THE EFFECTS OF 25 MINUTES STAXERCISE ON FLEXIBILITY AND AGILITY/BALANCE TESTS IN ELDERLY MEN

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Abstract

This study is aimed to investigate the effect of 25 minutes of continuous active stretching – based exercise (STAxercise) on the flexibility and agility / balance of a group of elderly men. An experimental research design was used. Participants consisted of 20 sedentary males aged 60 to 64 years, who participated in this study having different weight and height. All participants took part in the "Healthy Generation Program" held in Petaling Jaya in 2016. They were engaged three times per week for 24 weeks of STAxercise interventions. All participants completed the tests (i.e. flexibility & agility / dynamic balance) before and after the intervention. The results showed that the participants had increased in inches in terms of flexibility and reduced in time agility - dynamic balance after 24 weeks of intervention. The present study recommends STAxercise as another approach for elderly people to practice at home. Future research needs to investigate the effectiveness of STAxercise with different modes of exercises other than the effects on psychological states of the participants.

Keywords: Active stretching, STAxercise, flexibility, agility, balance, elderly

Introduction

A person is considered old upon reaching the age of 65 or more. They are divided into three categories which are 65 to 74 years (young elderly), 75 to 84 years (old elderly), and above 85 years (older elderly) (Papilla, Olds, & Feldman, 2006). Hence, the likelihood of elderly people facing a decrease in their postural stability is very high (Nejc, Loefler, Cvecka, Sedliak, & Kern, 2013). As revealed by Coriolano Appell, Perez, Maio Nascimento, and Appell (2012), the functional capacities reduce in every aging person. The term physical activity may be defined in many different ways. Physical activity includes all movements associated with everyday life (e.g., work, routine activities, exercise activities, and recreational activities (Miller, 2002). Usually, older adults are retired from work and their work responsibilities require minimal physical activity. For this reason, it is important that the lifestyle of these individuals includes recreational activities, exercise, or other activities that require physical exertion.

It is now accepted that regular physical activity can provide benefits for all older individuals regardless of their physical health. It is not advisable, however, to prepare exercise or activity guidelines that can be applied to all older adults. Although a sedentary lifestyle is often directly related to chronic diseases associated with aging, the activity level of many individuals declines with age even if they have no chronic disease. Past study has highlighted the effectiveness of physical activity for elderly people particularly on physical, social, and psychological factors (Mechling & Netz, 2009). Previous researchers stated that the ability of a person to balance can be monitored by asking a person to stay in an upright posture during both static and dynamic tasks (Benjuva, Melzer, & Kaplanski, 2004). In fact, daily activity of a person will be disrupted if the person is poor in his body balance (Chou, Hwang, & Wu, 2012). Hence, proper intervention needs to be introduced regularly to older people in order to improve their quality of life particularly in reducing the risk of falls. For example, activities which focus on balance training and tai chi intervention, or both balance and strength training, helped to reduce falls (Knerl, Schuler, Taylor, Cosio – Lima, Caillouet, 2009; Li et al., 2005; Province et al., 1995; Robertson, Campbell, Gardner, & Devlin, 2002). Past researchers also found that strength training and coordinative exercise benefits older people in controlling their stability (Skelton, 2001). However, there is still a lack of literature regarding flexibility training, particularly in relation with elderly people (Frankel, Bean, & Frontera, 2006). Barret and Smerdely (2002) have reported that flexibility training improves balance performance better than resistance training. Previous researchers also found that modifications in the steps of locomotion in elderly people can be seen during the initial difficulties of walking movement (Maki & Mcllroy, 2006). Additionally, the Pilates method also helps to improve the abilities to maintain body balance in elderly people (Miller, 2002). This intervention only uses the person's body weight and consists of group of functional exercises and steps. It was later extended with the aid of equipment (Shedden & Kravits, 2006). It was found to be a suitable exercise to integrate a person into his or her functional challenges in daily life (Latey, 2001).

Literature supports the view of active stretching being more favorable than passive as far as improving the muscle flexibility is concerned (Godges, Macrae, Longdon, Tinberg, & Macrae, 1989; Herbert, 2013; Mcroni et al., 2010; Sady, Wortman, & Blanke, 1982). For example, a four-week intervention program of active stretching increases hamstrings

flexibility (Rani & Mohanty, 2015). Past researchers also found progressive home-based exercise program (foot and ankle) helps to increase flexibility, body balance, and strengthen the muscles of older people (Long, Jackson, & Laubach, 2013). However, the role of continuous stretching based exercises has never been explored by researchers. It should be the ideal intervention to be applied to elderly people within home-based exercise program. The objective of this study was to investigate the effects of 25 minutes of continuous active stretching – based exercise (STAxercise) on flexibility and agility / balance in a group of elderly men.

Materials and methods

Participants

Twenty sedentary males with different weights and heights (M = 78.95, SD = 9.28), (M = 1.69, SD = .02) aged 60 - 64 years, (M = 62.05, SD = 1.50) participated in this study. All participants were recruited from a special training program known as "Healthy Generation Program" which was conducted by Healthy Generation Malaysia.

Measures

STAxercise is a new approach to exercise. It is a 25 minutes stationary continuous active stretching steps routine. As recommended by the American College of Sports Medicine (ACSM, 2014), the participants in this study had engaged in the program three times per week for 24 weeks of exercise program conducted by a certified sports science instructor. The Faculty of Sports Science, Universiti Teknologi MARA Ethics Committee approved the study. Participants provided written informed consent. Sixty-five to eighty-five percent was the maximum target heart rate for the age. According to ACSM, the intensity should be of low to moderate intensity and related to the functional capacity of the individual (ACSM, 2014). The Carvonen method was used to determine the intensity of STAxercise. Each participant used a polar device and performed according to the target heart rate and exercise. Additionally, there were no nutrition restrictions or modifications during the intervention program (Ismail, 2018). Active stretching consisted of 16 steps of movements, ranging from low to moderate intensity and accompanied by breathing techniques (see Tables 1 & 2).

Table 1: Steps of Continuous Active Stretching (STAxercise)

Steps	Exercise / Stretches	Description
1		Inhale – Abdominal Stretch Hold the stretch for 3 seconds
2		Exhale - Hamstrings Stretch Hold the stretch for 3 seconds
3		Inhale – Abdominal Stretch Hold the stretch for 3 seconds
4		Exhale – Quad Stretch Hold the stretch for 3 seconds
5		Inhale - Quad / Soleus Stretch Hold the stretch for 3 seconds

6		Exhale – Hip / Hamstring / Gastroc Stretch (extend your right leg) Hold the stretch for 3 seconds
7		Inhale – Gastroc Stretch Hold the stretch for 3 seconds.
8		Exhale – Lower Back Stretch Hold the stretch for 3 seconds.

Table 2: *Steps of Continuous Active Stretching (STAxercise)*

Steps	Exercise / Stretches	Description
9		Inhale – Quad / Soleus Stretch Hold the stretch for 3 seconds.
10		Exhale – Deltoid / Upper Back / Quad / Soleus Stretch Hold the stretch for 3 seconds.
11		Inhale – Lower Back Stretch Hold the stretch for 3 seconds.
12		Exhale – Gastroc Stretch Hold the stretch for 3 seconds.

13 

Inhale – Hip / Hamstring / Gastroc Stretch (extend your left leg)
Hold the stretch for 3 seconds.

14 

Exhale – Quad / Soleus Stretch
Hold the stretch for 3 seconds.

15 

Inhale – Quad Stretch
Hold the stretch for 3 seconds.

16 

Exhale – Abdominal Stretch
Hold the stretch for 3 seconds.

The present study used only two tests: (1) trunk/leg flexibility, (2) agility / dynamic balance to evaluate the ability of elderly people to carry on certain activities. The reliability levels of the tests were .98 and .99 (Osness et al., 1996).

Trunk / leg flexibility: Sit and reach

This test procedure is similar to the sit and reach test item included in the YMCA Physical Fitness Test. A yardstick is taped to the floor with a perpendicular line over the 25-inch mark. The test performer, with shoes removed, sits with the legs extended flat on the floor and the heels at the 25-inch mark. The yardstick should be between the legs, with the (0) point toward the performer. With the feet spread about 12 inches apart and one hand placed directly on top of the other, the performer slowly reaches forward, sliding the hands along the yardstick as far as possible. The performer must hold the final position for at least two seconds. The test administrator should place a hand on top of one of the performer's knees to ensure that the knees are not raised during the test. Two practice trials are permitted, and the better of two test trials is recorded. The score is recorded to the nearest ½ inch.

Agility/dynamic balance

The test performer sits in a chair with heels on the floor. On the signal "ready, go," the performer stands up, moves to the right, goes to the inside and around the cone (counter clockwise), returns to the chair, sits down, and raises the feet from the floor. Without hesitating, the test performer immediately stands up, moves to the left, again going to the inside and around the cone (clockwise), returns to the chair, and sits down, completing one circuit. The performer immediately stands up and completes the circuit a second time. The two circuits complete one trial. After a 30 – second rest, a second trial is administered. A practice trial is administered to reach 0.1 second. The score is the time for the best trial.

Procedure

An experimental research study was conducted to identify the effects of 25 min - STAxercise on selected functional fitness assessment. The present study only selected two tests (trunk/leg flexibility & agility / dynamic balance) to evaluate the ability of elderly men to carry on certain activities. All participants were engaged in three days per week for 24 weeks of training program (Ismail, 2018). During the initial meeting, the participants underwent a health screening test before they engaged in this exercise program. All participants were free from any injuries and health problems based on the medical clearance form recorded by Healthy Generation Malaysia under the "Healthy Generation Program". They had only performed some physical activities which were less than one hour per week for at least a year before the intervention program (Hiruntrakul, Nanagara, Emasithi, & Borer, 2010). Additionally, a medical assistant was assigned to monitor the entire intervention session. Overall, the program managed to approximately cover 25 minutes for a session and was conducted by a certified instructor with a sports science background.

Results

The preliminary assumption was normally distributed and a paired – samples t-test was conducted to evaluate the effects of 25 minutes continuous active stretching (STAxercise) on selected functional fitness tests among elderly men. Table 3 shows that there was a statistically significant improvement in inches of flexibility level from pre-test (M = 13.35, SD = 4.19) to post test (M=18.00, SD=3.71), t (19) = -14.56, p < .001 (two tailed). The mean decrease in flexibility level was -4.65 with a 95% confidence interval ranging from -5.32 to -3.98. The eta squared statistic (1.0) indicated a large effect size.

Table 3 shows a statistically significant reduction in time of agility / balance test scores from pre-test (M = 34.30, SD = 5.85) to post test (M=31.10, SD=5.61), t (19) = 8.11, p < .001 (two tailed). The mean reduce in agility / balance test scores was 3.20, with a 95% confidence interval ranging from 2.37 to 4.03. The eta squared statistic (.77) indicated a large effect size.

Table 3: *Comparison of flexibility Levels and Agility / Balance Levels for pre-test and post-test*

Measure	Pre test		Post test				
	M	SD	M	SD	*t*	*p*	ES
Flexibility	13.35	4.19	18.00	3.71	-14.59	<.001	1.0
Agility/balance	34.30	5.85	31.10	5.61	8.11	<.001	.77

Note. ES = Eta Squares

Conclusions

Continuous active stretching (STAxercise) performed for only 25 minutes three times per week for 24 weeks improves in inches of flexibility and reduces in time of agility / balance of elderly (60 – 64 years old) men. Therefore, the main objectives of this study were met: i) increased inches flexibility in elderly men; and ii) decreased time of agility / balance after the intervention program. The most interesting finding was that active stretching, when altered into a 25 minutes exercise regime three times per week, was sufficient to increase inches in flexibility and reduce the time of agility / balance in sedentary older men. These results were supported by other researchers that used stationary active stretching (Gallon et al., 2011; Rani & Mohanty, 2015) and other methods of training (Barrett & Smerdely, 2002; Long, Jackson, & Laubach, 2013; Shubert, McCulloch, Hartman, & Giuliani, 2010), the improvement found in the present study can be attributed to the 25 minutes continuous movements as supported by the previous study (Gallon et al., 2011; Ferber, Ostering, & Gravelle, 2002). The findings of the study are the first to report the effects of a continuous active stretching – based exercise program on elderly people, where majorities of the studies used stretching as part of the exercise regime.

A limitation found in this study is that the pre-experimental one-group study design is weaker than true experimental designs in terms of control. Therefore, true experimental designs are recommended for future studies (Baumgartner & Hensley, 2006). Additionally, different method of exercise like Pilates or any dance exercises should be included and compared with the proposed exercise Coriolano Appell et al., 2012; Netz, Wu, Becker, & Tenebaum, 2005). As supported by previous studies, further research is needed to determine the relative effectiveness of STAxercise in the psychological well-being of elderly people (Arent, Landers, & Etnier, 2000; Netz et al., 2005).

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