Timed Up and Go Risk Predictor of Falls in Elderly People Residing in the Community?

ORIGINAL

Mayara Muniz Peixoto Rodrigues[1],
Renata Maia de Medeiros Falcão[1],
Rafaella Felix Serafim Veras[2], Keylla Talita Fernandes Barbosa[1],
Fabiana Maria Rodrigues Lopes de Oliveira[1],
Maria Auxiliadora Pereira[3], Maria de Lourdes de Farias Pontes[4],
Maria das Graças Melo Fernandes[3],
Josilene de Melo Buriti Vasconcelos[3], Jacira dos Santos Oliveira[3]

1 Postgraduate Nursing Program, Federal University of Paraiba. João Pessoa, Paraiba, Brazil.
2 Federal University of Paraiba. João Pessoa, Paraiba, Brazil.
3 Department of Clinical Nursing, Federal University of Paraiba. João Pessoa, Paraiba, Brazil.
4 Department of Public Health and Psychiatric Nursing, Federal University of Paraiba. João Pessoa, Paraiba, Brazil.

Contact information:

Mayara Muniz Peixoto Rodrigues.

Address: University City, João Pessoa, Paraíba, Brazil. 58051-900.
Tel: (+55) 83 3216-7109.

☑ mayara_muniz_@hotmail.com

Abstract

Objective: evaluate the risk of falls of elderly people residing in a community in northeastern Brazil using the "Timed up and go".

Method: Descriptive study, with a quantitative approach, performed with elderly people residing in a community. The collected data related to the sociodemographic and economic characteristics of episodes of falls in the last two years, regular practice of physical exercise and complaint of pain at the time of the interview; and, at last, the application of the "Timed up and Go" test.

Result: Most of the elderly were classified as "free and independent" and "independent". There is a direct relationship between advanced age and increased time to perform the test.

Conclusion: The "Timed up and Go" test was not effective in predicting risk of falls alone and should associate with other indicators.

Introduction

Population aging is a worldwide phenomenon. In Brazil, the segment composed by more advanced ages (from 60 years) has grown and tend to grow even more. The census of the Brazilian Institute of Geography and Statistics counts approximately 10.8% (20.6 million) of

elderly people with estimates of an increase to 14% (32 million elderly) in 2025 [1].

With that increase in the number of elderly people in the population, it is noteworthy that this group frequently presents worsening of chronic and degenerative diseases, being more vulnerable to multiple health reducers, including falls [2].

Changes in balance capacity are one of the most relevant factors for the occurrence of falls, since it is directly involved in most activities of daily living. That change, associated with the decline of other physical capacities, such as force, is a decisive factor in the occurrence of the aforementioned event [3].

Falls are not normal events associated with aging that can be avoided through various evidence-based interventions, ranging from simple to complex. Therefore, health professionals need to identify individuals with greater vulnerability to falls, enabling the application of measures [2, 4].

Several tests evaluate the functionality of elderly people, such as the Timed up and go (TUG), which has been widely used and presents high reliability, and can be applied in different environments in a practical and low-cost way. The test realistically assesses mobility and balance in those individuals by creating a fall risk, propitiated by actions that require movements to be performed, such as: lifting, walking, turning, and sitting [5].

Moreover, the American and British Geriatrics Societies recommend the TUG for use in routine screening for falls and for gait and balance assessment in the prevention of falls in the elderly [6].

Considering that a careful and well-conducted evaluation can have a positive impact on the prevention of falls, the objective of this study was to evaluate the risk of falls of elderly people living in a community in the northeast of Brazil using the Timed up and go test.

Method

This is a descriptive study with a quantitative approach carried out in the territory of a Basic Health Unit located in the municipality of João Pessoa - PB.

The population consisted of elderly people (age ≥ 60 years), men and women, registered in the aforementioned Basic Health Unit, contemplated by means of an assortment. The sample was defined during a home visit of the randomized users where only those who agreed to participate in the survey were followed in the study, oriented in time and space and were able to wander with or without the aid of safety devices. A total of 213 elderly individuals who met the inclusion criterion participated in the study, excluding nine of them who were wheelchair-bound and bedridden.

For the data collection, a structured instrument was used, divided into three sessions. The first one involved sociodemographic and economic characteristics, such as: age, gender, education and monthly income. In the second, individuals were questioned about episodes of falls in the last two years, regular practice of physical exercise and pain report at the time of interview. And, at last, the application of the TUG, which is a test that evaluates the mobility and the balance of the individual through the movements required to accomplish it [5].

The application and interpretation of the TUG occurred according to Podsiadlo [5], being carried out as follows: after orientation, the individual, sitting in a chair with his/her hands resting on the knee, stands and walks as usual for three meters delimited with a tape line marked on the floor, returns and sits back, resting on the back of the same chair. The researcher times the time to perform the activity and, from the final result, classifies the individuals as: "totally independent" (values less than 10 seconds), "independent" (between 10 and 19 seconds), "partially dependent" (between 20 and 29 Seconds); and "totally dependent" (30 or more seconds). For this work, there was an adaptation, which united the last two classifications so that individuals with times greater than 20 seconds were considered "partial or total dependents".

The data were processed through the statistical program Statistical Package for Social Sciences -

SPSS, version 20.0. Pearson's chi-square test was applied to compare the performance of the TUG with the studied variables and the p-values ≤ 0.05 were considered statistically significant.

The results were interpreted through descriptive statistics, with the respective absolute and relative frequencies, being presented through tables and figures and discussed according to the relevant literature.

The research followed the recommendations of Resolution 466/2012 [7] concerning the standardization of researches on human beings, as well as respected the responsibilities and duties contained in Chapter III of the Resolution of the Federal Nursing Council 311/2007 contemplated in Article 89 102 [8]. The research was authorized by the Research Ethics Committee/Federal University of Paraiba under protocol No. 0660/15 and CAAE: 51441815.1.0000.5188.

Result

There were 156 (70.4%) elderly women, with a mean age of approximately 72.81 years with a standard deviation of ± 8.62, a minimum age of 60 and a maximum of 94 years. Regarding education in years of study, there was an average of 6.45 years, with a standard deviation of ± 4.94, a minimum of no year of study for illiterate, and a maximum of 15 years of study for those with complete higher education. Regarding the individual income of the elderly, the average was R$1.711,97 per elderly person (approximately two minimum wages), with

Figure 1: Distribution of data according to the Timed up and go test classification of the interviewed elderly in the community of João Pessoa/Paraiba - João Pessoa, Brazil, 2016.
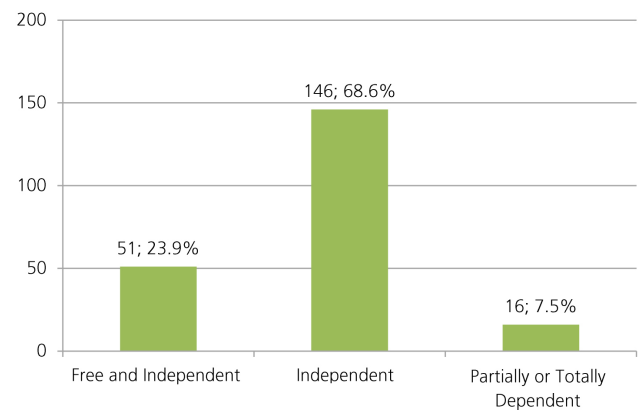
a standard deviation of ± R$1.876,01. There were, among the interviewees, both individuals with no individual income as a maximum individual income of R$14.960,00.

The performance of the study participants during the TUG showed an average of 12.77 seconds per elderly person, with a standard deviation of ± 5.88, a minimum of 7 and a maximum of 45 seconds.

Figure 1 shows the classification of TUG results in which 51 (23.9%) elderly people were considered "free and independent", 146 (68.6%) were "independent" and only 16 (7.5%) were classified as "partially or totally dependent".

Table 1 shows the relationship between sociodemographic and economic data and TUG performance. There was statistical significance in associations with age group and education. Regarding

Table 1. Distribution of sociodemographic data and relationship with the Timed up and go of the interviewed elderly in the community of João Pessoa/Paraiba, João Pessoa, 2016.

Sociodemographic Characteristics	Timed up and go [n(%)]						Pearson (<0.05)
	Free and independent		Independent		Partially or totally dependent		
	n	%	n	%	n	%	
Gender							
Female	35	23.3	101	67.3	14	9.3	0.20
Male	16	25.4	45	71.4	2	3.2	

Sociodemographic Characteristics	Timed up and go [n(%)]						Pearson (<0.05)
	Free and independent		Independent		Partially or totally dependent		
	n	%	n	%	n	%	
Age							
60 – 69	38	45.2	45	53.6	1	1.2	
70 – 79	10	12.5	63	78.8	7	8.8	0.00
80 or older	3	6.1	38	77.6	8	16.3	
Education							
Illiterate	3	9.1	25	75.8	5	15.2	
1 - 4 years	12	16.9	51	71.8	8	11.3	
5 - 8 years	6	21.4	20	71.4	2	7.1	0.01
9 - 11 years	18	36.7	31	63.3	0	0	
12 or more	12	37.5	19	59.4	1	3.1	
Individual monthly income Minimum Wages*							
≤ 1 min. wage	21	21.4	66	67.3	11	11.2	
> 1 - ≤ 3 min. wages	14	23.0	43	70.5	4	6.6	
>3 - ≤ 5 min. wages	6	35.3	10	58.8	1	5.9	0.5
> 5 min. wages	3	20.0	12	80.0	0	0.0	
No income/Unknown/ Unanswered	7	31.8	15	68.2	00.0	70.05	

* Minimum wage = R$880,00.

Table 2. Distribution of risk factors for falls and relationship with the Timed up and go of the interviewed elderly in the community of João Pessoa/Paraiba, João Pessoa, 2016.

Risk factors	Timed up and go [n(%)]						Pearson (<0.05)
	Free and independent		Independent		Partially or totally dependent		
	n	%	n	%	n	%	
Falls reports							
Yes	17	27.4	42	67.7	3	4.8	0.5
No	34	22.5	104	68.9	13	8.6	
Physical exercise							
Yes	29	37.2	46	59.0	3	3.8	0.02
No	22	16.3	100	74.1	13	9.6	
Pain							
Yes	28	25.7	77	70.6	4	3.7	0.09
No	23	22.1	69	66.3	12	11.5	

age, although the highest percentages were in the "independent" individuals in all age groups, the classification of "free and independent" individuals was more present in the age group from 60 to 69 years, whereas, over 80 years old, there were fewer people with that classification. Likewise, in relation to "partially and totally dependent" individuals, the group with 80 years old or more concentrated the greatest number of individuals. Regarding education, there was statistical significance (p=0.01), but there was no relevance, since, regardless of the study years, most individuals were considered "independent". Gender and individual monthly income were not statistically significant (p > 0.05). **(Table 2).**

When relating the TUG to risk factors for falls, there was statistical significance only in relation to physical exercise (p=0.02), but without relevance, since there was no difference in walking between the group that regularly exercised from the one that did not. Regarding the report of falls and pain, the Pearson test did not show a relationship, since both presented p > 0.05.

Discussion

The TUG, in this study, showed a minimum time of seven and maximum of 45 seconds with an average of 12.77 seconds per elderly person. In a study carried out with 55 elderly people from a community in northeastern Brazil, the results were similar, since the individual who performed the test in less time performed it in seven seconds and the one who performed in a longer time, did it in 22 seconds, with an average of 12.58 seconds [3].

According to the classification proposed by Podsiadlo [5], more than 50% of the elderly were considered "independent". This data corroborates another study carried out with 102 patients from a geriatrics outpatient clinic of a basic health unit located in Brazil, in which the percentage of elderly individuals who presented scores between 10 and 19 seconds was 69% of the total [9].

When comparing TUG scores with age, a meta-analysis showed that times greater than nine seconds for individuals between 60 and 69 years of age; 10.2 for the elderly between 70 and 79 years old and 12.7 for those aged 80 to 99 years can be considered above-average values, requiring interventions to reduce the risk of accidents [10].

A study carried out with elderly patients hospitalized at a cardiologic unit in southern Brazil demonstrated that age was a significant influencing factor, since all the shortest test times related to low risk of falls were among the elderly with less than 70 years [11], an important factor to consider in this study, since the mean age of participants was 72.8 years.

When crossing the TUG with the report of falls, the results corroborated with the study by Santos and Holanda [11], in which the average time spent to perform the test was similar in those who fell and those who did not. So, in the group that reported fall, the result was 17.7 ± 7.7 seconds, and the group that did not fall presented an average of 17.1 ± 4.3 seconds (p=0.8209).

A prospective study with 64 elderly subjects showed that the history of falls and TUG cannot predict episodes of falls, since participants who suffered falls may have acquired a better sense of risk and caution in performing daily living activities [12].

The results obtained from this study indicated that the TUG applied alone is not able to predict the risk of falls of the elderly in the community in question, a fact also observed in other studies.

A survey of 259 elderly people in a British community showed that the TUG's ability to predict future falls was limited and may be more useful in people at high risk for falls rather than as a primary measure in risk assessment [13]. In another study, the authors suggest that TUG is not useful for predicting falls in healthy and active elderly, indicating it for those with impairment in health status and functional capacity [14].

Another longitudinal study that followed 628 participants in three French cities over a period of 11 years concluded that it is important to measure gait speed repeatedly in the elderly to identify those at greatest risk of disability and to identify the determinants of the decline in order to establish prevention and treatment strategies to reduce the risk of disability [15].

Conclusion

Most of elderly people were classified as "free and independent" and "independent", according to the TUG, presenting good physical mobility. The variables with the highest statistical ratio were age, education and physical exercise; however, only age

showed significance, because the more advanced the age, the greater the dependence for locomotion and the risk of falls.

The TUG is a low-cost and practical instrument, but this study, as well as the literature, showed that it is ineffective in predicting the risk of falls alone, and it should be associated with other methods.

Since this is a cross-sectional study, the results presented reflect the occurrence of the event studied and performance in the test in the past and present, respectively, not being not possible to establish a relationship with the future episodes. Therefore, a demand for other studies that seek to prove the prediction of the TUG in the occurrence of falls over time should establish a causal relationship among risk factors in a reliable way.

References

1. Instituto Brasileiro de Geografia e Estatistica (IBGE). Censo Demografico: resultados preliminares. Rio de Janeiro, 2011. Acesso em: 05 dez 2016. Disponivel em: http://www.ibge.gov.br/home/estatistica/populacao/censo2010/resultados_preliminares_amostra/notas_resultados_preliminares_amostra.pdf.

2. Hammerschmidt KSA, Santos SSC. Cuidados de enfermagem na prevenção de quedas em idosos hospitalizados. In: Gonçalves LHT, Tourinho FSV. Enfermagem no Cuidado ao Idoso Hospitalizado. 2012, 1ª ed: 338-380. São Paulo: Manole.

3. Rodrigues ALP, Souza VR. Eficiência do teste Timed up and go na predição de quedas em idosos atendidos em uma Unidade Básica de Saúde de Fortaleza-CE. Revista Brasileira de Prescrição e Fisiologia do Exercício. 2016; 10(58):314-20.

4. Al-aama T. Falls in the elderly: spectrum and prevention. Can Fam Physician. 2011; 57(7):771-6.

5. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc. 1991; 39(2):142-8.

6. Panel on Prevention of Falls in Older Persons. American Geriatrics Society and British Geriatrics Society: Summary of the Updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. J Am Geriatr Soc. 2011; 59(1):148–57

7. Brasil. Ministério da Saúde. Conselho Nacional de Saúde. Brasil. Ministério da Saúde. Resolução n° 466/2012 do Conselho Nacional de Saúde. Comissão de Ética e Pesquisa - CONEP sobre pesquisa envolvendo seres humanos. Brasília; 2012.

8. Conselho Federal de Enfermagem (COFEN). Resolução COFEN 311/2007: Código de ética dos profissionais de Enfermagem. Acesso em: 05 dez 2016. Disponível em: http://www.poralcofen.gov.

9. Bretan O, Silva Júnior JE, Ribeiro OR, Corrente JE. Risk of falling among elderly persons living in the community: assessment by the Timed up and go test. Braz J Otorhinolaryngol. 2013 Jan-Feb;79(1):18-21.

10. Virtuoso JF, Gregório LPP, Medeiros PA, Mazo GZ. The "Timed up and Go" in the prediction and explanation of falls in old people practicing physical exercises. Rev. Bras. Cineantropom. Desempenho hum. 2014; 16(4):381-9.

11. Santos LK, Holanda CJ. Risco de Quedas em Idosos Hospitalizados na Enfermaria de Cardiologia do Hospital Regional de Mato Grosso do Sul. UNICIÊNCIAS, v. 19, n. 2, p. 141-149, Dez. 2015

12. Landers MR, Oscar S, Sasaoka J, Vaughn K. Balance confidence and fear of falling avoidance behavior are most predictive of falling in older adults: prospective analysis. Phys Ther, 2016; 96(4):433–42.

13. Kojima G, Masud T, Kendrick D, Morris R, Gawler S, Tremi J et al. Does the timed up and go test predict future falls among British community-dwelling older people? Prospective cohort study nested within a randomised controlled trial. BMC Geriatrics. 2015; 15:38.

14. Schoene D, Wu SM, Mikolaizak AS, Menant JC, Smith ST, Delbaere K, et al Discriminative ability and predictive validity of the timed up and go test in identifying older people who fall: systematic review and meta-analysis. J Am Geriatr Soc. 2013; 61 (2):202-8.

15. Artaud F, Singh-Manoux A, Dugravot A, Tzourio C, Elbaz A. Decline in fast gait speed as a predictor of disability in older adults. Journal of the American Geriatrics Society, 2015; 63(6):1129-36.