

The Relative Effect of Low Impact Aerobic on the Risk of Falling in the Elderly As Compared to Traditional Gym

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Abstract: BACKGROUND: Gym is recommended for the elderly to maintain good health. Aerobic is a type of gym which results in high oxygen uptake. However, aerobic can lead to high risk of falling and consequent injury to the elderly. Recently, a new modified aerobic known as low impact aerobic was introduced to the elderly. This study aimed to determine the relative effect of low impact aerobic on the risk of falling in the elderly as compared to traditional gym. METHOD: This study is a randomized control trial (RCT) conducted to the elderly integrated group Kedung Gobyak, Sobokerto, Ngemplak, Boyolali. A sample of 30 elderly people were randomized into two groups: 15 elderly people in the low impact aerobic group and 15 elderly people in the traditional elderly gym. The independent variable was type of gym. The dependent variable was falling risk, which was measured by Tinetti test. Aerobics was performed 3 times a week with 20-30 minutes duration per session for 4 weeks. Difference in mean of falling risk between the two groups was tested by independent t-test. RESULTS: As a result of randomization, there were no statistically significant difference ($P = 0.851$) in mean of falling risks before gym between low impact aerobic group and elderly group. There were no statistically significant difference ($P = 0.672$) in mean of falling risk after gym between low impact aerobic group (mean = 25.93; SD = 4.57) and elderly group (mean = 25.27; SD = 3.94). CONCLUSION: Low impact aerobic can be practiced by the elderly to maintain good health as an alternative to the traditional elderly gym since it does not increase the risk of falling as compared to the elderly gym.

Key words: Elderly, low impact aerobic, elderly gym, falling risk.

1. Introduction

The decreasing cognitive functions in elders population may lead to dementia and delirium, where this situation can jeopardize the elders in performing their daily activities. Minor accidents can occur due to decrease alertness, anxiety and fear may increase due to orientation disorders, and also the worsening of psychosocial effects are due to decreasing of language functions. Along with the decrease of memory functions, it increased general problems amongst the elders [1].

The results showed that there were significant decrease of body function in elderly, as such: vision (76.24%), memory (69.39%), sexual (58.04%), flexibility (53.23%), teeth and mouth (51.12%) [2]. This situation tends to potentially cause general health problems and mental health specifically in the elderly [3].

Falling could happen to anyone. The higher risk of falling occurs in the elderly due to decreasing physical function. Falling may lead to serious or minor injuries that generate to serious disability in the elderly [4].

Physical activity on a regular basis is very important for maintaining the physical condition of the elderly, lowering the risk of falling and becoming a way to live independently. Many benefits are obtained by doing physical activity. The benefits of doing regular physical activity, among others, can increase muscle mass, reduce the risk of osteoporosis, make strong bones, maintain physical function and independence in everyday life.

Sobokerto village, Ngemplak sub district Boyolali has elderly integrated service, but no research has been done about aerobic effect on elderly. The activities carried out are counseling, activity therapy, group therapy, cognitive therapy, traditional elderly gym and others. Given the magnitude of the benefits of physical activity in the elderly for their physical condition, then

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want to know whether there is aerobic effect on the risk of falling in elderly.

2. Material and Methods

The study is a randomized control trial (RCT). It took place in the Village of Sobokerto Ngeplak Boyolali District. Sampling technique with random sampling. Inclusion criteria: elderly are over 60 years old, level of awareness is good enough (place, time, person), and able to walk independently or with help (cane). Exclusion criteria: elderly with acute infection, terminal disease, acute fracture, severe circulatory disease, elderly on long term care or elderly who only move on the bed. A sample of 30 elderly people were randomized into two groups: 15 elderly people in the low impact aerobic group and 15 elderly people in the traditional elderly gym. The independent variable is type of gym. The dependent variable is falling risk. The research instrument used Tinetti test. Aerobics performed as much as 3 times/week for approximately 4 weeks with duration of 20-30 minutes. Technique of data analysis with t-test.

3. Results

The total population in this study are 57 elderly. The number of samples obtained in the study were 30 samples. All of the sample are female. The sample is divided into two groups: 15 elderly group of traditional elderly gym and 15 elderly group of low impact aerobics. The age of the study sample in group of traditional elderly gym ranged from 46 years to 102

years. While the age of the study sample in the low impact aerobic group ranged between 46 years to 95 years. The age classification of research samples based on the criteria of world health organizations can be seen in Table 1.

As a result of randomization, there was no statistically significant difference ($P = 0.851$) in mean of falling risk before gym between low impact aerobic group and elderly group. There was no statistically significant difference ($P = 0.672$) in mean of falling risk after gym between low impact aerobic group (mean = 25.93; SD = 4.57) and elderly group (mean = 25.27; SD = 3.94) (Table 2).

The results indicate that low impact aerobic can be practiced by the elderly to maintain good health as an alternative to the traditional elderly gym since it does not increase falling risk as compared to the elderly gym.

4. Discussion

Age is very influential against the risk of falling. This study proved that there is a significant difference in the elderly group who do aerobics compared with the elderly group who do gymnastics. This can be seen in the descriptive differences, age range in both study groups. In the group of gymnastics has a more age range than the aerobic group. The age range in the group of exercises ranged from 46 to 102 years, while in the aerobic group ranged from 46 to 92 years. As we know that the elderly suffered a setback with age.

In the American College of Sports Medicine [5]

Table 1 Distribution of age of study sample.

Age	Frequency traditional gym (%)	Frequency low impact aerobics (%)
60-74 years (elderly)	8 (53.3)	12 (80)
75-90 years (old)	4 (26.7)	2 (13.3)
> 90 years (very old)	3 (20)	1 (6.7)
Total	15	15

Table 2 Result of t-test of mean difference in scores of falling risk between low impact aerobic group and traditional elderly gym after intervention.

Group	n	Mean	SD	P
Low impact aerobic	15	25.93	4.57	0.672
Traditional elderly gym	15	25.27	3.94	

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mentioned nearly half the decline in physical capacity associated with the aging process that may occur due to lack of physical activity. Without regular exercise, individuals who are over 50 years of age may be at risk of health problems such as: decreased periods, and muscle strength and decreased physical endurance; decreased coordination and balance capability; reduced joint flexibility and mobility; decreased cardiovascular and respiratory function; decreased bone strength, increased amount of fat and blood pressure as well as mood disorders, such as anxiety and depression; increased risk of various diseases including cardiovascular disease and stroke.

Burbank et al [6] and Dayhoff et al [7] explain that women over 60 years tend to face several health problems. One of the problems is flexibility. Decreased body flexibility in the elderly can decrease the level of physical fitness, physical activity, and as risk factors that can result in fractures and disabilities.

Previous findings [6, 8-11] prescribe ideal exercises for the elders by adding a motion-based exercise that combines motion to exercise balance and weights akin promote muscle strength; stretching for body flexibility and contraction of the muscles to increase the functions of the heart and lungs. McArdle et al [11] and Giam et al [12] also mentioned that one of the recommended types of exercise for the elders is low impact aerobic gymnastics with mild-moderate intensity, duration of 20-50 minutes, within frequency three times per week.

Health conditions experienced by the elderly affect the risk of falling. Matters associated with falling risk factors are the sensory system, the central nervous system, cognitive, and musculoskeletal. Sensory systems that play a role in falling risk factors are visus (vision), hearing, vestibular, and proprioceptive functions. Muskuloskeletal is the main factor causing the elderly to fall mentioned by Reuben, Tinetti, Kane, Campbell, Brocklehurst as rewritten by Darmojo et al [4]. Muskuloskeletal disorders cause a gait disturbance and are associated with physiologic aging. Problems occurred as the impact of stiffness over the connective

tissue, decrease of muscle mass, deceleration of nerve conduction, decline of vision ability, proprioceptive deterioration. These conditions will cause a decrease in the scope of joint motion, decline muscle strength that weaken the lower limbs, delayed reaction time, deep perceptual deterioration and excessive postural sways.

All of these changes result in sluggish movement, short steps, and decreased running rhythm. The feet can not tread strongly and are more likely to falter easily. Deceleration of the reaction resulted in an elderly difficult/late anticipate in the event of interference such as slip, tripped, sudden events, making it easier to fall.

In general, the cause of fall amongst the elderly are result of combination out of several factors, as: (1) accidents that are the main cause of the fall of about 30-50% of cases; (2) headache and or vertigo; (3) orthostatic hypotension; (4) drugs such as diuretics/Antihypertensives, antidepressants, sedatives, antipsychotics, hypoglycemic drugs; (5) specific disease processes such as cardiovascular disease, neurology; (6) syncope (sudden loss of consciousness) [4].

Frequency of elderly in following gymnastics and aerobic activity affect the risk of fall. Perform regular physical activity will have a positive impact on the health quality of the elderly. Physical exercises performed routinely by the elderly provide benefits in many ways such as: (1) muscles: increase muscle mass in the short term; (2) bone: reduce the risk of bone loss and osteoporosis and exercise with a focus on balance of body load distribution can help bone become stronger and healthier; (3) heart and lungs: moderate intensity exercise; (4) joints: all joints in the body need to be moved to maintain health; (5) amount of body fat: regular physical exercise can burn fat, increase muscle mass and speed of body metabolism, so as physiological changes of the elderly can maintain appropriate weight; (6) maintain physical function and independence of life; (7) improve social interaction, quality of life and reduce depression; (8) reduce the

risk of injury due to fall; (9) reduce the risk of disease Heart, stroke, high blood pressure, type II diabetes and cancer; (10) Multimodal stimulation; (11) Improving reaction and movement planning [13]. It is also mentioned that regular physical activity increases the average life expectancy and is associated with general health, well-being and functional capacity.

The results of the research of low impact aerobics against the risk of falling in the elderly in the village of Sobokerto Ngemplak Boyolali district was statistically significant. It should be understood that the results descriptively did not show an increased risk of falling in the sample study. So in line with the aging process that experienced traditional elderly gym and low impact aerobic can maintain physical condition in order to stay fit and healthy. Samples also felt happy and eager to follow the training program provided. The majority of elderly states that her body feels fitter, healthier and more comfortable.

5. Conclusion

The result of data analysis could be interpreted as low impact aerobics play significant role in reducing the risk of falling elderly. Low impact aerobic can be practiced by the elderly to maintain good health as an alternative to the traditional elderly gym since it does not increase falling risk as compared to the elderly gym.

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