A STUDY TO FIND OUT RELIABILITY AND CONCURRENT VALIDITY OF FULLERTON ADVANCED BALANCE SCALE FOR ASSESSMENT OF FUNCTIONAL BALANCE IN INDEPENDENT OLDER ADULTS IN INDIA - AN OBSERVATIONAL STUDY

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ABSTRACT

Context: Falls are a common and often devastating problem among older people, causing a tremendous amount of morbidity, mortality and use of health care services including that most effective and cost-effective fall reduction programs have involved systematic fall risk assessment and targeted interventions, exercise programs and environmental-inspection and hazard-reduction programs.

Aim: The aim of the study was to find out reliability and con-current validity of Fullerton advance balance scale for assessment of functional balance in independent older adults.

Settings and Design: An observation study was carried out in Shree K.K Sheth physiotherapy college, Rajkot.

Method and Material: For measure reliability and validity of FAB Scale 40 (Male-24, Female-16) older adults should be taken. Intrarater reliability FAB Scale measured by rater A1 and after 24 hour by same rater A2. For concurrent validity of BBS score has been taken at first day by rater A1.

Statistical analysis: Data was analyzed by using SPSS Version 20. Intra rater reliability and concurrent validity of FAB Scale were assessed by Spearman's correlation coefficient.

Results: Spearman's correlation coefficient value for Intra rater reliability is 0.954 and concurrent validity is 0.847 which show moderately positive correlation of Intra rater reliability and concurrent validity of Fullerton Advanced Balance Scale with Berg Balance Scale.

Conclusion: The Fullerton Advanced Balance Scale appears to be reliable and valid test to independent older adults affect movement to walk over obstacles, anticipatory control, dynamic gait and reactive postural control in various directions. The FAB Scale is an easy-to-administer, less equipment use and less time consuming clinical test with concurrent validity, intra rater reliability for assessment of functional balance in independent older adults in India.

Keywords: Older adults; Intra rater reliability; Concurrent validity; Fullerton Advanced Balance Scale (FAB); Berg Balance Scale (BBS)

INTRODUCTION

Definition of the Elder is the frequent presence of multiple pathology and the atypical way in which illness can present with confusion, falls and loss of mobility and day-to-day functioning[1].

In three division of elder are; Young-old group consists of the population between 65 and 75, in Middle-old group consists between 75 and 85 and old-old group consists between older than 85 years of age[1].

The number of persons above the age of 60 years is fast growing, especially in India. India as the second most populous country in the world has 76.6 million people at or over the age of 60 constituting above 7.7% of total population[2].

Falls are an important cause of morbidity and mortality in the elderly. Most often the cause of fall is multifactorial. Falls and their squeal are potentially preventable and hence it is of importance to know the risk factors for falls in the elderly several promising strategies such as exercise programs, environmental modification, and other educational opportunities for preventing falls and fractures exist[2].

Fullerton Advanced Balance (FAB) Scale was developed by Debra Rose. FAB scale to develop a new balance assessment tool that could be used to identify balance problems of varying severity in functionally independent older adults and also evaluate more of the system (eg, sensory, musculoskeletal, neuromuscular) that might be contributing to balance problems. One of the advantages of the FAB scale is that it is quick to administer, requiring approximately 10 to 12 minutes. In contrast to the BBS, which is comprised of 14 test items, the FAB scale has only 10 test items. Each item is scored from 0-4. The maximum score is 40 points[3].

Patrick D. Neuls et al, (2011), did a systemic review on usefulness of the Berg Balance Scale to predict falls in the elderly and concluded that The Berg Balance Scale is used to help identify and measure changes to elderly clients fall risk as a part of a total balance evaluation and used in conjunction with other tests or measures as a total balance assessment[4]. In BBS, a subject is assessed with 5 point ordinal scale ranging from 0 to 4 with higher scores

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awarded on the basis of speed, stability or degree of assistance required for completion of the task[5].

NEED FOR THE STUDY

There are already many ways of measuring balance, but very less are suitable for use in the clinical setting to assess functional balance, the effects of individual rehabilitation interventions or to measure change over a short term .

The Fullerton Advanced Balance Scale is convenient, quick, more challenging, easy to access with periodically and simple to administer for functional balance evaluation in independent older adults in India.

There is no study which finds the reliability and con-current validity of Fullerton Advance Balance Scale with Berg balance Scale. So, the purpose of this study was to find concurrent validity and reliability of The Fullerton Advanced Balance Scale for assessment of functional balance in independent older adults in India.

AIM OF THE STUDY

The aim of the study was to find out reliability and con-current validity of Fullerton advance balance scale for assessment of functional balance in independent older adults in India.

OBJECTIVES OF THE STUDY

- To assess intra-rater reliability of the Fullerton advanced balance scale for assessment of functional balance in independent older adults in India.
- To assess concurrent validity of the Fullerton advanced balance scale for assessment of functional balance in independent older adults in India.

MATERIAL AND METHODS

STUDY SETTING: Shri K.K. Sheth Physiotherapy Centers, Rajkot
STUDY DESIGN: An Observational study
METHOD OF COLLECTION OF DATA:
Source of data collection: Shree K. K. Sheth Physiotherapy center, Rajkot
Study population: Independent Older adults
Sampling method: Purposive sampling
Sample size: 40 subjects
Materials to be used: FIG: 1 (a - b)

- Consent form , Measurement form, Pencil and Pen
- 12 inch ruler
- 6 inch high stool
- Stop Watch
- Measure tape
- Chair
- Foam Surface
- Mini Mental Status Examination Scale
- Fullerton Advanced Balance Scale
- Berg Balance Scale

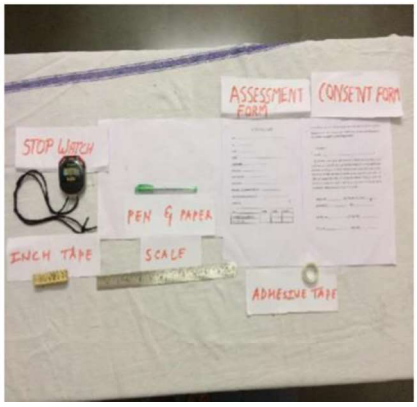


FIG: 1(a) Material used in the study

FIG: 1(b) Foam Surface and 6 inch High stool used in the study

Criteria for selection

Inclusion Criteria

- Age - 66 to 85 years.1
- Gender: both males and females.
- Subjects with normal cognitive function (MMSE >23)
- Independently Ambulatory older without use of assistance device

Exclusion Criteria

- Subjects with history of any recent surgeries in low back and lower limbs.
- Subjects with history of any recent musculoskeletal injuries like fractures, dislocation, joint instability or any soft tissue injuries no with other form of neurological impairments.
- Hemodynamically unstable patients.

- Uncooperative patients or patient who is not willing to participate.

MEASUREMENT PROCEDURE

- The subjects have been selected on the basis of inclusion and exclusion criteria.
- Before starting the study, brief assessment has been done by Mini Mental State Examination and written consent was taken from the subjects.
- Patients were then explained about the test and procedure to be conducted Fullerton Advanced Balance Scale conducted to check Functional balance in older adults. The FAB Scale was conducted twice by same rater (Rater A1 and Rater A2) at different time (after 24 hours of duration). BBS was taken to find out concurrent validity by rater A1.

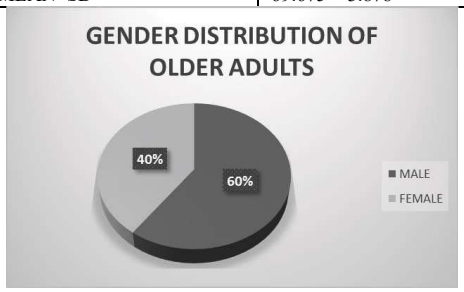
RESULTS

All the statistical analysis was done by Statistical Package for the Social Sciences (SPSS) statistical software version 20.0 for windows.

Intra rater reliability and concurrent validity of FAB Scale were assessed by Spearman's correlation coefficient. Level of significance (p value) was set to 0.01 level.

Table 1 - Age distribution of Older adults (years)

AGE GROUP (YEARS)	NO OF SUBJECTS
66 - 70	29
71 - 75	7
76 - 80	4
81 - 85	0
TOTAL	40
MEAN±SD	69.675 ± 3.878



Graph 1- Pie chart showing gender distribution of the older adults

Table 2:- Mean value and Standard Deviation of Fullerton Advanced Balance Scale and Berg Balance Scale in older adults

Outcome Measure	Rater	Mean	Standard deviation
Fullerton Advanced Balance Scale	Rater A1	30.325	± 5.244
Fullerton Advanced Balance Scale	Rater A2	30.600	± 5.550
Berg Balance Scale	Rater A1	49.550	± 4.037

Table 3:- Spearman correlation coefficient showing Intra rater reliability and concurrent validity of Fullerton Advanced Balance Scale with Berg Balance Scale of older adults

Measure	Spearman Correlation Coefficient	P value
Intrarater Reliability	**0.954	0.000
Concurrent Validity	**0.847	0.000

** Correlation is significant at the 0.01 level (p value <0.01)

Interpretation: table shows moderate positive correlation of Intra rater reliability and concurrent validity of Fullerton Advanced Balance Scale with Berg Balance Scale.

DISCUSSION

This study was conducted to check reliability and con-current validity of the Fullerton advanced balance scale for assessment of functional balance in post independent older adults in India.

In the above study the results for intrarater reliability and concurrent validity suggested moderate positive correlation with Rater A1 and Rater A2 both which suggest that functional balance can reliably and validly be measured in independent older adults by using Fullerton Advanced Balance Scale.

Balance impairments increase fall risk, resulting in high economic costs and social problem. Decreased muscle strength, range of movement, abnormal muscle tone, motor coordination, sensory organization, cognition, and multisensory integration can contribute to balance disturbances at different levels[6].

Result of present study suggested that Fullerton advanced Balance Scale is reliable and valid tool to asses balance in post stroke patients and this is supported by a study done by Debra J. Rose in 2006 et al; Development of a Multidimensional Balance Scale for Use With Functionally Independent Older Adults and concluded that Preliminary results suggest that the FAB scale is a valid and reliable assessment tool that is suitable for use with functionally independent older adults residing in the community[7].

Item 10 (reactive postural control) was found to measure a balance-control mechanism different from that measured by the other nine FAB scale items. Item 10 is intended to measure an individual's ability to respond quickly to an unexpected loss of balance using a protective and involuntarily controlled righting response[8].

During the study it was observed that in FAB Scale Item 4 (Step up over bench), Item 5 (Tandem walk), Item 6 (Stand on one leg) and Item 8 (Two footed jump) are more difficult in

subjects. It is more challengeable items to perform in older adults.

Penelope J. Klein et al, (2009), conducted a study on research analysis of the Fullerton advanced balance scale and concluded that the scale appears to be a reliable and valid tool to assess balance function in older adults. The test was found to discriminate among participants of varying balance abilities. It also determine the test is for diagnostic prescriptive utility[8].

The present study finding suggests that Fullerton Advanced Balance scale is reliable and valid scale to measure Functional balance in independent older adults in India.

LIMITATION OF THE STUDY

Small sample size, Inter-rater reliability, specific age criteria for independent older adults was not taken in to consideration.

FURTHER RECOMMENDATION

Study can be performed in specific age criteria and Physiotherapist with different years of experience can be taken to check inter rater reliability.

ACKNOWLEDGEMENT

I am first thankful to Almighty God and my family for blessings. I extend my sincere thanks to my respected teacher Dr. Renuka Dafda. I am also thankful to Prayag Parekh, Sarika Patel and friends for their support.

CONCLUSION

The Fullerton Advanced Balance Scale appears to be reliable and valid test to independent older adults affect movement to walk over obstacles, anticipatory control, dynamic gait and reactive postural control in various directions. The FAB Scale is an easy-to-administer, less equipment use and less time consuming clinical test with concurrent validity, intra rater reliability for assessment of functional balance in independent older adults in India.

CONFLICT OF INTEREST

Nil.

SOURCE OF FUND

No fund was needed.

ETHICAL CLEARANCE

From Shree K.K. Sheth Physiotherapy College, Rajkot.

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