Original Article

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Physiotherapy Section

Age Related Timed Up and Go Test Values and Its Analysis among Elderly Kanchipuram District Population

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ABSTRACT

Introduction: TUG (Timed Up and Go test) test is widely used in elderly to assess fall and balance among community and institution dwelling elder population. Many studies have given the reliability and validity of the test and the uses of the test in elderly population. So far no studies had recorded the TUG values for middle and young population which may be important to frame preventive measures to improve balance and to prevent fall as they approach older age.

Aim: To find the TUG scores mean values among different age group and analyse its difference among various age group.

Materials and Methods: A Cross-sectional study was done in which subjects with no neurological deficit and no recent fractures or congenital deformities and who could walk without walking aid were selected. About 413 subjects among different age groups from 19 years to 70 years were recruited based on inclusion and exclusion criteria of the study, The age groups are divided as 19-20 (95 subjects), 21-30 (81 subjects), 31-40 (29 subjects), 41-50 (24 subjects), 51-60 (84 subjects), 61-70 years (100 subjects) respectively. The subjects were made to complete TUG test and the time duration was documented and analysed with One way Anova and Tukey HSD.

Results: There was a Significant difference in TUG test scores between 19-20 age group and above 40 age group up to 70 years, whereas no significant difference exist between 19-20 years age group and 20-40 age groups ($p<0.05$).

Conclusion: TUG scores differs with age groups and even middle age population has mobility impairments and they might have a risk of fall in future so middle aged population also should be screened for mobility impairments to improve their mobility and balance.

Keywords: Accidental falls, Postural balance, Timed up and go test

INTRODUCTION

A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level [1]. Increase in age cause a decline in health and increase in disability [2]. The incidence of fall increase with age, 25% incidence of fall was reported at the age of 70 which was increased to 30% at the age of 75 [3,4]. There may be lot of reasons for the falls in elderly and the most important reason documented was mobility impairments that needs a serious consideration [5,6]. The fall among elderly may cause serious impact on their activities of daily living and even be fatal, reported as the sixth leading cause of death in individuals over 65 years [7].

The fall among elders may also lead to fractures, frail bones [8]. Patients may have increased fear of falling, thus compromising their Quality of Life [8].

Timed Up and Go test is one of the reliable test in assessing mobility and locomotor performance [9]. American Geriatric Society/British Geriatric Society recommends Timed Up and Go test as a valid tool to identify the older people at risk of fall [8]. Studies have explored the use of Timed Up and Go test in various neurological conditions like parkinson's, Amyotrophic Lateral Sclerosis and Post stroke [10-14]. It is a useful tool to detect mobility impairments among elderly population. It is a reliable tool, easy to use and requires less equipments to perform [15].

Timed Up and Go test has an inter-rater reliability of about 0.99 among patients in hospitals and about 0.98 in community dwelling senior citizens [16]. It possess high retest reliability and found to have good specificity and sensitivity [17]. Those individuals who complete TUG test in more than 12 seconds of duration are associated with high fall risk [18].

A meta-analysis showed that the average time taken by the elder population (60-99 years) was between 8.1 to 11.3 seconds [18]. However to our knowledge, no study had calculated the Timed Up and Go test normative values for middle aged and younger population and also no study possess the documentation of TUG values for a wide range of age among normal population. So this study aims to bring out the reference values for wider age range among the community dwelling population in and around Chennai, India.

MATERIALS AND METHODS

This cross sectional study included 413 participants in the age group of 19-70 years from kancheepuram district, collected from SRM College of Physiotherapy, done for a period of six months from October 2017 to march 2018. The permission was obtained from Institution Ethical Commitee. All the participants were assessed thoroughly and the individuals with no cognitive impairment, those who were able to walk independently. Both men and women were included and subjects with neurological conditions, blind and deaf subjects, subjects with chronic illness, who were unable to walk 3 meters were excluded from the study. The Participants were divided under following age groups: 19-20 (95 subjects), 21-30 (81 subjects), 31-40 (29 subjects), 41-50 (24 subjects), 51-60 (84 subjects), 61-70 years (100 subjects) respectively.

The present study was formulated as per the recommendation by Podsiadlo [9] where the subjects were instructed to wear the normal foot wear that they use in normal day to day life. Subjects were instructed with regard to the test and the purpose of the study and an informed consent was obtained from them.

The floor chosen was non slippery and a distance of 3 meters was marked from the chair which was placed such that it does not move when the subject moves from sitting to standing or viceversa and the subjects were instructed to walk at their own pace and inform whenever they feel palpitation, giddiness or wanted to stop the test. The subjects

were given a trial for which no data was documented. The test were taken in daylight when enough ventilation and light was available.

The instruction was to get up from the chair and walk to the mark of the 3 meter and walk around it and return back and sit back in the chair. The time taken was recorded and documented in seconds. The subjects were allowed to use the arm rest of the chair if needed to get up and sit back in the chair. Three trials were done for each subject on the same time with adequate rest in between as required by the subjects. All the three trials time were recorded and documented and the average of the three trials were taken.

STATISTICAL ANALYSIS

Data was tabulated and analysed through SPSS Version 16. In this study, 95% confidence interval and significance of 5% was considered, One-way ANOVA was used to observe between groups association and for multiple comparison Tukey HSD was used.

RESULTS

Out of 413 subjects there were 161 males and 252 females with the mean age of 39.9, ranging from 19-70 years of age. [Table/Fig-1] provides the mean value of the Timed Up and Go score obtained in various age groups and this table shows that there was a statistically significant difference existing between these age groups, p<0.01.

S No.	Years	N	Mean	Std. Error	95% of confidence internal		F-value	Sig
					Lower	Upper		
1	19-20	95	6.9582	0.07280	6.8137	7.1028	1048.113	p<0.01
2	21-30	81	6.6981	0.10773	6.4838	6.9125		
3	31-40	29	7.1486	0.31655	6.5002	7.7971		
4	41-50	24	8.1204	0.25499	7.5929	8.6479		
5	51-60	84	12.0461	0.20137	11.6455	12.4466		
6	61-70	100	19.7400	0.19155	19.3599	20.1201		

[Table/Fig-1]: Timed Up and Go scores obtained by the subjects in accordance with the age groups.
One-way ANOVA is applied

[Table/Fig-2] explains the multiple comparison between groups using Post-HOC test and it details that there exist a significant difference in TUG test scores between 19-20 years age group and above 40 years age group up to 70 years, whereas no significant difference exist between 19-20 years age group and 20-40 years age groups. The values obtained from 31-40 years group shows no difference from 41-50 years age group TUG scores. 51-60 years age group and 61-70 years age group TUG scores were statistically significantly different from all other age groups compared and even between these two age groups there were different TUG scores values (p<0.05).

DISCUSSION

Timed Up and Go test is a commonly used test by physiotherapist to assess and document on the postural control, efficacy of the different exercise intervention [19-21], quality of life. But normative data exist only for elderly population and in patients of various condition. This study included 413 subjects who had no neurological deficit and also who could walk without aids. A meta-analysis stated the mean TUG score for people between 60-99 years and found the mean value for 60-69 year-old subjects to be 8.1 seconds, 9.2 seconds for 70-79 years and 11.3 seconds for 80-99 years [18]. But in this study the mean value of TUG scores for age group 60-69 is found to be 19.7 which is quite high and the mean value of 8.1 was found among age group 41-50 years [Table/Fig-1]. The results of this study goes in handwith Bischoff, where he found that community dwelling elderly women in age group of 60-85 years performed this test for less than 20 seconds [15]. TUG is usually administered for elder population and most of the studies documented the normative values among 60-90 age groups. The

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
19-20 years	21-30 years	.26006	.22311	.853	-.3788	.8989
	31-40 years	-.19041	.31297	.990	-1.0866	.7057
	41-50 years	-1.16221*	.33703	.008	-2.1272	-.1972
	51-60 years	-5.08786*	.22094	.000	-5.7205	-4.4552
	61-70 years	-12.78179*	.21136	.000	-13.3870	-12.1766
21-30 years	19-20 years	-.26006	.22311	.853	-.8989	.3788
	31-40 years	-.45047	.31924	.720	-1.3646	.4636
	41-50 years	-1.42227*	.34285	.001	-2.4040	-.4406
	51-60 years	-5.34792*	.22973	.000	-6.0057	-4.6901
	61-70 years	-13.04185*	.22052	.000	-13.6733	-12.4104
31-40 years	19-20 years	.19041	.31297	.990	-.7057	1.0866
	21-30 years	.45047	.31924	.720	-.4636	1.3646
	41-50 years	-.97180	.40709	.163	-2.1374	.1939
	51-60 years	-4.89745*	.31773	.000	-5.8072	-3.9877
	61-70 years	-12.59138*	.31114	.000	-13.4823	-11.7005
41-50 years	19-20 years	1.16221*	.33703	.008	.1972	2.1272
	21-30 years	1.42227*	.34285	.001	.4406	2.4040
	31-40 years	.97180	.40709	.163	-.1939	2.1374
	51-60 years	-3.92565*	.34145	.000	-4.9033	-2.9480
	61-70 years	-11.61958*	.33532	.000	-12.5797	-10.6594
51-60 years	19-20 years	5.08786*	.22094	.000	4.4552	5.7205
	21-30 years	5.34792*	.22973	.000	4.6901	6.0057
	31-40 years	4.89745*	.31773	.000	3.9877	5.8072
	41-50 years	3.92565*	.34145	.000	2.9480	4.9033
	61-70 years	-7.69393*	.21834	.000	-8.3191	-7.0688
61-70 years	19-20 years	12.78179*	.21136	.000	12.1766	13.3870
	21-30 years	13.04185*	.22052	.000	12.4104	13.6733
	31-40 years	12.59138*	.31114	.000	11.7005	13.4823
	41-50 years	11.61958*	.33532	.000	10.6594	12.5797
	51-60 years	7.69393*	.21834	.000	7.0688	8.3191

[Table/Fig-2]: Comparison of Timed Up and Go test values between different age groups.
Turkey HSD is applied
*The mean difference is significant at the .05 level

TUG scores varies enormously between various studies done in various population. TUG test values for 60-69 was found as 8.1 seconds, 14.4 seconds, below 20 seconds where as in this study it was found to be 19.7 seconds [15,18]. The difference between the present study and other studies might have been because of the type of subjects included. In other studies, only elderly population is included whereas in this study, population are of from various age groups from 19-70 years.

But TUG is a test to assess mobility impairment and Elizabeth stated that Mobility (walking) disabilities are quite common among middle aged women [22], also found the associated problems quite similar to the elderly community and they recommended to address the mobility impairments in middle aged population [23].

The results of this study shows a mean value of TUG score to be 7.1 seconds for the age group of 31-40 years and about 8.1 seconds for the age group 41-50 years. The mobility is found to get reduced as year progresses and among 51-60 years it rises to 12 seconds.

One source suggest that score less than 10 in TUG test suggest normal mobility [23], but according to the results of this study 51-60 and 61-70 population falls after 10 seconds and even 41-50 years subjects fall near to the normal value. So, this study recommends that mobility has to be assessed in middle aged population also.

The results of this study shows that there was a significant difference between 51-60 years and 61-70 years group with all other age groups. The values of TUG score varies significantly between 41-50 years age groups and all other age group except 31-40 year age group. But there exist no statistically significant difference in the mean score value between 19-20, 21-30 and 31-40 years age groups which have a mean value of 6.8. Age group of 31-40 and 41-50 years shows no significant difference in mobility impairment.

The mobility level steadily decreases with the increase in age and 31-40, 41-50 and 51-60 years shows a greater decline with a mean score of 7.1 seconds, 8.1 seconds and 12 seconds respectively. Higher TUG values predispose the subjects to increase risk of fall which might affect their mobility further compromising their Quality of life. This study shows the fall prevalence also steadily increasing with age and middle aged population should also be given care for prevention of fall.

LIMITATION

Few limitations were BMI should have been included and correlated with the TUG test, physical activity of the individuals are not considered. Future studies should be done to compare TUG test between men and women, their physical activity and TUG, Sensory Orientation and balance.

CONCLUSION

Timed up and Go test is highly influenced by age. There exists a significant difference between age groups But there was no significant difference in TUG score between 31-40 and 41-50 age group. This study recommends the mobility assessment from the age of 50 as the mobility impairment starts early nowadays due to change in lifestyle and TUG test can be recommended for population of all ages to assess mobility and thereby prevent fall and improve balance.

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