

ERGONOMIC EXERCISE AGAINST ELDERLY FUNCTIONAL CAPABILITIES

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ABSTRACT

This study aims to analyze the effect of ergonomic exercise on increasing the functional ability of the elderly in posyandu who have decreased ability to help. The design of this study used a quasi-experimental method with pre-test and post-test techniques without a comparison (control) group. The results showed that there was an increase in the value of functional ability with $p\text{-value} = 0.000 < 0.05$. In conclusion, ergonomic exercise therapy has an effect on increasing helping capacity in the elderly.

Keywords: Elderly, Functional Ability, Ergonomic Gymnastics

INTRODUCTION

The World Health Organization emphasizes the need for community-centered health services, especially for people with chronic or complex health conditions who require care and support (World Health Organization, 2018). Older people with different health conditions often experience disease-related complications and functional disorders, requiring health care at various care and social services. It has been shown that the trajectory of such care can be complicated when multiple health and social workers are involved (Kumlin et al., 2020).

By 2030, 1 in 6 people in the world will be 60 years or older. At this time, the share of the population aged 60 years and over will increase from 1 billion in 2020 to 1.4 billion. By 2050, the world population old 60 years and above will double (2.1 billion). The number of people aged 80 and over is expected to triple between 2020 and 2050 to reach 426 million (World Health Organization, 2021). Indonesia experienced an increase in the number of older people from 18 million people (7.56%) in 2010 to 25.9 million people (9.7%) in 2019 and is expected to continue to increase wherein 2035 to 48.2 million people (15.77%) (Andri et al., 2019; Kementerian Kesehatan RI, 2018).

The World Health Organization (WHO) has defined healthy aging as a process of maintaining functional ability to enable wellbeing in older age (Rudnicka et al., 2020). Aging is the progressive loss of function of tissues and organs over time. The free radical theory of aging later referred to as the oxidative stress theory of aging, is based on the structural damage-based hypothesis that age-related functional loss is caused by the accumulation of oxidative damage to macromolecules (lipids, DNA), and protein by RONS (Ferrucci et al., 2020).

Elderly is a period in which a person experiences various functional declines, both physical, physiological, psychological, and social (Sukadari et al., 2020). Physical changes in the elderly vary widely and occur in various systems, especially the musculoskeletal system. A decrease in the musculoskeletal system is characterized by pain in the joint area. The body has neuromodulators that can inhibit the transmission of

pain impulses, one of which is beta-endorphins. Endorphins play a role in reducing pain sensation by blocking releasing substance p from sensory neurons. The message of pain impulses in the spinal cord is inhibited, and pain sensation is diminished. High levels of beta-endorphins also have a direct psychological impact, namely helping to relax, reduce tension, increase feelings of pleasure, make a person feel more comfortable, and facilitate oxygen delivery to the muscles (Malo et al., 2019)

Several therapies that can be done to reduce joint pain in the elderly include pharmacotherapy, non-pharmacological, and psychological support. Non-pharmacological therapy, such as physical sports activities or gymnastics, is the best alternative to treat joint pain in the elderly (Gandari et al., 2019). Ergonomic exercise is one of the exercises that is recommended for the elderly

According to Wratsongko, movements that optimize body position aim to eliminate or minimize fatigue. Ergonomic gymnastics is a technique to control or correct the function and flexibility of the nervous system in blood flow, maximize oxygen supply to the brain, can open the intelligence system, sweat system, body heating system, uric acid burning system, cholesterol, blood sugar, lactic acid, digestive system. conversion of carbohydrates and negative energy disposal system in the body (Oktaviani, 2018).

Based on the initial survey results that the researchers conducted on several active Posyandu and the highest number of elderly who participated in the Posyandu were in the Elderly Posyandu. The results of short interviews that researchers led from 10 older people, 7 of whom experienced decreased functional ability. This study aimed to analyze the effect of ergonomic exercise on increasing helpful capacity in the elderly at the posyandu for the elderly who had been reduced functional abilities.

RESEARCH METHOD

This study is a quantitative study with a quasi-experimental design with a pretest and posttest design without a control group, namely an investigation without a control group. The effectiveness of the treatment was assessed by comparing the posttest scores with the pretest scores. The population in this study were all the elderly who attended the elderly posyandu, namely 25 people. Sampling in this study was done by purposive sampling. The sample in this study was 15 people. The data analysis used in this study was a univariate analysis to determine the characteristics of the elderly (age) functional ability before being given an ergonomic exercise intervention and after being given an ergonomic exercise intervention. The bivariate analysis used a statistical test paired t-test.

RESULTS

Univariate Analysis

Table. 1
Identity of Respondents by Age Group (n=15)

Age	Frequency	Percentage
60-65 Year	12 Respondent	80,0%
66-70 Year	3 Respondent	20,0%
>70 Year	0 Respondent	0 ,0%
Total	15 Respondent	100,0 %

Based on table 1 shows that there are 12 respondents (80.0%) aged between 60-65 years and 3 respondents (20.0%) aged between 66-70 years.

Table. 2
Frequency Distribution of Pre-Test Results
of Functional Ability Scores on Respondents

Pre Test	Frequency	Percentage
10	1	6,7 %
11	6	40,0 %
12	8	53,3 %
Total	15	100,0 %

Based on table 2, it can be seen that the results of the pre-test of the functional ability of the elderly using the modified Katz Index Questionnaire, namely the value of functional ability 10 as many as 1 person (6.7%), the value of functional ability 11 as many as 6 people (40%) and the value of functional ability functional 12 as many as 8 people (53.3%).

Table. 3
Frequency Distribution of Post-Test Results
of Functional Ability Scores on Respondents

Post Test	Frequency	Percentage
12	1	6,7 %
13	7	46,7%
14	5	33,3 %
15	2	13,3%
Total	15	100,0 %

Based on table 3, it can be seen that the post-test results of the functional ability of the elderly using the modified Katz Index Questionnaire, namely the value of helpful ability 12 as many as one people (6.7%), the value of functional ability 13 as many as seven people (46.7%), the value of helpful ability 14 as many as two people (33.3%) and the value of functional ability 15 as many as two people (13.3%).

Table. 4
Differences in the Value of Functional Ability Pre-Test and Post-Test Results on Respondents
After Ergonomic Gymnastics Intervention

Variable	Min-Max	SD	P value
Functional Ability Value before intervention	10-12	0,640	0,000
Functional Ability Score after intervention	12-15	0,834	

Based on table 4, it can be seen that 15 respondents before being given the ergonomic exercise intervention experienced a decrease in functional ability <13, but after being given the intervention, they experienced an increase in the value of helpful knowledge.

Bivariate Analysis

Table. 5
Distribution of Average Functional Ability of Respondents Based on Pre-Test and Post-Test
Results of Ergonomic Gymnastics Intervention

Variable	Mean	SD	SE	P Value	N
Ability Value Enhancement Functional				0,000	15
Respondent Pre-Test	11,47	0,640	0,165		
Respondent Post-Test	13,53	0,834	0,215		

Based on table five, respondents' average functional ability value before the intervention was 11.47, with a standard deviation of 0.640. After being given the intervention, the average helpful ability of respondents was 13.53, with a standard deviation of 0.834. The results of the statistical test of the t-test showed that the P-value = 0.000 ($P < \alpha = 0.05$), it can be concluded that there was a significant effect between before being given intervention and after being given an ergonomic exercise intervention on the value of functional ability in the elderly at the posyandu for the elderly.

DISCUSSION

Description of the Frequency Distribution of Respondents Characteristics by Age Group

The age of the elderly is grouped into three categories, namely 60-65 years, 66-70 years, and >70 years. The results showed that 12 respondents (80%) were aged between 60-65 years, three respondents (20%) aged between 66-70 years, and no respondents aged more than 70 years. The score for increasing functional ability was more significant in the 60-65 year age category because there were three respondents, an increase of 3 scores more effective than the previous score, while in the 66-70 year age category, there was only an increase of 2 scores from the previous

Description of the Frequency Distribution of Respondents' Functional Ability Scores Pre Test Results

Results Based on the univariate pre-test analysis, the results obtained from 15 respondents with a functional ability score of 10 there was one person (6.7%), a helpful ability score of 11 was six people (40%), and a functional ability value of 12 was eight people (53.3%).

This indicates that the functional ability of the elderly will experience disturbances along with increasing age. This is because the increase in a person's age affects the function of the body's organs. After reaching the peak of maturity in adulthood, the body's organs decrease. It decreased the ability to carry out activities and workability to decline. The decrease is due to the gradual shrinkage of body tissue, including muscle tissue, the nervous system, and other vital organs. The elderly who, because of their age, will experience biological, physical, and psychological changes (Sitanggang et al., 2021).

Description of the Frequency Distribution of Respondents' Functional Ability Values Post Test Results

Based on the post-test results, it can be seen that the post-test results of the functional ability of the elderly using the modified Katz Index Questionnaire, namely the value of helpful ability 12 as many as one people (6.7%), the value of functional ability 13 as many as seven people (46.7%), the value of helpful ability 14 as much as five people (33.3%) and the value of functional ability 15 as many as two people (13.3%).

Giving ergonomic exercise to the elderly who have decreased functional ability is carried out for 20 minutes 8 times two times a week. The results showed that all respondents experienced increased available capacity even though some of the elderly only experienced an increase of 1 score from the previous score. This is supported by Siagian et al., (2020) elderly who experience joint pain disorders should do active cross-range of motion exercises so that there is no decrease in range of motion in the elderly or no decrease in muscle strength.

Description of the Differences in Respondents' Functional Ability Values Before and After Ergonomic Gymnastics Intervention

Before being given an ergonomic exercise intervention for the elderly, the researchers assessed functional ability using a modified Katz Index questionnaire. The Katz Index questionnaire includes six helpful knowledge components: eating, continental (BAB and BAK), moving, going to the toilet, bathing, and dressing. Each question has a score of 0 to 1. The lowest Katz Index score is 0, and the highest Katz Index score is 17.

The assessment of the functional ability of the elderly is different between each respondent. According to research results, most elderly complain of pain in the joints and muscles, so it is difficult to carry out daily activities. This is by what was stated by Mas'adah (2017) the decrease in musculoskeletal ability, accordingly, can reduce the Range Of Motion (ROM) to affect the elderly in performing daily functions.

Giving ergonomic exercise to the elderly who have decreased functional ability is carried out for 20 minutes 8 times and done twice a week. The results showed that all respondents experienced an increase in the value of helpful power even though some elderly only experienced a rise of 1 score from the previous score. It is supported Siagian et al., (2020) exercise is very beneficial for improving blood circulation, losing weight, and producing synovial fluid to reduce joint pain in the elderly.

Ergonomic gymnastics can restore the position and flexibility of the nervous system and blood flow. It maximizes oxygen supply to the brain, maintaining the body's freshness system and the negative energy removal system from the body. In addition, it can also increase muscle strength the effectiveness of heart function, prevent hardening of the arteries, and launch the respiratory system. All ages can do this exercise, this exercise also consists of prayer movements, so it is easy for the elderly to apply this gymnastic movement (Oktaviani, 2018).

The Effect of Ergonomic Gymnastics Intervention on Improving Functional Ability in the Elderly

Based on the results of bivariate analysis of the effect of giving ergonomic exercise on functional ability in the elderly, it is known that the results of statistical tests using the T-test using SPSS 16 obtained a significant value, namely with P-value =

$0.000 < 0.05$, which means H_0 is rejected so it can be concluded that there is a significant effect between giving ergonomic exercise to increasing functional ability in the elderly at the Posyandu for the elderly.

Various treatment options are available for chronic pain management in the elderly, including pharmacological or non-pharmacological measures combined. A comprehensive approach to common sequelae such as depression, isolation, and physical disability is considered adequate. Non-pharmacological measures are considered particularly important in elderly patients. They have a lower frequency of adverse reactions than pharmacologic approaches, and their benefit is usually enhanced when combined with drug strategies. Practical non-pharmacological methods include physical therapy, cognitive behavioral therapy, and most importantly, patient and caregiver education intervention, while pharmacological treatment modalities include non-opioid and opioid medications, pain modulating drugs, topical agents, and other newer therapies (Ali et al., 2018).

Ergonomic gymnastics itself is a gymnastic technique to restore or correct the position and flexibility of the nervous system and blood flow. Ergonomic exercise is also helpful in maximizing the oxygen supply to the brain, opening the intelligence system, sweat system, body heating system, combustion system (uric acid, cholesterol, blood sugar, lactic acid, oxalate crystals), rheumatic pain. The movements in ergonomic gymnastics are very effective, efficient, and logistical because the series of exercises are a series of prayer movements that humans have carried out from the past until now (Gandari et al., 2019).

Movements can trigger endorphin release and inhibit trigger cell activity. The gate of gelatine being closed and the impulses to the reduced musculoskeletal disorders will be transmitted to the brain. This condition madder the respondents reach a state of calm. The shape of calm/relax is being suggested because the ergonomic exercise can provide subtle massages to various glands in the body, reduce cortisol and blood production, and restore sufficient hormone expenditure that will provide emotional balance and peace of mind (Lestari et al., 2021).

According to Dewi et al., (2019) ergonomic exercise needs to be done routinely and regularly because when the heart muscle pumps harder and continuously, the arteries will reduce more pressure. Exercise ergonomics can increase heart rate, breathing, blood pumping, and body metabolism. This leads to the fulfillment of the oxygen needs because the heart will increase the blood flow to the body.

CONCLUSION

From the results of this study, it can be concluded that there are differences in the value of functional ability in the elderly before and after being given Ergonomic Gymnastics intervention. There is an effect of ergonomic exercise activity therapy on increasing the helpful capacity of the elderly.

SUGGESTIONS

For Service and Society

The community can apply the results of this study to intervene in decreased functional abilities and improve health status.

For Nursing Education

This research can be published widely so that it can be used as a reference source to add studies on non-pharmacological therapy to improve functional abilities and improve health status. And further research can be done on ergonomic exercise on other variables

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