COMPARISON OF RISK OF FALL IN ACTIVE VERSUS SEDENTARY MALE INDIVIDUALS ABOVE THE AGE OF SIXTY YEARS

Faizan Hamid[1], Faryal Arshad[1], Samrood Akram[2], Maria Khalid[1], Hafiza Maria Hira[3], Qurat ul Ain[3]

[1] Physiotherapy Department, Fatima memorial hospital and college of medicine and Dentistry
[2] Riphah International University, Lahore
[3] Physiotherapy Department, MSK Dialysis Center, Lahore

HIGHLIGHTS:

- This analytical cross-sectional study included 92 male participants above the age of sixty years from different nursing homes in Lahore.
- Those individuals who were scored as "under active" or "under active regular" category, according to The Rapid assessment physical activity (RAPA) scale, were not included in this study. Assessment of fall risk was calculated through the Berg balance scale.
- Both the groups have equal chances of falls, and physical activity level does not affect the fall risk in the elderly with p = 1.00, which is >0.05, accepting the null hypothesis of this study. However, little difference in the mean values portrayed that people with an active lifestyle exhibited a low risk of falls compared to people with a sedentary lifestyle.

ABSTRACT

Background: Fall is considered a significant issue among the elderly and a leading cause of increased mortality. Lifestyle is somehow thought to interfere with the risk of falls. **Objective:** To evaluate and compare the risk of falls between physically active and sedentary male individuals above the age of sixty. **Materials &Methods:** This analytical cross-sectional study included 92 male participants above the age of 60 years, and the non-probability convenience sampling technique was used. The data were collected from different nursing homes in Lahore, including Great homes, Senior Citizen Foundation of Pakistan, Old age happy home, and Darul Kafala. The study was completed within six months. Assessment of fall risk was calculated through the Berg balance scale. **Results:** The mean age of all the subjects was 69.5±3.0 years. Of the 92 participants, 37 (40%) were living an active lifestyle, and 55 (60%) were living a sedentary lifestyle. Both the groups fall into the category of low fall risk (100%) according to the berg balance score. The results showed that both groups have almost equal chances of falls but mean rank values presented that individuals with an active lifestyle (50.78) had a relatively lower risk of falls than individuals with a sedentary lifestyle (p = 1.00).
Conclusion: Lifestyle is not a good predictor of fall risk. Individuals living active v/s sedentary lifestyles are both at low risk and have almost equal chances of falling. However, leading an active lifestyle can lower the chances of falls in male elderly individuals.**Keywords:** Fall risk, physical activity, elderly, physical therapy, Sedentary

INTRODUCTION

The subject of risk of falls is considered a dominant public health issue among the population of geriatrics.[1-3] There is an increasing trend in the elderly population in Pakistan with the passing years. For the people above age 60, the percentage is expected to rise from 5.8% in

2000 to 12.4% in 2025[4]. Regarding the age mentioned in a study, around 30% of the population above the age o history of at least one fall per year, with women outnumbering men[5]. People that endure a unit fall per annum fluctuate from 28 to 35% in the age group above 65. For people above the age of 75, the fall occurrence is from 32% to 42 %[6]. In addition, fall is the second cause of involuntary cause off identical injuries that leads to death.[4,6]leads result from some form of impairment that can either be intrinsic or extrinsic. Some hiring features include age-related body changes such as dull vision, mineral deficiency, neuronal impairments, etc. Neuronal impairments include Parkinson's disease, dementia, cortico-basal degeneration, and any otheurogother neurogenic diseases resultingirments. All these factors are considered some of the intrinsic factors. Also, some of the environments include the type of floor, inappropriate lightning, or the type of shoes. All these factors can be considered extrinsic factors that ultimately lead to the false. Evidence suggests that vitamin D may regulate muscle strength; if blood levels reach below average, it can cause myopathy and lead.[7]

With all these factors, the lack of exercise or decreased physical activity can also be a leading cause of falls and is also the factor of consideration in this study. Few randomized control types of research have shown the effect of muscle strengthening in minimizing the fall risk among elderly individuals. Along with this, balance exercises have a more prominent role in preventing falls among the elderly population.[8] Being physically less active automatically decreases muscle strength which can be a sole factor contributing to the fall in the elderly.[9]According to one latest research, a better physical routine assists in preventing falls in elderly individuals to a minor extent.[10]

Fall injuries are common and are among the major significant for primary long standing pain.[11] Although some serious injuries are rare, such as head injuries or spinal cord injuries, the "post-fall syndrome" after the fall can result in severe depression and social withdrawal, leading to the inability to hold self-confidence the carrying out daily activities. All these factors ultimately lead to increased dependency.[12] A 2011 survey assessed fall risk among older women on basis of their physical activity as well as their functional status. It concluded that frailty is directly associated with decreased social activities, predominantly by avoiding outdoor activities, which can enhance the chances of falls. The study has also shown that the fall risk or the fear of fall also has some co-relation with the hand grip strength.[13]

Another survey conducted in 2014 over older men states that the factor of "fear of fall" assists in preventing falls but also promotes a desk-bound life. Hence the physical activity level decreases by adapting to a more sedentary lifestyle which can indirectly affects the patient's ability to prevent the occurrence of fall to some extent.[14]. Certain exercise interventions are sometimes expected to reduce the probability of fall. At the same time, the selection of specific exercises for this purpose has no good evidence. It is not yet identified which exercise variable surpasses all other exercise interventions. However, poor balance is a vital element in the occurrence of fall.[15]As far as the role of physical therapy is concerned, it helps in maintaining overall strength and flexibility in elders, but according to recent studies, it does not have any significant effect on decreasing the fall to occur in the geriatric population.[10] Amazingly, some past studies also show that higher the level of the physical activity, the more prone the individuals towards the fall. Therefore, prediction of fall is sometimes

difficult and it depends upon the validity and reliability of the questionnaires and the test tool used in the study. Also the prediction of fall is very much dependent over external disturbances and also sometimes temporary psychological issues that are difficult to be neglected and can be the only reason of fall even in healthy individuals. [10,16]

As per the author's knowledge, there is no such study previously conducted in Pakistan that focuses upon the impact of physical activity over the chances of fall among male individuals above the age of 60. The study aims at making comparison of fall risk among the physically active male elderly individuals and those who prefer a desk bound life in the targeted population of Pakistan. Also the incidence of fall is a major element that effects the lifestyle in geriatrics population so this should be of great consideration. There is a defined criterion set which classify the participant as being either an active or sedentary individual. Broadly, this study will help us to conclude that whether adopting a physically active lifestyle actually decreases the risk to fall among male elderly that are over the age of 60 years.

METHODOLOGY

The analytical cross-sectional study carried out including 78 participants selected by non-probability convenient sampling technique. Sample size (n) was 78 according to following formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

Keeping confidence level 95%, anticipated population proportion 0.05310 and Absolute precision 0.05, calculated sample size is 78 or more respondents. The data was collected from different Old age homes in Lahore which includes: Great homes, Senior Citizen Foundation of Pakistan, Old age happy home and Darul Kafala. The complete time duration for this study was 6 months. The inclusion criteria included all males that are above the age of 60 who are neurologically, physically and psychologically sound. The exclusion criteria include Males suffering from some neurological disorders such as Parkinson's disease, dementia or ataxia etc., those males having any physical deformity such as leg length discrepancy, any history of traumatic injury, any male elderly who recently went through any surgical intervention and patients having eye sight value greater than -3db. The Rapid assessment physical activity (RAPA) questionnaire17 was used to access the active and sedentary lifestyle of the included participants. Individuals who perform 30 minutes or more a day of moderate physical activities 5 days a week, or those who perform 20 minutes or more a day of vigorous physical activities 3 days per week are categorized as active individuals and those individuals who rarely or never do any physical activity were categorized as sedentary individuals. Those individuals who were scored as "under active" or "under active regular" category, according to RAPA scale were not included into this study.

Berg balance scale was used to identify the level of risk of fall in the participants who met the inclusion criteria of my study. They were classified into the categories of low, medium and high risk of fall depending upon their berg balance score. Berg balance score consists of 16 items questionnaire.18 Each question carries a maximum of 4 points. The total score is 56. Individuals with a score of 41-56 are regarded as those with low risk of fall. Those with a score of 21- 40 are regarded as medium risk of fall. Those below 20 are regarded as high risk of fall.

An informed consent was taken from and a brief description about the purpose of research was delivered. While conducting the study, the ethical issues were also put under consideration and the confidentiality of all the participants was maintained throughout the study and later on. Study was commended to institutional review board (IRB) after the approval from respected committee of Fatima Memorial Hospital.

Statistical Package for Social Sciences; version 17.0 (SPSS 17.0) was used to analyze the data. Descriptive statistics including frequencies and percentages were extracted for demographics and berg balance score. Mann Whitney's U test was used to analyze difference of fall risk in elderly males with active versus sedentary lifestyles. P value less than 0.05 was considered significant.

RESULTS

The mean age of all the subjects was 69.5±3.0 years with minimum of 60 and maximum of 79 years. Out of total, 20.7% were between 60-64 years of age, 26.1% were between 65-69 years of age, 33.7% were from 70-74 years of age, and 19.6% were from 75-79 years of age. Data computed in the table shows of the total 92 participants, 37 (40%) elderly males had an active lifestyle and 55 (60%) had sedentary lifestyles. Scoring of Berg Balance Scale portrayed that all 92 participants fell into category of low risk of fall. (Table-I)

Table 1: Distribution of the participants according to the age groups

Variables	Construct	F	Percentage
Age Group	60-64 years	19	20.7%
	65-69 years	24	26.1%
	70-74 years	31	33.7%
	75-79 years	18	19.6%
Lifestyle	Active	37	40.2%
	sedentary	55	59.8%
Berg Balance Scale Score	41-56 (low fall risk)	92	100%
	21-40 (medium fall risk)	0	0%
	0-20 (high fall risk)	0	0%

The table shows that all active;37 (100%), as well as sedentary; 55 (100%), individuals fall in the category of low fall risk according to the scoring of berg balance scale. (Table-II)

Table II: Assessment of risk of fall with respect to Berg Balance Scale

Berg Balance Scale	Life style of subject	Frequency	Percentage
Low Fall Risk	Active	37	100%
	Sedantary	55	100%

According to current research, although both sedentary and active elderly falls into the same category of low risk fall according to berg balance scale, but there is still a minor difference in their score with active individuals having a means score of (50.78) and sedentary individuals having a mean score of 44.80. The above test statistics shows that there is no significant difference in the risk of fall between elderly males with active and sedentary lifestyles. Both the groups have equal chances of fall and physical activity level does not affect the fall risk in elderly with p = 1.00 which is >0.05, accepting the null hypothesis of this study. However, little difference in the mean values portrayed that people with active lifestyle exhibited low risk of fall as compared to people with sedentary lifestyle. (Table-III)

Table III: Mann-Whitney U test for risk of fall in individuals with active and sedentary lifestyle

Risk of Fall	Lifestyle	Mean Rank	P-Value
Low Fall Risk	Sedentary Lifestyle	44.80	1.000
	Active Lifestyle	50.78	

Summarizing the results, it can be stated that being physically active does not have a major impact over reducing the risk of fall. Majority of the participants were between the age group 70-74 and out of the total subjects, more number has adapted sedentary lifestyle yet no significant difference in risk of fall was deduced when statistical test was applied stating p value greater than 0.05. In a nutshell, both groups were considered having similar chances of fall regardless of the lifestyle adopted.

DISCUSSION

The main purpose of this study was to identify and to compare that whether adapting a healthy lifestyle tend to decrease the fall risk among the elderly individuals. This can indirectly be termed as whether the physical fitness has any impact over decreasing the fall risk among elderly that sounds healthy. According to current research, although both sedentary and active elderly falls into the same category of low risk fall according to berg balance scale, but there is still a minor difference in their score with active individuals having a means score of (50.78) and sedentary individuals having a mean score of 44.80. According to test statistics, this study has p value of (1.00) therefore there is no significant difference in fall risk between two groups. However, on the basis on berg balance scale mean score, one can deduce that the active lifestyle has slightly lower risk of fall if compared with sedentary lifestyle.

According to one study conducted in Malaysia in 2017 [10], there is no significant correlation between the two factors one being the physical fitness and other being the fall risk. Both active and sedentary elderly falls into the category of low fall risk. The results are much similar to the current study which also states that both category individuals are termed under the category of low fall risk and that the physical fitness has very less role in preventing fall risk. Another study showed relationship of muscle strength and aerobic endurance in falling and non-falling males above the age of 70. It shows that the lack of muscle strength and decreased aerobic endurance are also considered among the fall risk factors to a certain extent. [19]

Other similar studies conducted, worked at identifying certain factors that can contribute towards fall. Among all other factors such as eyesight, hand grip strength and other environmental factors, it state that muscle weakness especially proximal muscle has association with the risk of fall primarily because of loss of stability in such individuals.[20,21]

A systematic review was conducted in 2016 by [15] which shows that some form of exercises can also help to prevent fall risk in older adults. However, it also shows that the most effective form of exercises are not known. There were certain tasks in berg balance scale that were proven quite difficult for both categories such as task 12 and 14. These tasks asks the individuals to place one foot on stool in front and to stand on one foot respectively. On average the individuals of both categories and all age groups score average of 2.0 or below in these tasks. So, these results can be interpreting as the activities involving weight on one foot for a longer while or stair climbing can be an additional factor contributing towards fall in sedentary individuals. In the current study majority of the participants fall under the age group 70-74 and all of them belongs to the population of Pakistan. Considering the generalizability of this study, this is more applicable over the male population of Pakistan and between the age group 70-74. The

results of this study can be considered valid because of certain reasons. The questionnaires used for this study has high validity and reliability therefore the values are authentic. In addition to this, all possible effort was done to reduce the effect of any confounding factor while taking readings from the participants. Therefore, this study can provide fair to moderate evidence over this specific topic. Although there was not marked difference in results of two groups but still it is recommended to the elderly to carry out some sort of physical activity. If not so, it can bring several other problems or bodily changes which can bring some additional factors such as obesity that can lead towards fall.

It is advisable to perform further extensive study in terms of sample size and including both genders so that the results can more easily be generalized. Fall is a major cause of fractures and some other serious conditions. Therefore, further work needs to be done to further access the causes that can leads towards fall. Also prevention strategies need to be defined by the professionals that can help to counter the possible cause leading towards fall. The results of this study cannot be generalized on the population of Pakistan primarily due to very small sample size. Also, women were not the part of this study which makes generalization of this study more difficult. The sample collected was based over the convenience of the researcher and therefore the subjects were only selected from a small accessible area. Therefore, there are chances of attaining selection bias. Secondly, those who were using glasses were verbally asked about the value of their glasses. Therefore, the values can be misleading and eyesight could be a factor that could cause fall. There is expectancy of response bias while answering RAPA scale. The participant may not answer it correctly depending upon his own psychology regarding his fitness and activity level.

CONCLUSION

There is no significant difference between the active and sedentary lifestyles of the individuals of ages above sixty years. Both kind of individuals fall into the same category of low fall risk and both have almost equal chances of fall. However, the active lifestyle has slightly lower risk of fall if compared with sedentary lifestyle.

REFERENCES

01- Tinetti ME, Speechley M. Prevention of falls among the elderly. New England journal of medicine 1989; 320(16): 1055-9.

02- Tan KM, Tan MP. Stroke and falls—clash of the two titans in geriatrics. Geriatrics 2016; 1(4): 31.

03- Stenhagen M, Ekström H, Nordell E, Elmståhl S. Accidental falls, health-related quality of life and life satisfaction: a prospective study of the general elderly population. Archives of gerontology and geriatrics 2014; 58(1): 95-100.

04- Hashmi Z, Danish SH, Ahmad F, Hashmi M. Falls in Geriatric Population-A Cross Sectional Study for Assessment of the Risk Factors. Journal of Dow University of Health Sciences 2013; 7(3).

05- Freiberger E, Menz HB. Characteristics of falls in physically active community-dwelling older people. Zeitschrift für Gerontologie und Geriatrie 2006; 39(4): 261-7.

06- Masud T, Morris RO. Epidemiology of falls. Age and ageing 2001; 30(suppl4): 3-7.

07- Halfon M, Phan O, Teta D. Vitamin D: a review on its effects on muscle strength, the risk of fall, and frailty. BioMed research international 2015; 2015.

08- Tongterm T, Suputtitada A, Lawsirirat C, Janwantanakul P. Functional Fitness Test for Screening the Risk of Falls in the Elderly: Using Decision Tree Technique. Journal of Exercise Physiology Online 2015; 18(6).

09- Duray M, Genç A. The relationship between physical fitness and falling risk and fear of falling in community-dwelling elderly people with different physical activity levels. Turkish journal of medical sciences 2017; 47(2): 455-62.

10- Low ST, Balaraman T. Physical activity level and fall risk among community-dwelling older adults. Journal of physical therapy science 2017; 29(7): 1121-4.

11- El-Khoury F, Cassou B, Charles M-A, Dargent-Molina P. The effect of fall prevention exercise programmes on fall induced injuries in community dwelling older adults: systematic review and meta-analysis of randomised controlled trials. BMj 2013; 347: f6234.

12- O'Loughlin JL, Robitaille Y, Boivin J-F, Suissa S. Incidence of and risk factors for falls and injurious falls among the community-dwelling elderly. American journal of epidemiology 1993; 137(3): 342-54.

13- Aoyama M, Suzuki Y, Onishi J, Kuzuya M. Physical and functional factors in activities of daily living that predict falls in community-dwelling older women. Geriatrics & gerontology international 2011; 11(3): 348-57.

14- Jefferis BJ, Iliffe S, Kendrick D, et al. How are falls and fear of falling associated with objectively measured physical activity in a cohort of community-dwelling older men? BMC geriatrics 2014; 14(1): 114.

15- Arnold CM, Sran MM, Harrison EL. Exercise for fall risk reduction in community-dwelling older adults: a systematic review. Physiotherapy Canada 2008; 60(4): 358-72.

16- Mitchell RJ, Lord SR, Harvey LA, Close JC. Obesity and falls in older people: mediating effects of disease, sedentary behavior, mood, pain and medication use. Archives of gerontology and geriatrics 2015; 60(1): 52-8.

17- Topolski TD, LoGerfo J, Patrick DL, Williams B, Walwick J, Patrick MMB. Peer reviewed: the Rapid Assessment of Physical Activity (RAPA) among older adults. Preventing chronic disease 2006; 3(4).

18- Neuls PD, Clark TL, Van Heuklon NC, et al. Usefulness of the Berg Balance Scale to predict falls in the elderly. Journal of geriatric physical therapy 2011; 34(1): 3-10.

19- Maciaszek J. Muscle strength and aerobic endurance as factors differentiating falling and non-falling men over 70 Years. Journal of Human Kinetics 2010; 25: 35-40.

20- Campbell AJ, Borrie MJ, Spears GF. Risk factors for falls in a community-based prospective study of people 70 years and

older. Journal of gerontology 1989; 44(4): M112-M7.

21- Moreira MN, Bilton TL, Dias RC, Ferriolli E, Perracini MR. What are the main physical functioning factors associated with falls among older people with different perceived fall risk? Physiotherapy research international 2017; 22(3).