

Comparison of the Effectiveness of Elderly Exercise with *Static Cycle Exercise* on the Depression Level Profile of Elderly Individuals

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Submission Date: 29 July 2023 ; Receipt date: 1 November 2023

ABSTRACT

Depression is a mental disorder that usually manifests as depressed mood, loss of interest or pleasure, feelings of guilt, difficulty sleeping or lack of appetite and concentration. This type of research is quasi-experimental with a group pretest and posttest design. With a total population of 38 respondents and a total sample of 20 respondents. By using The Geriatric Depression Scale (GDS) as a research instrument. The results of examining the data used the GDS questionnaire which was then processed using the Graphpad prism program. The results showed that there was a significant effect by giving elderly exercise 3 times a week for 5 weeks, and there was an insignificant effect by giving *static cycle exercise* 3 times a week for 5 weeks. In the elderly exercise group, the GDS score showed a significant decrease, whereas in the *static cycle exercise* treatment group, the GDS score showed a slight decrease, which means not too significant. The conclusions from this study are that there is a significant effect of giving elderly gymnastics on the depression level profile of elderly individuals, there is an insignificant effect by giving *static cycle exercise* to the depression level profile of elderly individuals in Mranti Village, Purworejo Regency, and elderly gymnastics is more effective than *static cycle exercise*. The suggestion that can be given is that physiotherapists are more active in providing exercise programs so that elderly people are always active.

Keywords: *Effectiveness, Aerobic Gymnastics, Static cycle exercise, Elderly*

ISSN 2722 – 9610
 E –ISSN 2722 - 9629

INTRODUCTION

Increasing age will result in physical, mental and social decline, aging reflects physiological changes that occur throughout the life span (Singh, 2014). The *World Health Organization (2013)* also states that old age, including middle age, is also called *middle age*, which is grouped from 45 to 59 years, then old age, also called *elderly*, is age ranging from 60 to 74 years, there is an age that is classified as old, called with *old* being the range from 75 to 90 years of age and very old, called *very old*, being age more than 90 years and above.

Depression in the elderly is a mental disorder that often occurs with depressed mood, loss of interest, feelings of guilt, disturbed sleep patterns or decreased appetite for food, and results in unstable concentration so quite a few elderly

people experience depression (Dao *et al.*, 2020). Biological theory states that depression occurs due to a decrease in the hormones serotonin and epinephrine which have the role of neurotransmitters, which are the messengers of signals between nerve networks responsible for influencing mood, so low levels of serotonin and epinephrine have the risk of having an impact on psychological disorders (Rochmawati, 2013). Depression factors are associated with support in social activities and an important role in physical activities such as doing things one enjoys including hobbies, recreation, and spiritual activities which can affect mental health (Francis, 2014). In the World Health Organization (WHO) in 2010, the overall prevalence of depressive disorders in the elderly throughout the world was in the range of 10% to 20%, estimated at 7 million, out of 39 million. 3 Report on the results

of research from Basic Health in 2013, stated that the prevalence of elderly people aged over 75 years was 33.7% experiencing depression, 65-74 years old was 23.2% and elderly people aged 55-64 years were 15.9%.

Aerobic exercise has quite a high influence on the health of the brain system, aerobic exercise can improve memory and memory skills and improve the performance of several functions of the body's organs. The majority of seniors do low-impact aerobic exercise to look younger. When doing aerobic exercise, the body warms up and the heart rate increases and this can cause blood to flow more quickly to the muscles and then back to the lungs. (Wang *et al.*, 2022)

Elderly people who do aerobic exercise, for example, cycling, swimming, elderly gymnastics, walking, and yoga regularly can increase serotonergic and noradrenergic levels in the brain, similar to the effect of anti-depressants which can reduce anxiety sensitivity and influence mood improvement, which it can improve quality of life. sleep (Shivakumar, 2013). Depressive disorders in the elderly are characterized by the presence of typical symptoms in the form of sadness or anhedonia which are persistent and are followed by somatic, cognitive and symptomatic disorders in the form of decreased appetite, sleep disturbances, feelings of lack of calm, lack of energy, decreased concentration, feelings of guilt and thoughts of suicide (Kurdi & Flora, 2019).

Depression in the elderly often occurs along with chronic physical problems they experience, for example, diabetes, heart disease, high blood pressure, chronic liver disease which is difficult to cure, as well as long-term use of certain medications, such as steroids from several blood medications. high and heart disease, sleeping pills and anti-rheumatic drugs which can make depression worse (Supriadi, 2015). In the elderly, depression is a complex syndrome whose manifestations are varied, the most frequent being complaints (insomnia), taking care of oneself accompanied by a decline in psychological condition, including sadness, crying, anxiety, sensitivity and paranoia (Pratiwi. *et al.*, 2019). Research studies regarding the biosocial role of the family in depression in the elderly show that family involvement such as support and family relationships, plays an important role in the cause, treatment, prognosis and moderation of risk

factors related to depression, this can be seen when unhealthy family relationships can cause depression. the existence of good relationships in the family, low family support, less cohesion, less emotional involvement, and more family conflict can influence and trigger depressive mental disorders, this is what family and social involvement must involve as an important component in caring for the elderly with depressive symptoms (Uche *et al.*, 2018). Chronic diseases such as diabetes mellitus, coronary heart disease, osteoporosis and cerebrovascular disease are the diseases that most often occur in the elderly, these disorders cause medical, social and psychological problems and can reduce the physical function and quality of the elderly in society (Leeuwen *et al.*, 2019).

The impact of depression on the elderly is based on the psychological aspect, namely a prolonged negative mood which allows the elderly to tend to stay at home, or not take part in social activities, of course, this will have an impact on the quality of life which includes physical, psychological and social, then the social aspect is related to relationships. individuals and people around them tend not to interact with each other, and the spiritual aspect, namely the meaning of life's goals, will have an impact on mental peace and dealing with every problem (Machdy, 2019).

The general aim of this research is to determine the comparative effectiveness of providing elderly exercise with *static cycle exercise* on the profile of depression levels of elderly individuals in Mranti Village, Purworejo Regency. The specific objectives of this research are to determine the influence of providing elderly exercise on the profile of depression levels in elderly individuals, the effect of providing *static cycle exercise* on the profile of depression levels in elderly individuals and to analyze the comparative effectiveness between providing elderly exercise with *static cycle exercise* on the level profile. depression in elderly individuals. It is hoped that this research will serve as an input and reference for the development of science so that it will increase attention to the comparison of the effectiveness of providing exercise for the elderly and *static cycle exercise* with the profile of depression levels in the elderly and can provide input and reference in the development of

knowledge to the public regarding the preparation of an exercise program for the elderly and *static cycle exercise* is related to the profile of depression levels in the elderly.

RESEARCH METHODS

This type of research is *quasi-experimental* with a *two-group pretest and posttest design*. Treatment group I is elderly exercise, and treatment group II is *static cycle exercise*. The research was conducted for 5 weeks in Mranti Village, Purworejo Regency. The elderly exercise group is in the yard of Mranti Village, while the *static cycle exercise* is at the respondent's house. The tools and materials needed for the research consist of a GDS form, stationary bicycle, stopwatch, stationery, portable speaker, and *informed consent*.

The population used was 38 elderly people in Mranti Village. The sampling technique was *purposive sampling* with criteria of age 60-74 years, no congenital disease, health, ability to communicate well, and willingness to be respondents. Exclusion criteria were experiencing cognitive impairment, using mobility aids, respondents who were sick and undergoing treatment, and unwilling respondents. The total sample obtained based on the inclusion criteria was 20 elderly people. The research stages include the selection phase, providing information to subjects, sample selection, filling out consent, implementation and data analysis. The data analysis technique for GDS examination results uses a *graphpad prism*. The code of ethics used is *informed consent, confidentiality, anonymity and balancing and benefits*. In analyzing the data using statistical tests, namely the normality test using the *Shapiro Wilk Test* and hypothesis testing using the *Paired T-test*.

RESULTS AND DISCUSSION

Research result

Table 1. Mean *Geriatric Depression Scale (GDS)* Score in 2 Treatment Groups

Sample	Group 1		Group 2	
	Pre-test	Post-test	Pre-test	Post-test
Mean ± SD	7,3 ± 1,337	2,3 ± 1,159	6,5±1,354	5,7± 1,337
Difference	5		0,8	

From the data in Table 1, data obtained from measuring depression reduction values using the *Geriatric Depression Scale (GDS)*, in treatment group 1 the mean value was 7.3 ± 1.337 before the intervention, and in group 2 the mean value was 6.5 ± 1.354 . before intervention is carried out. After the intervention in group 1, the mean value was 2.3 ± 1.159 , and in group 2 the mean value was 5.7 ± 1.337 .

Table 2. Data Normality Test for Each Treatment Group with the Shapiro Wilk Test

Group	P Value		Data Distribution
	Pre-test	Post-test	
Treatment I Exercise for the Elderly	0,4664	0,1240	Normal
Treatment II Static Cycle Exercise	0,2769	0,4664	Normal

Based on the results of the data normality test using the GraphPad Prism 9 computerized system, the results were $p > 0.05$, which means the data is normally distributed so that it can be continued with the next analysis test.

Table 3. Effect of Elderly Exercise and *Static Cycle Exercise* on the Depression Level Profile of Elderly Individuals in Mranti Village, Purworejo Regency

Treatment Group	Paired T-test		P Value
	Treatment I Exercise for the Elderly	Treatment II Static Cycle Exercise	
Mean	-5,000	-0,8000	<0,0001
SD	1,491	0,4216	<0,0002

Data are displayed in the form of mean and SD then hypothesis testing is carried out using a paired T-test with $p < 0.05$. The results of the analysis of the two treatment groups were used to see the influence of elderly exercise and *static cycle exercise* on the depression level profile of elderly individuals in Mranti Village, Purworejo Regency.

Based on analysis using paired T-tests, different results were obtained between the two treatments. The results of this study in both

groups were equally significant, with both p-values approaching 0.00. In treatment group I, the elderly exercise showed a significant effect with a p-value <0.0001, while in treatment group II *static cycle exercise* showed a not very significant effect with a p-value <0.0002.

Discussion

Based on the results of this study, it was found that there was a significant effect by giving the elderly exercise 3 times a week for 5 weeks, and there was a less significant effect by giving *static cycle exercise* 3 times a week for 5 weeks. In the elderly exercise treatment group, the *Geriatric Depression Scale (GDS)* score showed a significant decrease, while in the *static cycle exercise* treatment group, the *Geriatric Depression Scale (GDS)* score showed a slight decrease, which means it was not very significant.

The research results show that *aerobic exercise*, such as elderly exercise and *static cycle exercise*, has been proven to reduce the level of depression in the elderly. Because with exercise and *static cycle exercise*, there will be a release of endorphin compounds. Endorphin is an endogenous opioid polypeptide compound that produces analgesia and a feeling of well-being, which is produced by the pituitary gland and hypothalamus during exercise. Endorphin release is associated with a positive mood and an overall increased sense of freedom (Dinas *et al.*, 2015). Recent studies also show that *aerobic exercise* will stimulate the growth of new nerve cells and release proteins, such as (*Brain-Derived Neurotrophic Factor / BDNF*), which is derived from the brain, to increase the survival of nerve cells and inhibit the formation of the hormone cortisol or stress hormone. In previous research, it was also stated that *aerobic exercise* intervention for 8 weeks, with a frequency of 3-5 times a week, was considered significant in increasing amygdala serotonin and norepinephrine in the hippocampus in the brain in depression sufferers, compared to those given a low frequency once a week (Wang *et al.*, 2022). However, the type of *aerobic exercise* and how to do it also have a different effect on reducing depression. In this research, it was proven that improvements from the molecular side alone are not influential

enough if they are not balanced with psychosocial aspects.

Based on the results of data analysis, elderly exercise is considered more effective in reducing the profile of depression levels in elderly individuals because elderly exercise is done together outside the home, resulting in social interaction between elderly individuals which can make them feel more enthusiastic, motivate each other, and make the mood more positive. Apart from that, aerobic exercise combined with dance and music will have a relaxing effect on the body and create feelings of happiness, which will have an impact on preventing stress, anxiety, nervousness or depression (Young *et al.*, 2013)

Meanwhile, *static cycle exercise* is considered less effective in reducing the depression level profile of elderly individuals because *static cycle exercise* is carried out in their respective homes so there is no social interaction between elderly individuals. This is by psychological theory which states that social interaction can increase self-confidence, enthusiasm and satisfaction with life. Based on this theory, supports that the static cycle is less effective because it cannot divert attention from worries and depressing thoughts so in terms of psychology, there will be less enthusiasm, no self-esteem, no sense of satisfaction with life and self-confidence in physical abilities (Perna, 2014).

CONCLUSION

Based on research conducted on the comparison of the effectiveness of elderly exercise with *static cycle exercise* on the depression level profile of elderly individuals in Mranti Village, Purworejo Regency, it can be concluded that there is a significant influence by providing elderly exercise and *static cycle exercise* on the depression level profile of elderly individuals. However, elderly exercise has a higher level of influence compared to *static cycle exercise*.

THANK-YOU NOTE

Thank you to God Almighty for making this research run smoothly, as well as the lecturers who always guided me in preparing this research

and friends and family who always provided support for this research.

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