Test-Retest Reliability Of The Berg Balance Scale For Elderly Adult

Loh Siew Lee[1], Lee Ai Choo[2]
[1]Institut Pendidikan Guru Kampus Pulau Pinang, [2]Universiti Pendidikan Sultan Idris, Malaysia

Article Info

Abstract

Balance significant for keeping up postural harmony and along these lines for the shirking of falls. Ageing may influence the central nervous system and neuromuscular system properties prompting deficiencies in equalization and step execution. The motivation behind this investigation was to assess the test-retest reliability of the Berg Balance Scale (BBS) used to look at equalization in elderly adult. Twenty healthy volunteer elderly adult (age 62–91) were incorporated three males and 17 females into the examination. The Berg Balance Scale (BBS) was assessed twice by a similar assessor. Each volunteer played out the Berg Balance Scale (BBS) succession in random request around the same time and after two days. The test-retest reliability assessments were made at roughly a similar time of day. The mean age in years of the participants was 71.9. The test-retest reliability for the BBS was excellent Intraclass Correlation Coefficients (ICC = 0.994). The BBS is a reliable and valid scale to be utilized in balance assessment of elderly adult.

Keyword: Balance, Elderly Adult, Berg Balance Test

Introduction

Balance can be characterized as the capacity to keep up the body centre of gravity in its base of support to minimum sway or most extreme stability (Shumway-Cook A, Woollacott MH, 1995). Balance is a important component in the daily activities to maintain different positions, to react consequently to the intentional development of the body furthest points, and to respond to outer annoyances represents to a postural control space required (Berg K et al., 1989). Balance can be estimated by some instrument for utilitarian balance assessment.

There are a few appraisals for assessing balance that is proper for an elderly adult, for example, Functional Reach Test (FRT), Timed Up and Go Test (TU and GT), Performance-

Oriented Mobility Assessment (POMA), The Berg Balance Scale (BBS), etc. Functional Reach Test (FRT) measures the maximal separation one can reach forward beyond arm's length while keeping up feet fixed in a standing position (Duncan, Weiner, Chandler, and Studenski, 1990). FRT measure just a single angle-forward.

Time Up and Go Test (TU and GT) is a modifies, time variant of "Get-Up and Go" Test (Mathias, Nayak, and Issacs, 1986; Podsiadlo, D., and Richardson, S., (1991). It quantifies the time it takes an individual to get up from a standard armchair, walk a distance of 3 m, turn, walk back to the seat, and sit down. Time Up and Go Test (TU and GT) just measure dynamic equalization and versatility and furthermore prescient validity is less established.

Performance Oriented Mobility Assessment (POMA) is a presentation trial of equalization and walk during convolution utilized during a typical daily task (Tinetti, 1986). The balance bit comprises of 9 manoeuvers, which are reviewed on an ordinal scale as either ordinary, versatile, or strange. The walk bit rates seven step qualities as ordinary or irregular. There are a sum of 16 points on the equalization part and 12 points on the walk divide. POMA evaluates a wide range of parts of equalization and quick to manage, however it may not be delicate to changes in balance.

The Berg Balance Scale (BBS) was initially produced for the appraisal of postural control and is generally utilized in numerous fields of rehabilitation, since, aside from its low cost. It is easy to apply and evaluates the risk of falling inside the elderly (Berg KO, Wood-Dauphinée S, Williams JI, 1995). BBS was intended for use in elderly and neurologically hindered people and was received as the "highest quality level" of balance execution. BBS measures static and dynamic balance capacities utilizing utilitarian task ordinarily performed in regular day to day existence. This estimation requires validity and reliability before it is utilized clinically. The purpose for this examination was to evaluate the test-retest reliability of the Berg Balance Scale (BBS) used to examine balance in elderly adult.

Methodology

Subjects
Twenty healthy volunteer elderly adult (age 62–91) were incorporated three males and 17 females into the investigation. Each volunteer played out the Berg Balance Scale (BBS) grouping in random request around the same time and after two days.

Procedure
The Berg Balance Scale (BBS) has 14 items which evaluate balance during functional activities in daily life. The 14 items in the scale asses static sitting and standing balance, just as expectant balance during exercises normally performed in every day work, including moves, turning, reach forward and retrieving objects from the floor. The scale expects 15 to 20 minutes to finish. It includes negligible equipment, for example, a chair, stopwatch, ruler, step and space and requires no specialized training (Berg KO, Wood-Dauphinée S, Williams JI, 1989).

The scoring is done on a 5-point scale, that considers whether the patient can perform the task securely and autonomously, regularly dependent on a clear period time. Typical exhibitions are reviewed from 0 (unfit to perform) to 4 (ordinary execution). Which means to state 0 is the most exceedingly terrible imprint and 4 the best execution from the acknowledgment of freedom undertakings. Scores on individual items are summed for a total score, with a maximum of 56. Scores of 0 to 20 represent to balance disability, 21 to 40 represent to adequate balance, and 41

to 56 represent to great balance. The less indicates the bigger risk the person's stability. A duplicate of the Berg Balance Scale can be gotten online from the web.

Data Analysis

The SPSS 21 statistical software was utilized to compute the test-retest reliability between participant's scores obtained from all tests at the 0.06 alpha level. Data from the test-retest reliability study (N=20) was analyzed utilizing an Intraclass Correlation Coefficient (Portney LG, Watkins MP, 2000).

Results and Discussion

The mean, range (minimum and maximum values), and standard deviation (SD) for each balance test-retest for the 20 participants are exhibited in Table 1. None of the participants had recently been presented to either test.

The test-retest reliability testing (N=20) for the Berg Balance Scale is appeared in Table 2. The Berg Balance Scale showed excellent reliabilitu (ICC = .994). A_Total represent as test and B_Total represent as retest. Mean for test-retest total contrasts were 0.15. In the interim, normal contrasts for standard deviation in test-retest were 0.094.

Table 1
 Descriptive Statistics

	N	Minimum	Maximum	Mean	Variance
Gender	20	1	2	1.85	.134
Age	20	62	91	71.90	60.621
Height	20	36.90	88.00	58.8450	192.268
Weight	20	1.38	1.70	1.5555	.009
BMI	20	17.80	35.56	24.1250	18.735
A_TOTAL	20	48	56	53.65	7.082
B_TOTAL	20	48	56	53.80	6.589
Valid N (listwise)	20				

Table 2
Statistics

		A_TOTAL	B_TOTAL
N	Valid	20	20
	Missing	0	0
Mean		53.65	53.80
Median		54.50	55.00
Mode		56	56
Std. Deviation		2.661	2.567
Range		8	8
Minimum		48	48
Maximum		56	56

Table 3
Intraclass Correlation Coefficient

	Intraclass Correlation[a]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.989[b]	.971	.996	202.725	19	19	.000
Average Measures	.994[c]	.985	.998	202.725	19	19	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.
a. Type A intraclass correlation coefficients using an absolute agreement definition.
b. The estimator is the same, whether the interaction effect is present or not.
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Test-retest reliability of the Berg Balance Scale (BBS) was found to be excellent. These finding are similar to those reported for elderly adult (ICC=0.994). As the BBS does not address strolling walking, other execution based devices, for example, the Dynamic Gait Index (DGI) (Shumway-Cook A, Woollacott MH, 2001), and Functional Gait Assessment (FGA) (Wrisley DM, Marchetti GF, Kuharsky DK, Whitney SL, 2004), could be considered for this population. These two instruments incorporate walking, head-turning, and stair climbing tasks as significant segments of dynamic balance testing, and could be viewed as a higher-level balance test with respect to the Berg Balance Scale.

Conclusion

Test-retest reliability was inspected in a group of individual's healthy elderly. Excellent reliability was found for the Berg Balance Scale (BBS). This preliminary finding is increasingly strong for the BBS.

References

Berg K, Wood-Dauphinee S, Williams J. The Balance Scale: reliability assessment with elderly residents and   patients with an acute stroke. *Scand J Rehabil Med*. 1995;27:27-36.

Berg KO, Wood-Dauphinee S, Williams JI, Gayton D. Measuring balance in the elderly: preliminary development of an instrument. *Physiother Canada*. 1989;41: 304-311.

Duncan, E. W., Weiner, D. K., Chandler,]., & Studenski, S., (1990). Functional reach: A new clinical measure of balance. *Journal of Gerontology,* 45, MI92-MI97.

Mathias, S., Nayak, U. S. L., & Issacs, B., (1986). Balance in elderly patients: The "Ger-Up and Go" Test. *Archives ofPhysical Medidne and Rehabilitation,* 67, 387-389.

Podsiadlo, D., & Richardson, S., (1991). The Timed "Up and Go": A test of basic funcrional mobiliry for frail elderly persons. *Journal o/the American Geriatric Society,* 39, 142-148.

Portney LG, Watkins MP. *Foundations of Clinical Research. Applications to Practice*. 2nd ed. Upper Saddle River, NJ: Prentice Hall Health; 2000.

Shumway-Cook A., Woollacott MH., Motor Control: Theory and Practical Applications. Baltimore, Md: Williams   & Wilkins; 1995.

Shumway-Cook A, Woollocott MH. *Motor Control: Theory and Practical Applications*. 2nd ed. Lippincott WIlliams & Wilkins; 2001.

Wrisley DM, Marchetti GF, Kuharsky DK, Whitney SL. Reliability, internal consistency, and validity of data obtained with the functional gait assessment. *Phys Ther*. 2004;84:906-918.