published studies investigating objective measures of altered mobility and falls in the acute hospital setting are limited. Paper-based tools are not efficient or effective in identifying falls risk (Evans et al 1998), yet there are no validated objective measures to replace their use. A key recommendation of this study is that further trials of objective measures of mobility in acute hospital settings be conducted and published.

This study has identified preliminary data regarding normal Timed Up and Go Test score values for older acute medical patients. To identify any clear relationships between Timed Up and Go Test scores and falls, future research needs to include a larger sample in a multi-centre design. It is suggested that the study design be prospective with an ability to contact patients after discharge to gather information regarding falls in the first week following separation from the hospital. The increased falls risk for patients with the comorbidity of incontinence is a relationship that could be explored further by examining this cohort specifically along with their Timed Up and Go Test results.

It is important that objective measures of altered mobility and falls risk are developed to increase the accuracy of falls risk identification within hospitals.

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