



RESEARCH ARTICLE

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RELATIONSHIP BETWEEN TIMED UP AND GO TEST AND FUNCTIONAL CAPACITY IN ELDERLY OF SOUTHEAST BAHIA

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ABSTRACT

Introduction: The aging process cause several alterations in the organism resulting in several limitations. The functional capacity and motor performance are affected because the loss of muscle and bone mass what decrease the power and strength. These functions can be evaluated through instruments being the commonly used the Lawton scale and Timed Up and Go test (TUG test). **Objective:** To relate the functional capacity and motor performance in elderly of southeast Bahia. **Material and Methods:** The samples were composed by 246 seniors of both sex and age range of 65 to 100 years. They answered the Lawton scale and TUG test. **Results:** Mostly older were classified as independent for TUG test and partial dependent for the Lawton Scale. There was a weak correlation between the instruments. **Discussion:** The discrepancy between the classifications of the instruments can be explained because functional capacity isn't only measure by physical conditions but for social, emotional and psychologic factor too. **Conclusion:** TUG test and Lawton Scale can classified the same subject in different forms. More studies are need to identify which one is more reliable.

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INTRODUCTION

Since the 60's, with the fecundity index fall and age structure alteration, the Brazilian population aging occurs in a fast way causing the progressive narrowing of the population pyramid basis (LAGO; REIS, 2017). In 2020, it is expected that the elderly number will be nearly 30,9 millions of people representing 17% of the Brazilian population transforming Brazil in the 6th country with higher number of elderly people in the world (PINTO et al., 2016). Several alterations accompanied the aging process, including in the neuromuscular system, which causes changes in motor unit size, properties and morphology can modify the motor function and performance in older peoples reducing mobility and functional capacity what leads to negative consequences in the ambulation and balance causing fall occurrence and reduced functional capacity (HUNTER et al., 2016; MARTINEZ et al., 2015; BENAVENT-CABALLER et al., 2015).

Functional capacity can be considered the individual competence to preserve physical and mental abilities ensuring the performance in daily living activities and will impact on quality of life (OPPEWAL et al., 2015). The Lawton Instrumental activities of daily living scale is considered one of the most popular instrument to evaluate functional capacity through the self-reference performance in daily living activities (MAO et al., 2018). It can be performed by direct interview within 10-15 minutes and assesses the function in nine items: ability to use telephone, shopping, food preparation, housekeeping, laundry, transports, responsibility for own medication and the ability to handle finances (KADAR et al., 2018). A quick and inexpensive way of assess the functional capacity are specific physical test that can be associated with outcomes relevant to the clinical evaluation such as quality of life and mortality, and can predict the performance in daily living activities (SPRINT et al., 2015). One test that has been widely used to inform about functional

capacity in elderly is the Timed Up and Go (TUG) test that evaluates mobility, balance, agility, posture, gait speed, stability in walking, transfer from sitting to standing (RODRIGUES *et al.*, 2017). In this test, a better functional performance is indicated for a fast time (BARRY *et al.*, 2014). Once self-referred scale or questionnaire can underestimate or overestimate the data because depends of the interviewers answer which can contain mistakes or forgetfulness (MELO *et al.*, 2017), the objective of the present study is to relate the Lawton scale and TUG test.

MATERIAL AND METHODS

This study is part of a larger project entitled “Epidemiological Profile of Chronic Diseases in Southwestern of Bahia” which objective is to research the epidemiology of non communicable chronic diseases (NCCD). It was realized in the city of Vitoria da Conquista, Bahia, Brazil (geographical coordinate: latitude 0 14°53’ and longitude – 40° 48’). The sample was composed of 246 seniors of both sex resident in cities of Southwestern that were regulars in a municipal hospital and conviviality center. It was excluded seniors with mobility disorders and cognitive impairment. In the visit to realize routine exams, the aged was invited to response the functional capacity scale and perform the motor test. To identify the sociodemographic variables, it was used a proper questionnaire based in the patterns of the Brazilian Institute of Geography and Statistics. All the seniors answered the Mini Mental State Examination before the procedures.

The functional capacity was assessed by the Lawton Instrumental Activities of Daily Living Scale. This scale was created by Lawton and Brody in 1969 being largely used in research and clinical practice. It is self-referred and analyze nine activities of daily live: telephone use, transportation, shopping, housework, food preparation, own medication use and finance management. There are three options of answer: “independent”, “need help” and “inability to perform the task”. The score varies from 1 to 3 to each item being the independence the highest point and the maxim score is 21. The Lawton Scale was applied of a simple way by trained researcher aiming decrease the inter-rater error. To identify the motor performance, it was used the Timed Up and Go Test (TUG test) that consisted of get up from a chair without arm help, walk usually for a three meters distance, turn, go back to the chair and sit touching the chair backrest. The aged received the “go” command to perform the test and it was timed by the command until the touching of the backrest.

The test was realized two times, once to become familiar with the test and second to mark the time. A better functional performance was indicated by a fast time being the score used as cut-point ≥ 13.5 seconds (BARRY *et al.*, 2014). The score of TUG test was classified by Bischoff *et al.* (2003) that consider the performance until 10 second as independence, between 11-20 seconds as partial independence, and more than 20 seconds as important mobility deficit or dependence. The data were tabbed in Excel 2016 and the statistical analysis was made in the Statistical Package for the Social Sciences (SPSS) version 23.0 for the frequencies, means and standard deviation. All the participants signed an informed consent form and the study was approved by the Ethics Committee with the protocol number of 1.859.545.

RESULTS

From the sample, the marjority was 72,7% female with mean age of 70,78 ($\pm 7,6$) years. About marital status, 47,15% were married and one aged didn’t answered. The sample characterization can be observed in Table 1.

Table 1. Sample Characterization

Variable	N	%
Sex		
Male	67	27,24
Female	179	72,76
Total	246	100
Marital Status		
Married	116	47,35
Widower	70	28,57
Single	33	13,47
Widower	17	6,94
Total	245	100
Age range		
≤ 60	3	1,22
60-70	132	53,66
70-80	83	33,74
80-90	26	10,57
90-100	1	0,41
>100	1	0,41
Total	246	100

With regard to the Lawton Scale, 48,8% of the sample was classified as independent, 39,8% partial dependent and 11,8% as total dependent. The mean score was 24 points classified as partial dependence. Analyzing for sex, the most of male (55,2%) was considered independent, 32,8% partial dependent and 12% total dependent. While the female had similar values in the classifications independent (45,8%) and partial dependent (42,5%), 11,7% was considered total dependent. The classification by sex can be visualized in table 2.

Table 2. Classification Lawton Scale

Classification	General		Male		Female	
	n	%	n	%	n	%
Independent	119	48,37	37	55,2	82	45,8
Part ial Dependence	98	39,83	22	32,8	76	42,5
Total Dependence	29	11,8	8	12	21	11,7

About the Timed Up and Go test (TUG test), the general mean was 12,53 ($\pm 7,7$) seconds being classified as partial independent. When analyzed by sex, the male showed a better performance with the mean of 9,02 ($\pm 0,56$) seconds being classified as independent and the female was 14,76 ($\pm 9,35$) being classified as partial independent. From the sample, 32,11% was categorized as independent, 65,85% as partial independent, and 2,06% dependent. Classifying by sex, the majority (59,7%) of male were partial independent, 37,3% independent and 3% dependent while the female presented 68,2% as partial independent, 30,3% independent and 4,5% dependent. The data can be better analyzed in the Table 3. When compared the classification of Lawton Scale and the TUG test, of the considered independent for the test, 48,5% was classified independent and 51,5% dependent by the scale.

Table 3. Classification of Time Up and Go test (TUG test)

Classification	General		Male		Female	
	n	%	n	%	n	%
Independent	79	32,11	25	37,3	54	30,16
Independent for major displacement	162	65,85	40	59,7	122	68,15
Dependent	5	2,06	2	3	3	4,47

Table 4. Relation between Lawton Scale and TUG test

Lawton Scale Classification	Timed Up and Go Test Classification											
	Independent						Dependent					
	General		Male		Female		General		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%
Independent	117	48,5	35	53,8	82	46,6	2	40	2	100	0	0
Dependent	124	51,5	30	46,2	94	53,4	3	60	0	0	3	100
Total	241		65		176		5		2		3	

Only five seniors was considered dependent in the TUG test, from these, 40% were independent and 60% dependent in the classification of the scale. Considering the dependence in the TUG test, two were male and three female and both men were considered independent and the female were dependent in Lawton's scale. The data was classified in dependent and independent being the partial dependent considered dependent in the Lawton's scale and partial independent considered independent in the TUG test. In the table 4, the data can be better analyzed. To analyze the correlation between the values of the scores from TUG Test and Lawton Scale, the data were disposed in the statistic program MiniTab in which was used the Pearson's correlation test whose result was $r=-0,344$ what suggest a weak correlation between the measures.

DISCUSSION

The level of independence is influenced by the ability to perform instrumental activities of daily living that is an important determinant of the need for support (OPPEWAL *et al*, 2015). The loss of independence in these activities define functional disability (LAU *et al*, 2015). Activity limitations are usually assessed by instruments that measure the activities of daily living that can be of two types, the basic, which is less complex task and englobe self-maintaining tasks, and instrumental, more complex that need higher cognitive level functions as attention and memory, these kind of activities are considered important to an independent life (SIRIWARDHANA *et al*, 2018). In the present study, 48,8% of the sample was classified as independent, 39,8% partial dependent and 11,8% as total dependent with the majority of both sex being independent. This value was less than 94% of independent found by Aguiar *et al* (2019) in elderly of Belem/PA/Brazil and more than 21,3% observed by Aguiar *et al* (2019) in older of Minas Gerais, Brazil. This can be explained by the age of this sample that was 70,78 ($\pm 7,6$) once studies show that the functional capacity declines with the age. Lee *et al* (2019) demonstrated that 81.2 years are the cut-off value considered the threshold for the deterioration of daily living function in older adults. Considering the Timed Up and Go test (TUG test), the general mean was 12,53 ($\pm 7,7$) seconds being classified as independent that was a better result than found by Souza *et al* (2017) of 15,32 ($\pm 4,39$) in a sample of Guanambi, Bahia, Brazil with a similar age (72,05 $\pm 7,86$).

When analyzed by sex, the male showed a better performance with the mean of 9,02 ($\pm 0,56$) seconds being classified as independent and the female was 14,76 ($\pm 9,35$) being classified as partial independent corroborating with the findings of Rodrigues *et al* (2018) that showed male scoring <10 seconds and female >10 seconds in TUG test. From our sample, the majority was classified as partial independent (65,85%), 32,11% was categorized as independent and 2,06% dependent. Similar to the values found by Rodrigues *et al* (2017) in elderly of Joao Pessoa, Paraiba, Brazil, whose majority also was partial independent (68,65), 23,9% independent and 7,5% dependent. When related the classification of Lawton Scale and TUG test, the majority was considered independent for both (48,5%) and only three older were in the category dependent for both measure, all of them, female (60%). From the sample, 51,5% were considered dependent by the Lawton scale and independent by the TUG test showing a conflict of status and only two subjects were considered dependent by the test and independent by the scale, both male. This fact suggests that the auto-referred instrument can be influenced by other factors that not only the physical condition. Devi (2018) affirm that the scale of functional capacity reflect the psychic, social, emotional and physical state of the subject but none is perfect at this level and the scale must be considered complement to the clinical studies. This can be explained because questionnaire can underestimate or overestimate the information (MELO *et al*, 2017). According to Santos *et al* (2016), motor tests showed greater validity, sensitivity, reproducibility and applicability when compared with other forms of assessment, such as self-reporting.

Final Considerations

The majority of the seniors evaluated in this study was classified as independent for both instruments, Lawton Scale and TUG test. Male elder were mostly independent for both and female were dependent for Lawton Scale and independent for TUG test. There was a weak correlation between both instruments. New researches are needed to compare physical test with auto-referred instruments once this can be influenced by other factors that not only the motor performance.

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