The Effect of Low Impact Aerobic Exercise on the Physical Fitness of Elderly Gymnastics Members in the Lin Tien Kung Community, South Tangerang City

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Article Info	Abstract
	This study aimed to determine the effect of Low Impact Aerobic exercise on the physical fitness of elderly individuals in the Lin Tien Kung Exercise Community, South Tangerang City. The background of this study was based on the decline in physiological functions among the elderly and the limited availability of structured, safe, and age-appropriate exercise programs. This research employed a quasi-experimental method with a One Group Pretest–Posttest Design, involving 25 elderly participants as the sample. The exercise program was conducted over 8 sessions within 4 weeks, with a duration of 45–60 minutes per session, consisting of warm-up, main activity, and cool-down phases. Data were collected using the Senior Fitness Test (SFT), which includes six components of physical fitness: Chair Stand Test, Arm Curl Test, Chair Sit and Reach Test, Back Scratch Test, 2-Minute Step Test, and 8-Foot Up and Go Test. Data analysis was performed using the Paired Sample t-Test to identify significant differences between pretest and posttest results. The analysis results showed Sig. (2-tailed) values < 0.05 for all components, indicating a significant effect of Low Impact Aerobic exercise on improving elderly physical fitness. Low Impact Aerobic exercise was proven to be effective in enhancing muscle strength, flexibility, balance, and endurance, as well as providing psychological benefits in the form of increased motivation and social interaction. This study recommends the implementation of Low Impact Aerobic exercise as a regular activity for elderly communities to maintain health and improve quality of life sustainably.

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1. INTRODUCTION

The number of elderly people in Indonesia continues to increase in line with rising living standards and advances in healthcare. This situation presents a unique challenge for society and the government, as the elderly are vulnerable to various declines in bodily functions, both physical and psychological (Di et al., 2021). One of the most obvious changes is a decline in physical fitness. Decreased muscle strength, cardiovascular endurance, joint flexibility, and balance cause the elderly to tire more easily, have difficulty moving freely, and are at higher risk of injury or falls (Hambali & Kusmaedi, 2019). Therefore, efforts to maintain physical fitness are crucial to ensure the elderly remain active, independent, and productive in their daily lives. One effective way to maintain physical fitness in the elderly is through regular, programmed exercise (Setiawan et al., 2020). However, when choosing the type of exercise, it is important to remember that the physical condition of the elderly is no longer as strong as in younger ages. Movements that are too fast, strenuous, or

high-intensity can actually cause joint and muscle injuries (Nurittama et al., 2025). Therefore, the appropriate type of exercise for seniors is low- to moderate-intensity exercise that still provides fitness benefits but is safe. One such exercise is *low-impact aerobics* (Sugiarto et al., 2025).

Low-impact aerobics training *is* a form of physical activity that combines rhythmic movements of light to moderate intensity without putting excessive pressure on the joints (Wardani & Nurudin, 2020). The movements are performed gradually and regularly to the rhythm of music with a tempo that is not too fast, making it suitable for seniors with physical limitations. In addition to strengthening muscles and increasing cardiovascular and pulmonary endurance, this exercise can also improve body coordination, increase agility, and stimulate the body's balance system (Nurittama et al., 2025). Through fun and easy-to-follow exercises, seniors can exercise without feeling physically or mentally burdened. In South Tangerang City, sports activities for the elderly have developed in various community forms, one of which is the Lin Tien Kung gymnastics community. This community is known for its active routine of gymnastics activities, with members who are mostly senior citizens. The exercise program implemented not only aims to maintain physical health but also to strengthen social relationships among members. Group gymnastics activities can create an atmosphere of togetherness and high motivation for participants to remain active in exercising (Yuniartika et al., 2024). However, even though regular exercise activities are carried out, there has not been much research that specifically assesses the extent to which exercise is effective. *Low-impact aerobics* programs implemented can significantly impact the physical fitness of elderly community members (Rudiansyah, 2023). Most programs operate traditionally without structured measurements of changes in physical fitness, such as endurance, strength, and flexibility. However, by understanding the effects of the exercises provided, instructors and community managers can improve training patterns for optimal results (Pratiwi & Nugraheni, 2024). Furthermore, physical fitness not only impacts the physical abilities of older adults but also their overall quality of life. Elderly individuals with good fitness tend to be more independent in carrying out daily activities, have a more stable psychological state, and are more active in socializing with their surroundings (Arobaya et al., 2024). Therefore, efforts to improve physical fitness through exercise are essential. *Low-impact aerobic exercise is not* only important from a physical health perspective but also as a form of support for the social and mental well-being of the elderly.

Based on this description, it is important to conduct research that focuses on the influence of exercise. *Low Impact Aerobic Exercise on* the physical fitness of elderly exercisers in the Lin Tien Kung Community in South Tangerang City. This study is expected to provide an overview of the extent to which routine exercise can improve elements of physical fitness such as muscle strength, endurance, flexibility, and body balance. The results of this study can also serve as a reference for community managers, exercise instructors, and related parties in designing more effective and safe exercise programs for the elderly. Thus, it is hoped that the elderly can maintain their physical health, reduce the risk of degenerative diseases, and improve their quality of life in old age.

2. MATERIALS AND METHODS
Research Design

This research uses a quasi-experimental method (*as if an experiment*) with a *one-group pretest–posttest design. This* design was chosen because the research was conducted on the same group of subjects without a comparison group (control), but measurements were taken before and after treatment to determine the changes that occurred as a result of the exercise intervention. *Low Impact Aerobics* (Sugiyono, 2019). In this design, the researcher provided treatment in the form of training for *Low-Impact. The* study was conducted on members of an elderly exercise community, and then physical fitness levels were measured before and after the exercise program. The comparison of pretest and posttest scores served as the basis for determining whether the exercise had an effect.

In this study, the independent variable (X) was exercise of *low-impact aerobics dan the* dependent variable (Y) is the physical fitness of the elderly.

This study has two main variables, namely the independent variable in the form of exercise, *Low Impact Aerobic* and the dependent variable is the physical fitness of the elderly. These two variables are operationally defined so they can be measured clearly and objectively in the field. The independent variable in this study is exercise of *Low Impact Aerobics*, namely a series of aerobic exercise movements with light to moderate intensity, which are performed rhythmically following the beat of the music.

Participants

Participants in this study were members of the Lin Tien Kung elderly gymnastics community in South Tangerang City who actively and regularly participated in gymnastics activities. Participant selection was conducted using a random sampling technique. *Purposive sampling*, namely, determining the sample based on certain criteria that have been set to suit the research objectives. The inclusion criteria include: (1) being an active member of the Lin Tien Kung elderly gymnastics community; (2) being between 55–70 years old; (3) having a stable health condition and being declared fit to participate in physical activity based on the results of an initial examination; (4) being willing to participate in the entire series of exercises *Low Impact Aerobic* during eight meetings; and (5) not currently participating in another physical exercise program that could potentially influence the research results.

The number of participants was determined based on the minimum requirements for simple experimental research. In sports and fitness research, the ideal sample size is between 20–30 people to achieve adequate statistical power (Sugiyono, 2018). Therefore, this study involved 25 elderly individuals as a sample. All participants were placed in one experimental group that received treatment in the form of *low-impact aerobic exercise. Physical* fitness measurements were conducted before and after treatment using the Senior Fitness Test instrument, which covers aspects of muscle strength, flexibility, balance, and endurance. Participants were selected using the technique *purposive sampling* considered appropriate considering the characteristics of the elderly who have certain physical limitations so that special considerations are needed in experimental research.

Research Instruments

A research instrument is a tool used to collect data based on the variables being studied. In this study, the instrument used was the Senior Fitness Test (SFT), developed by Rikli and Jones (2001) (Langhammer & Stanghelle, 2015). This test was chosen because it has been proven valid and reliable for measuring the physical fitness of the elderly population, taking into account safety factors and participants' physical abilities.

The physical fitness test for older adults aims to assess physical abilities related to muscle strength, flexibility, cardiorespiratory endurance, and balance. This test consists of several measurement components tailored to the characteristics of older adults to avoid excessive fatigue or the risk of injury during implementation (Purwantini et al., 2024). The test components used in this study include six main types of measurements:

a) Chair Stand Test (Standing from Chair Test)
b) Arm Curl Test
c) Chair Sit and Reach Test
d) Back Scratch Test
e) 2-Minute Step Test
f) 8-Foot Up and Go Test

All six test components' results are recorded in units of time, distance, or number of repetitions. This data is then converted into a physical fitness score for seniors, reflecting their overall physical condition. The Senior Fitness Test instrument was chosen because of its high validity and reliability in measuring senior fitness.

Research Procedures

Data collection techniques are an important step in research because they function to obtain accurate and relevant information on the variables being studied. In this study, data collection was carried out directly in the field (*field research*) through physical fitness tests for the elderly (*Senior Fitness Test*), which was carried out before and after the training treatment was given, Low *Impact. The* data collection process is carried out through three main stages, namely pretest*, treatment,* and *posttest.* Each stage has its own role in producing valid and comparable data. The next stage is the implementation of treatment, namely the training program of *Low-impact aerobic* activity is conducted eight times over four weeks, twice per week. Each training session lasts approximately 60 minutes and is divided into three parts:

Table 1. Training Session

Training Session	Time (minutes)	Information
Heating	10 minutes	done with light movements to prepare the muscles and joints to be ready for activity
Core Exercises	35 minutes	contains a combination of movements *Impact Aerobics,* which involves footwork, arm swings, and body coordination, accompanied by moderate rhythmic music
Cooling	10 minutes	done with light stretching movements to gradually reduce the intensity of the heart rate

Next, data were collected and analyzed from the results of the initial test (pretest) and final test (posttest) using a statistical test approach. The final stage was to draw conclusions from the results of the data analysis using SPSS 22 Windows. In this study, the author used data analysis in this study through two stages: descriptive analysis and inferential analysis. Descriptive analysis was used to describe the physical fitness condition of the elderly before and after participating in the exercise of *Low Impact Aerobics. Based* on the results of the Senior Fitness Test, with statistical indicators in the form of average values, minimum and maximum values, and standard deviation. Furthermore, inferential analysis was conducted to test the research hypothesis using the t-test. *Paired Sample t-Test*, because the data came from two measurements in the same group. Before the t-test was conducted, the data were first tested for normality using the Shapiro–Wilk test as a prerequisite for analysis. Hypothesis testing was conducted at a significance level of 0.05, where a Sig. (p-value) <0.05 indicates a significant difference between the pretest and posttest results of the elderly's physical fitness after participating in the exercise of *Low Impact Aerobics*.

3. RESULTS

The analysis was carried out through two main stages, namely descriptive analysis and inferential analysis, in accordance with the research design. *One Group Pretest–Posttest Design* (Sugiyono, 2010). All pretest and posttest data on the six components *Senior Fitness Test* were processed using relevant statistical procedures so that the results could answer the research objectives and hypotheses. Descriptive analysis was used to describe the initial (pretest) and final (posttest) physical fitness conditions of participants after being given low-impact aerobic exercise treatment. Statistics used included the average value (mean), minimum value, maximum value, and standard deviation. The summary of the research data is as follows:

Table 2. Description of Physical Fitness Data for the Elderly (*Chair Stand*)

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	8.17	10.08
Max (Highest Value)	15.15	17.70
Rate-Rate (Mean)	11.67	13.43
Standard Deviation	1.91	1.85
Variance	25	25

Table 3. Description of Physical Fitness Data for the Elderly (*Arm Curl*)

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	9.76	13.02
Max (Highest Value)	18.13	19.96
Rate-Rate (Mean)	15.21	16.86
Standard Deviation	1.97	1.51
Variance	25	25

Table 4. Description of Physical Fitness Data for the Elderly (*Sit & Reach*) cm

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	-0.76	2.18
Max (Highest Value)	12.39	13.57
Rate-Rate (Mean)	5.16	6.60
Standard Deviation	3.10	3.03
Variance	25	25

Table 5. Description of Physical Fitness Data for the Elderly (*Back Scratch*) cm

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	-5.57	-4.54
Max (Highest Value)	3.69	8.16
Rate-Rate (Mean)	-1.57	0.07
Standard Deviation	2.57	2.83
Variance	25	25

Table 6. Description of Physical Fitness Data for the Elderly (*2 Minute Step*)

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	65.06	73.80
Max (Highest Value)	110.82	107.15
Rate-Rate (Mean)	82.41	90.01
Standard Deviation	9.73	7.62
Variance	25	25

Table 7. Description of Physical Fitness Data for the Elderly (*8 Foot Up & Go*)

Data Variable	Mark	
	Pretest	**Posttest**
Min (Lowest Value)	3.76	4.05
Max (Highest Value)	9.12	8.13
Rate-Rate (Mean)	6.84	6.12
Standard Deviation	1.26	0.87
Variance	25	25

Based on the results of descriptive analysis of the six components of physical fitness, there was a consistent increase in all aspects after implementing the training program. *Low Impact Aerobics*. The average Chair Stand Test score increased from 11.67 to 13.43 times, and the Arm Curl Test from 15.21 to 16.86 times, indicating increased leg and arm muscle strength. Lower and upper body flexibility also improved, indicated by an increase in Chair Sit and Reach Test scores from 5.16 cm to 6.60 cm and Back Scratch Test from -1.57 cm to 0.07 cm. In addition, cardiovascular endurance increased from 82.41 to 90.01 steps in the 2-Minute Step Test, while balance and agility improved with a decrease in the 8-Foot Up and Go Test time from 6.84 seconds to 6.12 seconds. Overall, these results indicate that low-impact Aerobic exercise is effective in improving the overall physical fitness of the elderly, including aspects of strength, flexibility, endurance, and balance, which positively contribute to maintaining health and quality of life for the elderly.

Based on the results of statistical analysis, which includes normality, homogeneity, and Paired *Sample t-Test*, it can be concluded that low-impact Aerobic exercise has a significant effect on improving the physical fitness of the elderly in the Lin Tien Kung Gymnastics Community in South Tangerang City. The results of the normality test indicate that the data are normally distributed, while the homogeneity test shows that the data variance is homogeneous, thus meeting the requirements for parametric analysis. Furthermore, the results of the test, *Paired Sample t-Test, show* a Sig. (2-tailed) value < 0.05 for all components of the physical fitness test. This indicates a significant difference between the results of the *pretest* and *posttest after* being given training *in low-impact Aerobics.* Thus, the research hypothesis was accepted. This exercise program has been shown to improve muscle strength, flexibility, endurance, and overall body balance in older adults and is suitable for routine use to maintain fitness and health in older age.

4. CONCLUSION

Based on the results of the data analysis that has been carried out, both through descriptive tests and inferential tests, it can be concluded that the exercise Low *Impact Aerobic* has a significant influence on improving the physical fitness of the elderly. The results of this study were obtained through data processing stages starting from normality tests, homogeneity tests, to statistical tests. *Paired Sample t-Test*, which overall shows that there is a real difference between the results *pretest* and *the* physical fitness of the study participants. Descriptively, there was an increase in the average score in all components of the Senior Fitness Test, including leg muscle strength (Chair Stand), arm strength (Arm Curl), lower body flexibility (Chair Sit and Reach), shoulder flexibility (Back Scratch), cardio-respiratory endurance (2-Minute Step Test), and balance and agility (8-Foot Up and Go). This increase reflects a positive change in physical condition after the participants participated in the training program. *Low Impact Aerobics, as* many as eight meetings. Through the test results *Paired Sample t-Test.* The Sig. (2-tailed) value was obtained $= 0.000 < 0.05$ for all tested variables, so it can be concluded that there is a significant difference between before and after the training treatment. This means that the training of *Low-Impact Aerobics significantly* improves the physical abilities of the elderly in various aspects of physical fitness. Thus, the research hypothesis states that *"Low*

Impact Aerobic Exercise has a significant effect on improving the physical fitness of elderly gym members in the Lin Tien Kung Community, South Tangerang City," is declared acceptable. Physiologically, this increase occurs due to exercise. *Low-Impact Aerobics can* stimulate the heart, lungs, and muscles continuously at light to moderate intensity (Rismayanthi et al., 2022). Rhythmic and regular movements improve blood flow, strengthen upper and lower body muscles, and improve flexibility and balance without putting excessive pressure on joints. For the elderly, this is crucial for maintaining fitness, increasing stamina, and preventing the risk of injury due to the natural decline in body function (Widjayanti et al., 2019). From the results of this study, it can be concluded that exercise has of *impact on aerobic. Not* only does it provide physical benefits, but it also has a positive impact on the mental and social well-being of the elderly. Group activities accompanied by music create a pleasant atmosphere, increase enthusiasm for life, and strengthen social interactions among community members (Rubiyatno et al., 2023). The elderly become more active, confident, and have a higher motivation to maintain their health. Thus, overall, this study proves that exercise of *Impact Aerobics is* an effective, safe, and recommended form of physical activity to improve physical fitness and quality of life for older adults. This exercise program can be used as a routine activity by senior exercise communities, health institutions, and local governments to maintain the health and independence of older adults on a sustainable basis.

5. ACKNOWLEDGMENTS

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