

ORIGINAL ARTICLE

DIFFERENCES IN BALANCE AND ACTIVITY CONFIDENCE BETWEEN GERIATRIC POPULATION OF HILLY AND PLAIN AREA

1. Women Institute of Rehabilitation Sciences (WIRS), Abbottabad
2. Multan College of Physical Therapy, Multan Medical & Dental College Multan.
3. Riphah College of Rehabilitation Sciences (RCRS), Riphah International University Islamabad

Correspondence

Dr. Rehan Ramzan (PT)
BSPT, PP-DPT
Senior Lecturer, Multan College of Physical Therapy,
Multan Medical & Dental College Multan
E-mail: rehan99physio@gmail.com

Received on: 14-07-2016

Revision on: 22-11-2016

Published on: 27-01-2017

Citation

Sultana B, Ramzan R, Malik AN, Aftab A, Khan R, Abro S.
Balance impairments in hilly and plain geriatric
population. T Rehabil. J 2017;01(01):16-18
doi: [21.2017/re-trj17vol01iss01p16](https://doi.org/10.21201/re-trj17vol01iss01p16)

Bushra Sultana¹: Design & Conception, Collection, analysis & interpretation of data, Revised and Accountable for all aspects

Rehan Ramzan²: Design & Conception, Analysis & interpretation of data, Revised and Accountable for all aspects

Arshad Nawaz Malik³: Design & Conception, Analysis & interpretation of data, Revised and Accountable for all aspects

Abstract

Objective: This study aims to explore differences in balance and activity confidence between geriatric population of hilly and plain areas. **Material & Method:** This study was a comparative cross sectional survey conducted 60 years or above geriatric population from hilly and plain areas. The sample (n=204) were collected through convenient sampling technique. The sample was divided into two groups Group A (Hilly area, n= 102) and Group B (Plain area, n=102). The informed consent was taken and demographic was noted. The standardized balance assessment tool includes Berg Balance Scale, activity balance confidence test (ABC) and time up and go test were used for balance assessment. Data was analyzed through SPSS ver 21. **Results:** There is no statistically significant difference in balance, activity confidence and time up and go test of both groups. But activity confidence is significantly more in male as compare to female ($p=0.00$) **Conclusion:** The populations of plain and hilly areas have almost same level of postural control and stability. But activity balance confidence is more in male as compare to female.

Key words: Balance problems, Geriatric population, Postural control

INTRODUCTION

Postural control has integral part of performing skillful functional and daily activities and important for the achievement of dynamic activities.¹ The base of support and center of gravity are the components of balance which determine the stability and control of human body. Thus balance is controlled by the interaction of nervous, musculoskeletal and contextual effects.² The old age population which is consider a person above 60 year age has serious concerns regarding the postural stability.³ The old age and fall both are interlinked and associated with each other, the fall leads to the dependence of person on others which ultimately produce the immobility. The lack of proper balance is one of key factor in occurrence of fall which leads to disability and loss of functional and social activities.⁴ The literature shows that 30% percent of people over the age of 65 years fall yearly, that number rise up to 40% in people over the age of 80 years which mostly results in serious injuries such as hip fractures and wrist fractures.^{5,6}

In persons with age of 60 or above have great chance of fall which is the major cause of morbidity, mortality and reduced functional activities.⁷ Impairments in all sensory systems which are somatosensory, visual and vestibular are found with aging.⁸ Older adults have more balance problems because of decline of one or more than one system especially when they only rely on vestibular system to control balance.⁹ Reduced anticipatory adjustments have been explained in older individuals who may explain

higher incidence of fall during different activities such as walking, carrying objects from floor etc.¹⁰ It is also noted that sway in female is also high as compared to males in all and it was concluded that as advancing age, postural change and postural control and postural sway decreases due to decline in central nervous system.¹¹

Population of Hilly area has different musculoskeletal development than plain areas as they have strong abdominals because they move on hills and mountains. The people in hilly areas have more strong vestibular system because of their living environment and the people in hilly area have strong proprioceptive system because they have to move on uneven and rough surfaces. So study objective was to explore the differences in balance and mobility activity of healthy geriatric population of hilly and plain areas.

MATERIAL & METHODS

This study was a comparative cross sectional survey conducted in Abbottabad, Rawalpindi and Islamabad. The sample (n=204) were collected through convenient sampling technique. The sample was divided into two groups, Group A (n=102) and Group B(n=102) included healthy geriatric population from hilly area and plain area respectively with equal distribution of male (n=102) and female (n=102) subjects in both groups. The inclusion criteria were 60 year or above healthy males and females' resident of hilly and plain area. The informed consent was taken prior to collection of data. The demographic detail was obtained in term of age, gender and occupation. The standardized tools berg balance scale, activity balance

confidence and time up and go test were used to assess the subjects. The independent t-test was used to explore the differences in both groups; chi square test was used to find association between variables. SPSS ver. 21 was used to analyze the data.

RESULTS

The results of comparative cross sectional survey showed that mean age in group A was 66.04 ± 8.00 and in group B was 66.76 ± 5.81 . The results showed no significant differences in balance, mobility and activity score between healthy geriatric population from hilly and plain areas. (Table 1) The results of study also showed that activity balance confidence in male is more as compare to female subjects (72.34 ± 19.92 vs 63.93 ± 22.29 , $p=0.00$). There were significant correlation among age of geriatric population and balance ($r=-0.4$, $p=0.00$), activity balance confidence (ABC) score ($r=-0.32$, $p=0.00$) and Time Up and Go ($r=0.35$, $p=0.00$) (Table 2)

Table1: balance mobility characteristics among geriatric population of hilly (n=102) and plain (n=102) area.

	Group	Mean	SD	p-value
Age In Years	Hilly Area	66.04	8.00	0.46
	Plain Area	66.76	5.81	
Berg Balance Score	Hilly Area	44.07	9.95	0.65
	Plain Area	44.64	7.86	
Activity Balance Confidence Test	Hilly Area	67.66	24.29	0.75
	Plain Area	68.60	18.41	
Time Up And Go	Hilly Area	13.29	7.12	0.14
	Plain Area	14.67	6.41	

Table2: balance mobility characteristics among geriatric population of hilly and plain area. (n=204)

	r	p-value
Age – Berg Balance score	- 0.40	0.00
Age – Activity Balance Confidence	- 0.325	0.00
Age - Time Up And Go	0.353	0.00

DISCUSSION

This comparative cross sectional survey focuses on the balance problems of geriatric population in plain and hilly terrain. Balance problems were measured by using different tools using berg balance scale, activity balance test and time up and go. The results of study showed that there were no significant differences in balance and mobility of geriatric population in both groups.

Shummway-cook et al¹² conducted a study to find out risk of fall in community dwelling elders by using time up and go test. From this study they concluded that time up and go is very specific and sensitive test to check the risk of fall in community dwelling geriatric population.¹² Vestibular functions from berg balance scale were better in geriatric population of hilly area as compared to plain area population as they move on hilly surfaces.

One study was conducted by Agarwal et al¹³ Balance disorders in US adults which shows that vestibular hypo function increases with advancing age which becomes the main factor of fall in those adults which in turn affects overall health condition of older adults.¹³ A double blind study was taken by Fernie et al¹⁴ to find out the relationship of postural sway and risk of fall in elderly population and they found that there were no significant relation in these 2 factors means they didn't found increase risk of fall by increasing postural sway in geriatric population.¹⁴

From ABC scale more elderly people from hilly area were confident that they move on icy sidewalk as compared to plain area which shows that their proprioceptive system was also stronger than the geriatric population of plain area. Powell and mayers worked at Activity specific, Balance and Confidence test and compared this test with Fall Efficacy Scale and they concluded that activity specific, balance and confidence scale's items are more appropriate or valid to found loss of balance confidence as compared to Fall Efficacy Scale.¹⁵ Conraddson et al conducted a study to find out minimum score of berg balance scale after which older people become dependent on others for their activities of daily living. From this study they concluded that at score 8 and less older people become dependent on others for their activities of daily living.¹⁶ Muir et al conducted a study to predict multiple falls in community dwelling older adults by using berg balance scale and they concluded that berg balance scale is only valid to predict multiple falls as compared to other falls.¹⁷

The results of the study also showed association age with reduce balance, activity confidence and activity speed.¹⁸ Results of study also showed that male geriatric population have good balance and mobility as compared to geriatric females. Wolfson et al conducted a study to find gender based differences in balance of healthy elderly persons by using dynamic posturography and from this study they concluded that in quiet stance there is no balance difference in both genders but with sway males have good balance as compared to females.¹⁹ A study was conducted to find relationships between fall and sway and proprioception in elderly population and found very limited relationship between fall and proprioception and sway.²⁰

CONCLUSION

The populations of plain and hilly areas have almost same level of postural control and stability. But activity balance confidence is more in male as compare to female.

REFERENCES

1. Sofianidis G, Dimitriou A, Hatzitaki V. A comparative study of the effects of pilates & Latin dance on static and dynamic balance in older adults. *Journal of aging and physical activity*. 2016:1-26.
2. Smania N, Picelli A, Geroin C, Ianes P, Marchina EL, Zenorini A, Gandolgi M. Balance and gait rehabilitation in patients with Parkinson's disease. *Diagnosis and Treatment of Parkinson's Disease*. 2011:141-82.
3. Ambrose AF, Paul G, Hausdorff JM. Risk factors for falls among older adults: a review of the literature. *Maturitas*. 2013 May 31;75(1):51-61.
4. Honaker JA, Kretschmer LW. Impact of fear of falling for patients and caregivers: perceptions before and after participation in vestibular and balance rehabilitation therapy. *American journal of audiology*. 2014 Mar 1;23(1):20-33.
5. Cassell E, Clapperton A. Preventing injury in Victorian seniors aged 65 years and older. *Hazard*. 2008;67:1-24.
6. Rubenstein LZ, Josephson KR. Falls and their prevention in elderly people: what does the evidence show?. *Medical Clinics of North America*. 2006 Sep 30;90(5):807-24.
7. Fabre JM, Ellis R, Kosma M, Wood RH. Falls risk factors and a compendium of falls risk screening instruments. *Journal of geriatric physical therapy*. 2010 Oct 1;33(4):184-97.
8. Larson L, Bergmann TF. Taking on the fall: The etiology and prevention of falls in the elderly. *Clinical Chiropractic*. 2008 Sep 30;11(3):148-54.
9. Sturmeier DL, St George R, Lord SR. Balance disorders in the elderly. *Neurophysiologie Clinique/Clinical Neurophysiology*. 2008 Dec 31;38(6):467-78.
10. Williams K, Hinton VA, Bories T, Kovacs CR. Age and function differences in shared task performance: walking and talking. *Research quarterly for exercise and sport*. 2006 Mar 1;77(1):137-41.
11. Shaffer SW, Harrison AL. Aging of the somatosensory system: a translational perspective. *Physical therapy*. 2007 Feb 1;87(2):193.
12. Anne Shumway-Cook SBA MW. Predicting the Probability for Falls in Community-Dwelling Older Adults Using the Timed Up & Go Test. *Journal of american physical therapy association*. 2000;80(9):896-903.
13. Yuri Agrawal MJPC, MD; Charles C. Della Santina, MD, PhD; Michael C. Schubert, PhD; Lloyd B. Minor, MD. Disorders of Balance and Vestibular Function in US Adults. *JAMA Internal Medicine*. 2004;169(10).
14. Fernie G, Gryfe C, Holliday P, Llewellyn A. The relationship of postural sway in standing to the incidence of falls in geriatric subjects. *Age and Ageing*. 1982;11(1):11-6.
15. Powell LE, Myers AM. The activities-specific balance confidence (ABC) scale. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*. 1995;50(1):28-34.
16. Conradsson M, Lundin-Olsson L, Lindelöf N, Littbrand H. Berg balance scale: intrarater test-retest reliability among older people dependent in activities of daily living and living in residential care facilities. *Physical therapy*. 2007 Sep 1;87(9):1155.
17. Muir SW, Berg K, Chesworth B, Speechley M. Use of the Berg Balance Scale for predicting multiple falls in community-dwelling elderly people: a prospective study. *Physical therapy*. 2008 Apr 1;88(4):449.
18. Medley A, Thompson M. Contribution of age and balance confidence to functional mobility test performance: diagnostic accuracy of L test and normal-paced timed up and go. *Journal of Geriatric Physical Therapy*. 2015 Jan 1;38(1):8-16.
19. Wolfson L, Whipple R, Derby CA, Amerman P, Nashner L. Gender differences in the balance of healthy elderly as demonstrated by dynamic posturography. *Journal of Gerontology*. 1994 Jul 1;49(4):160-7.
20. Wingert JR, Welder C, Foo P. Age-related hip proprioception declines: effects on postural sway and dynamic balance. *Archives of physical medicine and rehabilitation*. 2014 Feb 28;95(2):253-61.

Disclaimer: None to declare.

Conflict of Interest: None to declare.

Funding Sources: None to declare.