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RESEARCH ARTICLES

Low Impact Exercise Affects the Stress Level of The Elderly in The Nursing Home Tresna Werdha Abdi Binjai

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Abstract: Stress can affect various aspects of life, including physical, psychological and social changes. Ageing and declining health are often associated with mental health conditions such as depression. Increasing physical activity can help reduce stress and improve mental health, especially depression. Aerobic exercise can be beneficial for the elderly, as long as it has the right dosage and design. Aerobic exercise to improve the physical fitness of the elderly uses low-impact exercise. This study aims to determine the influence of exercise on the level of stress of the elderly in the nursing home of Tresna Werdha Abdi Binjai. Pre-experimental design with one group pretest-posttest design. Exercise is carried out for 8 weeks with an exercise duration of around 30 minutes, 3-5 times/week. Sampling was taken using the total sampling method. The data collection technique used the Perceived Stress Scale (PSS) questionnaire, which was taken before and after the exercise intervention. Based on the Wilcoxon Rank Sum Test output, it is known as a value of p=0.000 (p = <0.005), so it can be concluded that there is a significant difference between the pre-test and post-test results after the exercise intervention. There is an influence of low-impact exercise on the stress level of the elderly at the Tresna Werdha ABDI Binjai Nursing Home.

Keywords: Elderly, low-impact exercise, stress level.

INTRODUCTION

Various biological and physiological disorders in the elderly can affect many aspects of life, including physical, psychological, and social changes, which can cause stress if managed poorly, even though some people experience difficulties in their daily lives. Causes of stress are multifactorial and can also be caused by negative life changes, such as the death of a spouse, a decline in socioeconomic status,

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comorbidities, social isolation, and housing.[1]

Population ageing has been the greatest challenge of the 21st century and suggests that by 2050, the ratio of the population of one in five people will be elderly, 60 years and older. Countries around the world are developing and implementing strategies for healthy ageing by promoting physical activity and recognising *sedentary lifestyles* as risk factors for chronic and degenerative diseases. Ageing and declining health are often associated with mental health, such as depression. Approximately one in five seniors suffers from depression, the second most common cause of physical and psychological disability in the elderly.[2] Therefore, this research is expected to help the elderly achieve *"healthy ageing"* with exercise in reducing stress levels. There are several studies that explain that exercise improves emotional function, mental health,[3] indicates a decrease in anxiety and depression after exercise and a significant improvement after low-moderate intensity aerobic exercise.[4] Exercise and physical activity produce endorphins in the brain, which function as natural pain relievers and improve sleep quality. This helps reduce stress that can affect the progression of the disease and significantly reduce health.[5]

Physical exercise or exercise can help improve the fitness of the elderly and become a physical stressor that can cause homeostatic disorders. The right amount of exercise is essential to prevent disease mechanisms that can turn *stressors* into stimulators. Aerobic exercise that requires oxygen is more related to endurance and sports activities. It involves the provision of light loads and their execution for a long time, using energy from the oxygen requirement. Aerobic exercise can be beneficial for the elderly, as long as it has the right dosage and design. Aerobic exercise to improve the physical fitness of the elderly uses a low-*impact type*. Low-impact aerobic exercise performed without jumping and with one foot on the floor is safe and suitable for the elderly.[6]

This study aims to determine the influence of exercise on the level of stress of the elderly in the nursing home of Tresna Werdha Abdi Binjai.

METHOD

Types of Research

Pre-experimental design with *one group pretest-posttest design* is a type of research used where only one group will be intervened upon. In the data measurement of the tool used, namely the *Perceived Stress Scale* (PSS) questionnaire, it was carried out before and after the leisure walking exercise intervention. The study will be conducted for 8 weeks with a duration of exercise ranging from 30 minutes, divided into 7 minutes of warm-up, 16 minutes of walking and 7 cooling pins. Exercise will be done 3-5 times/week. The data that has been collected will be processed and analysed statistically.[7]

Research Time and Place

This research will be conducted from September to November 2023 at the Tresna Werdha ABDI Nursing Home, Jl. Perintis Kemerdekaan No.156, Cengkeh Turi, Kec. North Sumatra 20761.

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Sample Withdrawal

This study uses a sample withdrawal with *the total sampling* method, with the entire population being used as a sample due to the limited number of populations.

Inclusion and Exclusion Criteria

Inclusion criteria: the elderly at the Tresna Werdha ABDI Binjai Nursing Home, who have lived in the nursing home for at least one month, the elderly are willing to be a research sample, and are still actively moving. Can walk.

Exclusion criteria: the elderly who cannot move or lie down, have poor hearing and vision, have heart and respiratory disorders, have poor cognitive function, have neurological disorders, have chronic sinus disorders, the elderly are unable to participate in *low-impact exercise* for 30 minutes.

Research Instruments

The instrument used in this study to measure stress levels is the *Perceived Stress Scale* (PSS) questionnaire, which has been modified into Indonesian. The researcher did not conduct a validity test because the PSS questionnaire has been widely used in previous studies and is a standard test that has been tested and accepted worldwide and in Indonesia, with the results of the reliability test *of Cronbach's Alpha* α = 0.950 and the validity test r = 0.492 – 1, where the instrument is proven to be valid and reliable[8]. This study also uses a tool in the form of a stopwatch, which is used to calculate the length of exercise time.

Data Analysis

Data analysis was carried out using the SPSS (*Statistical Product and Service Solution*) program version 26 *for Windows*. The data obtained will first be analysed univariately to determine the frequency distribution, characteristics and percentage of each respondent. Then conduct a two-variable or bivariate analysis. The data processed in this study is ordinal data, so the test carried out is a non-parametric *Wilcoxon Rank Sum test*. The tests carried out are non-parametric statistical tests, so uniform and normally distributed research data are not required. The *Wilcoxon Rank Sum Test* was conducted to answer the question "Does *low-impact exercise* affect stress levels in the elderly at the Tresna Werdha ABDI Binjai Nursing Home?". The data that is compared, namely, data before and after the intervention, is data in pairs.

RESULT

Distribution of Sample Characteristics

Based on Table 1 of the demographic characteristics of the respondents from the total 33 samples, the number of samples based on male sex was 11 people (33.3%), and women 22 people (66.7%). The age of the respondents aged 60-65 years amounted to 12 people (36.4%).

Table 1. Distribution of Sample Characteristics by Demographic

Demographic Characteristics	Quantity (n)	Percentage (%)
Gender		
Man	11	33.3%
Woman	22	66.7%

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Age		
60-65 Y.o	12	36.4%
66-70 Y.o	9	27.3%
71-75 Y.o	9	27.3%
76-80 Y.o	3	9.1%

Distribution of Sample Stress Level Characteristics

Based on Table 2, the results of the stress level measurement showed that at the time *of pre-test,* a sample of 13 people (39.4%) experienced mild stress, and 18 people (54.5%) experienced moderate stress. After receiving an intervention in the form of leisure walking exercise for 8 weeks, the *post-test* results showed that 84.8% of the sample experienced a change in stress level from moderate to mild, and the remaining 15.2% also experienced a change in stress level from severe to moderate. From the table, it can be concluded that the sample that initially experienced severe stress decreased after exercise became light stress, as well as those who experienced moderate stress during *the pre-test;* there was a decrease in stress levels during *the post-test* to be mild after the intervention.

Table 2. Stress Level Measurement Results

Stress Level	Pre-Test		Post-Test	
	n	%	n	%
Mild Stress	13	39.4%	28	84.8%
Moderate Stress	18	54.5%	5	15.2%
Heavy Stress	2	6.1%	0	0%

Differences in Stress Levels Before and After Intervention

Based on Table 3, the test results from 33 samples after the intervention showed an improvement in stress levels from severe to moderate stress and from moderate to mild stress. At the *pre-test*, there were 2 people (6.1%) who experienced severe stress, and then at the *post-test,* no samples were found who experienced severe stress. The moderate stress experienced by the sample during *the pre-test* was 18 people (54.5%), at the time *of the post-test,* it was reduced to only 5 people (15.2%), while in mild stress the *pre-test* results showed as many as 13 people (39.4%) and increased during *the post-test* with a sample of 28 people (84.8%). Based on the output of "*Test Statistics*", it is known *that Asymp.Sig. (2-tailed)* Worth 0.000. The value of 0.000 is smaller than <0.05, so it can be concluded that there is a significant difference between the results *of the pre-test* and *the post-test* after sports intervention is carried out, so that there is an effect of *low-impact exercise* on the stress level of the elderly at the Tresna Werdha ABDI Binjai Nursing Home.

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Table 3. Wilcoxon Sum Rank Test Results

		Stress Level				
		Pre-Test		Post-Test		P Value
		n	%	n	%	
Stress Level	Mild	13	39.4%	28	84.8%	P=0.000
	Moderate	18	54.5%	5	15.2%	
	Savere	2	6.1%	0	0%	

DISCUSSION

The criteria for the elderly, according to *the World Health Organisation* (WHO) and Law Number 13 of 1998, chapter 1, article 1, paragraph 2, state that the elderly are people over 60 years old. WHO divides the age of the elderly into 3 categories, namely, *elderly* aged 60-74 years, *aged* 75-90 years, and *very old* over 90 years old.[9,10]

A fairly high level of stress at the time before the intervention of leisure walking sports occurs due to several supporting factors, such as the elderly who experience a decline in cognitive or psychomotor function due to changes in the ageing process, causing a sense of despair because of their unpreparedness to face it. Another stressful factor that occurs in the elderly in the orphanage is problems with roommates, either due to cultural differences or emotions with each other. Apart from unsuitable roommates, some of them also experience stress because they remember their family who has never visited, or there is a family member who is sick.[11]

Another reason for stress in the elderly who are in nursing homes is a change in activities. Activities that are different from before they entered the orphanage make this one of the stressors because some of the elderly do these activities because of coercion. In addition to different activities, another reason that most often occurs is the death of a partner, which makes their enthusiasm for life decrease and causes a sense of loneliness. The loneliness they experience for a long time eventually leads them to give rise to feelings of hopelessness.[12]

In Table 2, the results of the stress level measurement showed that the final results *of the post-test* almost all samples experienced a decrease in stress levels to moderate and mild. Meanwhile, there were no more samples that experienced severe stress levels after sports interventions. This is in line with Wujtowicz I.'s research, which states that there are two important things that will happen when a person does exercise, namely, improving psychological health and reducing psychological stress. Improving psychological health includes nine sub-themes, namely increased self-confidence, increased energy, sense of accomplishment, alone time, greater productivity, improved memory and thinking skills, life satisfaction, improved ability and quality of sleep. Meanwhile, psychological stress reduction has three subtopics, namely stress reduction, anxiety and depression reduction, and fear of pain reduction. Factors that can reduce stress levels during exercise include that the sample states that exercise helps them reduce stress and improve their quality of life. Most of the sample answered that the

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exercise helped them reduce stress because it made them forget about their worries. Exercise can also help individuals reduce stress because they can find solutions to their problems while exercising.[13]

In Table 3, the results of the intervention test were found in *Asymp.Sig. (2-tailed)* is worth 0.000, which is smaller than <0.05, which is of significant value. Thus, it can be concluded that *low-impact exercise* has an influence on the stress level of the elderly at the Tresna Werdha ABDI Binjai Nursing Home. The results obtained from the test are in line with the findings of the research which wrote that the results of the research conducted by Ristau. An overall showing exercise can cause many physiological changes that help improve mood, self-esteem, and reduce stress and anxiety levels. In addition, research continues to show that regular exercise can significantly improve mental health and reduce symptoms of depression, anxiety, and stress.[14,15] In addition to reducing stress levels, other benefits brought by low-*impact exercise* are improving cognitive function, improving quality of life, lowering depression levels, maintaining good mood, and improving sleep quality [16]

A person over the age of 60 will experience physical, cognitive, and socioeconomic changes that can affect their stress levels. Physical decline in the elderly leads to reduced physical activity, fatigue easily and can increase stress. Exercise can improve blood circulation throughout the body, which in turn increases the amount of oxygen and nutrients needed for metabolism. Low-intensity aerobic exercise has shown results in maintaining brain blood flow, improving brain nutrition, smoothing neurotransmitter metabolism, and maintaining brain plasticity. The exercise movement will cause muscle contraction through the muscle spindle pathway. Muscle contractions increase energy consumption. The need for oxygen in active tissues will cause blood vessels to dilate and increase venous blood backflow. During exercise, glucagon secretion increases, muscle activity increases, catecholamines are out from the adrenal medulla, and the hormones epinephrine and norepinephrine play a role in increasing glycogenolysis. This process can have the effect of reducing a person's feelings of anxiety. Exercise activities such as aerobics increase dopamine and serotonin levels, providing feelings of happiness and joy, which in turn can have a stress-reducing effect[17].

In addition, leisurely walking exercise, which is a recreational activity that is aerobic in nature and when done for at least 30 minutes, has the potential to improve fitness. A leisurely walk reduces stress and anxiety by releasing endorphins (happy hormones) into the bloodstream. The effects of this leisurely walk mainly have an impact on health directly, namely controlling blood sugar, increasing adrenaline and serotonin, and lowering blood sugar levels[18].

The life of the elderly, especially those in nursing homes, is a very vulnerable situation to experiencing stress. Circumstances such as being away from family, feeling left out, not getting along with roommates, doing activities due to coercion, and others can be some of the factors that cause stress. Not only external factors, but the occurrence of stress is also

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supported by internal factors such as a body that is no longer fit, loneliness, lack of confidence, despair, and others increase stress in the elderly who are in nursing homes. The findings of this study are interrelated and consistent with previous research that stated that there is an effect of *low-impact exercise* on the level of stress of the elderly; thus, *low-impact exercise* in the form of a leisurely walk can be used as an alternative option in managing stress for all elderly or the community. In addition, this study not only explains the effect of *low-impact exercise*, but also proves the type of exercise, the time or duration needed for exercise, and the frequency that has been explained in the research method.

CONCLUSION

All samples, totalling 33 people, experienced a decrease in stress levels, from severe stress down to moderate stress and mild stress after low-*impact exercise intervention* in the form of leisurely walking, which means *low-impact exercise* with the leisurely walk method affects reducing the level of stress in the elderly. This statement is proven through the *Wilcoxon Rank Sum Test* with the results of *the Asymp.Sig. (2-tailed)* by 0.000, which means that <0.05 is a significant value.

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