

Impact of the First Step to Active Aging on Older Adult's Functional Fitness, Balance and Daily Activity

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Abstract. To determine how the First Step to Active Aging (FSAH) program impacts functional fitness (FF), balance, and daily physical activity (DPA) in older adults. The FSAH group consisted of 18 women. FSAH group met at a senior center for 11 wk, 2d/wk for a 50 min. training program (flexibility, strength, balance, aerobic). The control group consisted of 15 women. Program effectiveness was assessed using measures of FF (chair stand, arm curl, sit & reach, up & go, scratch test, and 12-min walk), balance (movement velocity (MVL), endpoint excursion (EPE), maximum EPE (MXE), and directional control (DCL) for forward (F), right (R), left (L) and back (B) movements), pedometer measured DPA, and weight. No baseline difference existed between groups. Repeated measures ANOVAs revealed group x time interactions ($p < .05$) on all measures except flexibility. After 11 weeks, FF improvements were noted in the FSAH group: Chair Stand 46%, Arm Curl 25%; Up-&-Go 8%; 12-min Walk 13%. With respect to LOS, MXE improved in all directions (F 18%, R 14%, B 23%, L 10%) and DCL improved in the F direction 9%. DPA also increased from 3,108 to 5,077 steps (38%). The control group did not change in any variable. Participating in a FSAH program improves FF.

Introduction

Functional fitness is a concept that reflects an older adult's ability to perform physical activities of daily life with relative ease [1]. This concept accounts for traditional physical fitness parameters such as muscle strength, cardio-respiratory endurance, and flexibility, but also includes balance. Even in healthy adults, each component of functional fitness declines with advancing age, negatively affecting quality of life [2]. For example, the age-associated decline in muscle strength is a major cause of physical disability in older people and decreased muscular strength and poor balance are major risk factors for falls.[3] Furthermore, impaired joint flexibility can negatively affect the ability to perform self-care activities such as bathing and dressing. Therefore, the purpose of this project is to determine how the First Step to Active Aging (FSAH) program impacts functional fitness, balance, and daily physical activity (DPA) in older adults.

Experiment, Results, Discussion, and Significance:

Recruitment

Older adults were recruited through newspaper and newsletter advertisement. Potential participants were screened using the EASY (Exercise and Screening for You) tool to ensure a population of able adults.

Assessment

Eligible participants underwent a variety of assessments including a functional fitness battery (FF), balance measures, and measurement of daily physical activity. Functional Fitness was measured using the following assessments: 1. lower body strength was assessed by the *chair stand* (participants stood and sat repeatedly for 30s); 2. upper body strength was assessed by the *arm curl* (participant performs elbow flexion and extension with a 5 lb for 30s); 3. lower body flexibility was assessed by the *sit and reach* (participants sat on the edge of a chair, extended one leg and bent the other while reaching toward their extended leg's toes - the measurement was the distance between the middle finger and the toes); 4. upper body flexibility was assessed by the *scratch test* (participants placed their preferred hand over their corresponding shoulder and their other arm was placed behind their back - the measurement was the distance between the tips of each hand's middle finger with plus scores indicating overlap between the fingers and minus scores indicating the distance short of the fingertips touching); 5. physical mobility was assessed by the *up and go* (participants sat in their chair and were timed as they walked as quickly as possible around a cone, stationed 8 ft. away, and returned to their chair); 6. Aerobic endurance was

assessed by the 12-min walk (participants walked a 50m course for 12 minutes – distance was recorded); 7. DPA was assessed using *pedometers* (participants wore a pedometer during the program and record their daily step counts. A force platform (Balance Master Platform, NeuroCom International) was utilized to obtain the dynamic balance measure called *Limits of Stability*. Participants were familiarized with all postures and procedures. The Limits of Stability assessment quantified the maximum distance a participant could lean in a given direction without losing balance. The participant's center of gravity appeared as a point in the middle of a computer screen. Targets appeared at distances around this point. The participant leaned toward each of 4 targets (front, back, left, and right) holding this position for 10s. Measured parameters were reaction time, sway velocity, directional control, endpoint excursion, and maximum excursion. Body weight was measured using a standard medical scale.

Intervention

The physical activity program was offered at a local senior center twice per week for 50 minutes. The intervention program consisted of: (a) flexibility training; (b) strength training, using elastic resistance bands; (c) balance training, using firm and pliable foam pads surfaces; and (d) increasing cardio-respiratory activity as measured by a pedometer.

Results

The experimental FSAH group consisted of 18 women ($X=73\pm 7$ yrs). The control group of 15 women ($X=75\pm 6$ yrs) was drawn from a waiting list for a similar program at a second area senior center. No baseline difference existed between groups. Repeated measures ANOVAs revealed group x time interactions ($p<.05$) on all measures except flexibility. After 11 weeks, significant FF improvements were noted in the FSAH group: Chair Stand 46%, Arm Curl 25%; Up-&-Go 8%; 12-min Walk 13%. With respect to LOS, MXE improved in all directions (F 18%, R 14%, B 23%, L 10%) and DCL improved in the F direction 9%. DPA also increased the equivalent of 1 mile, from 3,108 to 5,077 steps (38%) and Ss lost 2.3lbs (2%). The control group did not demonstrate change in any variable. Based on these results the authors conclude that participating in a FSAH program improved Functional Fitness. These improvements may allow older adults to continue to perform daily tasks and ultimately live independently longer. The distance a participant could lean in all directions also improved as a result of the FSAH program. As evidenced in literature^{Error! Bookmark not defined.}, improving strength and balance is linked to the reduction of fall incidence. Although not measured, participation in this project may reduce the likelihood of a fall. Results of this project also suggest that older adults are capable of utilizing pedometers as a means to increase their daily activity. Overall, it appears the FSAH program is effective in improving functional fitness, balance, and daily physical activity.

Conclusions

Regular physical activity substantially delays the onset of functional limitations and loss of independence. The benefits of regular physical activity and exercise can enhance the quality of life for the older adult, improve their capacity for recreation, and alter the rate of functional decline.

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