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Effect of Exercise Program in Reducing Risk of Fall in Elderly People

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Abstract

Objective: To study the Effect of Exercise Program in reducing risk of fall in elderly subject.

Materials and Method: Total 30 elderly subjects(10 males and 20 females) aged above 60 years were having problem with flexibility, balance and high risk of fall were selected for the assessment of their flexibility, gait and balance. Subjects who are bed ridden, having neurological conditions, Psychiatry condition and visual deficit were excluded from the study. Outcome measures used were Morse fall risk assessment tool, Timed up and go test, Functional reach test, Functional gait assessment.

Conclusion: The present study provided evidence to conclude that the exercise programme was significantly effective in improving strength, flexibility and balance along with reducing risk of fall in elderly population.

Keywords: *Fall, Elderly subject, flexibility, balance, gait, strength, exercise.*

Introduction

Fall is defined as unintentionally coming to rest on the ground or other level with or without consciousness. Falls are faced by elderly population. Balance in elderly is affected by both diseases as well as age related issues along with problems like cognitive impairment, various medications and environmental changes all appear to contribute to the increase risk of falls.[1]

Falls among elderly is a major public issue interfering with social essential. It has various physical, medical, psychological, social and economic consequences. This include disability and deformity,fear of repeated falls,direct costs of medical care associated with injuries and loss of potential income. The environment is perceived to play an significant role in falls experienced by the elderly population.[1]

Walking difficulty is very common problem experienced in older adults which leads to loss of independence. Multiple changes in different systems of body contribute to change in walking pattern in elderly. The disability of gait is a gradual process. This group of age related deficits results in inefficient gait. Body mechanics are altered starting with flexed trunk posture, decreased hip extension in mild to late stance, decreased ankle plantar flexion at power push off and movement control is disturbed like reduced rate of forward momentum, stride length and time variability, and timing issues, and difficulty in transitioning from stance to swing. Reduced hip extension causes blocking of the mechanical accumulation of potential energy in the limb tissue during stance phase with release during swing to fuel the limb forward movement, while also eliminating the hip extension. The loss of motor skills, high energy cost of walking is major factor contributing in the age-related decline in physical function and activity for older adults.[2]

The risk factor contributing to falls can be classified into two categories.

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Intrinsic and Extrinsic factors. Intrinsic factors typically includes Age, Gender, Poor balance, Weakness, Mobility whereas on the other hand extrinsic factors include Poor lighting, Slippery surface, Obstacles etc.[3]

Gait is one of the basic component to determine independency of function. Many physical therapy interventions are therefore, directed to restore and improve subject ambulation status.[4]

Various studies have been shown the effects of various physical exercise programs on the functional capacity of older subject. Resistance training, endurance training, balance training and combination of this exercise have beneficial effects on certain functional parameters in frail elderly subject.[5]

Studies on resistance training have shown that this type of exercise program can improve neuromuscular activity, muscle mass, strength, power and functional capacity as well as improve cardiovascular function. [5]

Balance training is another type of exercise intervention which can help to prevent fall. [5]

Exercise intervention include gait training, resistance exercise and balance training where resistance training has positive effects on the strength and bone density.[6,7]

Resistance exercises can be used for strengthening weak lower limb musculature as they function as prime movers of the limbs, also act as synergists to stabilize the trunk, and sometimes act as antagonists, which help to decelerate limb. Exercises to improve muscle strength and power helps in enhancing the ability of a weak lower limb musculature, like the plantar flexors of ankle. This helps in aiding the ground reaction forces. [2]

Stretching exercises aiding joint range of motion(ROM) helps in maintaining the postures of the limbs or trunk. Secondly the desired length of muscles can be obtained for optimal activation during dorsiflexion and in heel strike a appropriate lengthening of the calf muscles is needed to facilitate activation and lastly for appropriate movement-related feedback to the nervous system.[2]

A multi-component exercise intervention program that consists of strength, endurance, and balance training appears to be the best strategy for improving gait, balance, and strength, as well as reducing the rate of falls in elderly individuals and consequently maintaining their functional capacity during aging.[5]

Fall in older age population are related to socio economic, environment, behavioral and biological factors. Socioeconomic factors like low income & education levels, inadequate housing and lack of social. Environment al factors like poor building design, slippery floors. Biological factors like age, chronic illness. Behavioral factors like excess alcohol intake, lack of exercise and inappropriate foot.[8]

Materials and Methodology

Study Type: Experimental

Study Design: Pre and post

Sampling Method: Simple random sampling

Sample Size: 30

Study Duration: 6 months

Place of Study: Karad

Participants: Total 30 elderly subjects (10 males and 20 females) aged above 60 years were having problem with flexibility, balance and high risk of fall were selected for the assessment of their flexibility, gait and balance. Subjects who are bed ridden, having neurological conditions, psychiatry condition and visual deficit were excluded from the study. Outcome measures used were Morse fall risk assessment tool, Timed up and go test, Functional reach test, Functional gait assessment. Each and every elderly person was approached and informed consent was taken from the individuals, willing to participate. They were explained about the procedure of the study and then were assessed for flexibility, gait and balance using the outcome measure, after the demographic data from the individuals was collected.

Outcome Measures: Outcome measures used were Morse fall risk assessment tool, Timed up and go test, Functional reach test, Functional gait assessment. After the selection of appropriate candidates fulfilling the criteria they were asked to fill the questionnaire to record the number of falls prior starting the treatment. Subjects were asked to perform the set of exercises according to the set protocol. The set of exercises were practiced for 1 month and follow up was done for 5 months. The results gained after completing the 6 month protocol were noted by Morse fall risk assessment tool, time up go test, functional reach test. The change in individual's number of falls was noted by the pre and post answers noted in the questionnaire.

Statistical Analysis: Within group comparison statistical analysis of all pre and post interventional values was done by paried 't' test. The statistical analysis for MORSE FALL ASSESSMENT TOOL showed significant improvement within the group(p=<0.0001). The statistical analysis for FUCNTIONAL GAIT ASSESSMENT showed significant improvement within the group(p=<0.0001). The statistical analysis for TIMED UP GO TEST showed significant improvement within the group(p=<0.0001). The statistical analysis for FUNCTIONAL REACH TEST showed significant improvement within the group (p=<0.0001).

Table 1: Baseline Parameters

Parameters	Pre	Post	t value	p value	Inference
Timed up go test	3.773 ± 2.087	5.333 ± 2.705	9.252	< 0.0001	Significant
Functional reach test	5.427 ± 0.8542	5.830 ± 0.9692	8.003	< 0.0001	Significant
Functional gait assessment	22.567± 4.006	20.5± 3.138	4.821	< 0.0001	Significant
Morse fall risk assessment tool	48.5±21.502	39.667±19.517	7.737	< 0.0001	Significant

Discussion

This study "effect of exercise program in reducing risk of fall in elderly subject" was conducted among elderly population in Karad. As risk of fall increases among elderly subject due various factors, prevalence of falls is 30% in elderly population. Previously the studies have been conducted on the fall prevention. Until now, there was no study done to find the effect of exercise in reducing risk of fall in elderly subject.

Aim was to study the Effect of Exercise Program in reducing risk of fall in elderly subject. Objectives were to determine the effect of exercise program in reducing risk of fall. Inclusion criteria were age group of 60 years and above, both Male and female with history of fall. Exclusion criteria were bed ridden patient, existing Neurological condition, Patient with Psychiatry condition and Subject with visual deficit.

Total 30 elderly subjects (10 males and 20 females) aged above 60 years were having problem with flexibility, balance and high risk of fall were selected for the assessment of their flexibility, gait and balance. Subjects who are bed ridden, having neurological conditions, Psychiatry condition and visual deficit were excluded from the study. Outcome measures used were Morse fall risk assessment tool, Timed up and go test, Functional reach test, Functional gait assessment.

They were explained about the study and treatment protocol. Written consent was taken from the subjects. They were given the questionnaire to fill and tests were taken to find out the risk of fall. After the selection of appropriate candidates fulfilling the criteria they were asked to fill the questionnaire to record the number of falls prior starting the treatment. Subjects were asked to perform the set of exercises according the set protocol. This set of exercises were practiced for 1 month and follow up was done for 5 months . The results gained after completing the 6 month protocol were noted by Morse fall risk assessment tool, time up go test, functional reach test. The change in individual's number of falls was noted by the pre and post answers noted in the questionnaire.

Conclusion

In this study the exercise programme was significantly effective in improving strength, flexibility and balance along with reducing risk of fall in elderly population.

Hence Alternative hypothesis is proved.

Conflict of Interest: The authors declare that there are no conflicts of interest concerning the content of the present study.

Source of Funding: This study was self funded.

Ethical Clearance: The study was approved by the institutional ethical committee of KIMSDU.

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