“CORRELATION BETWEEN BALANCE CONFIDENCE, ACTUAL BALANCE ABILITY AND FUNCTIONAL MOBILITY IN COMMUNITY-DWELLING ELDERLY”

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Abstract

Introduction: Falls are a major health problems in the elderly persons 65 years of age and older, the lowest fall rates are reported among community-living, generally healthy elderly persons, between 30% and 60% of whom fall each year, for an overall annual rate of about 0.7 fall per person.1 In a community based study it was found that over 50 percent of falls among elderly persons result in at least some minor injury. Falls –related injuries decrease mobility and increase morbidity. Up to 2 percent of falls were found to result in fracture of hip; other fracture (in the arm and pelvis) could occur in up to 5 percent of falls. Serious injuries (head and internal injuries, laceration) could occur in up to 10 percent of falls.2 Hip fracture increases the use of health and social care, need for help in daily activities, and also use of assistive devices. Approximately 20% of hip fractures lead to permanent in long-term care. Higher mortality rate have also been observed among older adults with fracture.3 Injury to elderly individual secondary to a fall may result in decrease of their quality of life, permanent limitation of their activities, or death.4

1. Aims and Objectives: The aim of this study was to find whether a relationship exists between balance confidence balance and functional mobility in elderly. To literary study balance in elderly, compile a literature on balance confidence, functional mobility and to evaluate the relationship between balance confidence, actual balance and functional mobility in elderly.

RESEARCH QUESTION: Our study is to evaluate about the relationship between balance confidence, actual balance ability and functional mobility in elderly people who have diminished balance confidence.
Methodology
The Study Design is Correlation in Study.

Sample size-64

Sampling: Convenience sampling

- Community Centre- Sector-68, Gurugram
- Senior Citizen’s Club, Sector-56, Gurugram

INCLUSION CRITERIA
- Age 65-88 years, MMSE more than or equal to 24, Ability to walk 10 feet without assistance, Both males and females are included

EXCLUSION CRITERIA
- Depression as diagnosed by Geriatric Depression Scale, Uncontrolled visual and hearing deficit, Uncontrolled Diabetes Mellitus and Hypertension, Obvious deformity in trunk or lower limb, Presently diagnosed neurological problem like Stroke, Parkinsonism etc.

INSTRUMENTATION
- Ruler, Chairs of 46 cm of seating height with or without armrest, Foot stool of 15 cm height, Stop watch, Standard measuring tape, Marker etc.
PROTOCOL

64 male and female subjects were through convenient sampling

After approval by ethical Committee

Informed Consent

Health related information like past medical history, use of medication & use of assistive device was recorded

Evaluation of cognition with MMSE to rule out cognitive impairment and depressive symptoms using GDS

Assessment of static balance was done using OLST and active static balance was

Balance self efficacy was assessed using ABC & FES scale

Berg Balance scale was used for dynamic balance

Functional mobility was assessed by TUG test

Outcome measures of ABC scale, Falls Efficacy scale, Berg Balance scale, TUG test, Functional reach test and One Leg Standing test were recorded and analysed using SPSS software version and pearson correlation was used to correlate balance confidence, actual balance and functional mobility in elderly
PROCEDURE
The general assessment regarding subject’s demographic data and health related information like past medical history, use of assistive device, and use of medication was taken. Evaluation of cognition using the MMSE (appendix c) scores was done to rule out cognitive impairment. Level of depressive symptoms was evaluated using the Geriatric Depression Scale (GDS) (appendix d).

Balance self-efficacy was assessed using the Activities –Specific Balance Confidence (ABC) (appendix e) and Fall Efficacy Scales (FES) (appendix f). This was followed by assessment of static balance using One Leg Stance Test (OLST)(appendix g), active static balance by Forward Reaching Test (FRT) (appendix h). Berg Balance Scales (BBS) (appendix I) was used for dynamic balance and functional mobility was assessed by Timed Up and Go test (TUG) (appendices j).

Each Task was explained & demonstrated by the researcher. Then, the subjects were asked if he or she felt safe performing that task. Subjects who did not feel safe performing a task were reassured that they could perform the task as much as possible while they will be closely guarded for safety.

OUTCOME MEASURES
- ABC scale (Activities-Specific Balance Confidence), FES (Falls Efficacy (Scale))
- OLST (One Leg Stance Test), FRT (Functional Reach Test)
- BBS (Berg Balance Scale), TUG (Timed Up 7 Go Test)

DATA ANALYSIS
Data was analyzed using SPSS software version 16. Pearson’s Correlation was used to correlate balance confidence, balance and functional mobility in community dwelling elderly people. The significant level used was less than or equal to 0.01.
### RESULTS

**TABLE 6.1** Mean and standard deviation of ABC, FES, OLST, FRT, BBS, and TUG in different age groups of community dwelling elderly.

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>ABC (%)</th>
<th>FES (sec.)</th>
<th>OLST (sec.)</th>
<th>FRT (c.m)</th>
<th>BBS (Dynamec balance)</th>
<th>TUG (sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-70</td>
<td>88.40</td>
<td>10.50</td>
<td>10.10</td>
<td>26.16</td>
<td>52.45</td>
<td>10.90</td>
</tr>
<tr>
<td></td>
<td>± 8.49</td>
<td>± 1.57</td>
<td>± 2.72</td>
<td>± 4.21</td>
<td>± 1.60</td>
<td>± 1.88</td>
</tr>
<tr>
<td>71-76</td>
<td>85.63</td>
<td>10.63</td>
<td>8.46</td>
<td>25.78</td>
<td>50.63</td>
<td>11.57</td>
</tr>
<tr>
<td></td>
<td>± 7.29</td>
<td>± 1.34</td>
<td>± 1.47</td>
<td>± 3.62</td>
<td>± 1.97</td>
<td>± 2.24</td>
</tr>
<tr>
<td>77-82</td>
<td>80.68</td>
<td>13.68</td>
<td>6.99</td>
<td>25.26</td>
<td>48.57</td>
<td>12.31</td>
</tr>
<tr>
<td></td>
<td>± 9.98</td>
<td>± 3.65</td>
<td>± 2.57</td>
<td>± 3.5</td>
<td>± 2.00</td>
<td>± 2.84</td>
</tr>
<tr>
<td>83-88</td>
<td>82.83</td>
<td>13.83</td>
<td>6.30</td>
<td>21.95</td>
<td>47.16</td>
<td>12.66</td>
</tr>
<tr>
<td></td>
<td>± 1.42</td>
<td>± 3.60</td>
<td>± 1.95</td>
<td>± 2.22</td>
<td>± 4.96</td>
<td></td>
</tr>
</tbody>
</table>

ABC- Activities-Specific Balance Confidence Scale
FES- Falls Efficacy Scale
OLST- One Leg Stance Test
FRT- Functional Reach Test
BBS – Berg Balance Scale
TUG- Timed-up and Go Test
DISCUSSION

The results of this study showed the correlation between the balance confidence and balance performance and the functional mobility of elderly people. Study shows significant correlation between Activities-specific balance confidence scale (ABC) and OLST (One Leg Standing test), FRT (Functional Reach Test), BBS (Berg Balance Scale) and TUG (Timed Up and Go Test). People having higher balance confidence, scored better on the OLST, FRT and BBS. This shows a positive correlation between balance confidence and the balance measures. When balance confidence is low, balance is also poor.

Balance confidence is negatively correlated with the TUG, this shows people having higher balance confidence take lesser time for performance of TUG i.e., the functional mobility test. Functional mobility is higher in elderly having better balance confidence.

FES shows significant negative correlation with OLST (one leg standing test), BBS (berg balance scale) and TUG (Timed up and go test). A lower score on FES signifies better self efficacy. People with lower score on the fall efficacy scale, scored better on the balance measures.

FES did not having any significant correlation with the FRT (Functional reach test). This is may be because of tendency to approach imbalance during our reaching task may be governed by ehavioral or cognitive variables (such as impulsiveness, laziness, competitiveness or willingness to please the examiner) that are different than balance confidence.24

These findings suggest that people having higher balance confidence scored better on the balance measures and functional mobility measures. A similar study done by Myer et al reported a relationship between balance confidence and instrumental measures of balance performance12. If balance confidence is higher, balance is better and due to this, tendency to fall is less. Low balance confidence and poor functional balance are related to prevalence of falls.*Maki et al found that older adults who reported a fear of falling demonstrated large amplitude of postural sway when blindfolded and poorer scores when timed on a One-Leg Stance test compared to those who did not report fear of falling.

In addition to the findings mentioned above, a significant negative correlation was seen between ABC and FES.
CONCLUSION

The result of this study suggest that the balance confidence has a correlation with balance and functional mobility

CLINICAL IMPLICATION

Measures of both physiological and perceived fall risk should be included in fall risk assessments so as to tailor intervention for preventing falls in elderly people. In the area of balance rehabilitation, efficacy or confidence boosting may be as important as physical training itself. Apart from Balance performance tests, balance confidence can be one more tool available to the clinician when trying to determine whether patients are ready to assume more independent in their daily activities.

LIMITATION OF THE STUDY

Small size of the sample is a major limitation of the study that may have affected the results of the study.

SUMMARY

Aging can be characterized by a decreased ability to adapt and to recover from physiologic displacing stimuli. With aging, there is a loss in size, number, or both of functional units within every system of the body, as well as a loss in function of those units that remain. The biological ageing process includes certain changes in musculoskeletal & neuromuscular system that tends to increase in incidence of falls. These changes leads to decrease in muscle strength, coordination, balance, flexibility, posture, endurance and speed of motion together with delayed response to changes in activity level which complicate the functional capability of elderly. A “fall” is when a sudden, unintended loss of balance leaves the individual in contact with the floor or another surface such as a step or chair. Falls related injuries decrease mobility and increase morbidity. Ability to control posture is important to maintain safety functional activity of daily living. Reduction in balance has been related with incidence of fall in elderly. Decreased physical activity has also been related with increased incidence of fall in elderly.
Balance is our ability to maintain an upright posture and is an intricate and dynamic process. Balance is the ability to maintain the body’s position over its base of support, whether that base is stationary or moving. Balance can be static or dynamic. It has been documented that balance is needed to accomplish a wide variety of daily living activities such as gardening, reaching for items in a cupboard as well as walking.

Total 64 subjects were selected by convenient sampling method based on inclusion and exclusion criteria.

Ethical consent was taken.

All the elderly were asked to perform on BBS, FES, ABC scales and on TUG, OLST & FRT tests and scores were compared for each scale and test. Statistically significant values was observed less than or equal to 0.01. This study shows significant correlation between Activities-specific balance confidence scale (ABC) and OLST (One Leg Standing test), FRT (Functional Reach Test), BBS (Berg Balance Scale) and TUG (Timed Up and Go Test). People having higher balance confidence, scored better on the OLST, FRT and BBS. This shows a positive correlation between balance confidence and the balance measures. When balance confidence is low, balance is also poor. This study concludes that the balance confidence has a correlation with balance and functional mobility.