



The Effect of Motor Relearning Program (MRP) on the Activity of Daily Living (ADL) Levels in Post-Stroke Patients

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Background: Stroke is a physical disease that occurs spontaneously caused by sudden disruption of blood flow in the brain area. As well as showing symptoms of paralysis on one side of the body, weakness with varying degrees from weak to severe, accompanied by loss of sensation, failure of the coordination system, changes in walking patterns, and balance disorders, the Motor Relearning Program (MRP) is beneficial for the recovery of the patient's motor function and is more effective because it can encourage the development of cognition, association and autonomic nerves and improve standing balance in post-stroke patients. **Research objective:** to determine the effect of the motor relearning program on increasing activity of daily living in post-stroke patients. **Research Method:** The research uses a quasi-experimental design with a pre-test and post-test one group design type of research. There were 35 samples of research respondents who met the inclusion criteria by administering the research intervention, namely a frequency of 2 times a week for 4 weeks with an action time of 15 minutes. The instrument in this research uses the Barthel index to measure activity of daily living (ADL), carried out before and after the Motor Relearning Program (MRP). **Results:** The results of this study using the Wilcoxon test before and after treatment obtained a p value of 0.000, meaning a p value of 0.05, which means H_a was accepted. **Conclusion:** there is an influence of the motor relearning program on increasing activities of daily living in post-stroke patients.

Keywords: Motor Relearning Program (MRP), Activity of Daily Living (ADL), Barthel Index

INTRODUCTION

According to the latest definition from the American Heart Association (AHA), stroke is a condition in which there is acute dysfunction of the brain, retina, or spinal cord that lasts more than 24 hours, or for any duration if diagnostic imaging such as Tomography/CT scan or imaging Medical Magnetic Resonance/MRI, or autopsy, shows focal infarction or hemorrhage associated with the symptoms. Strokes can occur suddenly and require immediate treatment, therefore it is known as "Time is Brain" (Pulvers & Watson, 2017).

Stroke can be classified into two types based on the cause, namely ischemic or non-hemorrhagic stroke, and hemorrhagic stroke. Ischemic stroke occurs when blood vessels in the brain are blocked by plaque, a substance consisting of protein, calcium and fat, thereby blocking the flow of oxygen through the arteries. Meanwhile, hemorrhagic stroke is caused by bleeding in the brain due to rupture of blood vessels in the brain (Phallus, 2013).

There are around 33 million post-stroke patients globally, which is the third largest cause of disability requiring physical management and rehabilitation in the world, with 20.5 million of them having a stroke prevalence (Lennon S, 2018). The number of patients after experiencing a stroke in Indonesia has increased from 10.9 per 1,000 population in 2013 to 14.7 per 1,000 population in 2018, with a stroke





prevalence rate of 10.9 per 1,000 people. This figure was highest recorded in East Kalimantan (14.7 per 1,000 people) and lowest in Papua Province (4.1 per 1,000 people) (Ghani et al, 2016).

Nearly 80% of patients after experiencing a stroke will experience neuromotor deficits and show symptoms of paralysis on one side of the body. They may also experience varying degrees of weakness, ranging from mild to severe, accompanied by loss of sensation, impaired coordination, changes in walking patterns, and balance problems. After an attack, they must relearn how to use new somatosensory connections or carry out their functional tasks for a long period of time. Motor Relearning Program (MRP) is a rehabilitation program that is usually used to restore function caused by motor deficits (Pramita and Zuhri, 2017).

A person's independence in daily activities is very important because a person feels useful if he is able to carry out daily activities independently without depending on other people. On the other hand, stroke patients cannot carry out daily activities due to limited mobility and require the help of others, patients may feel useless and dissatisfied with their lives (Putri & Hamidah, 2014). According to the research results of Linggi, Alfani, & Lembang, (2018), there is a relationship between Activity of Daily Living (ADL) and the quality of life of post-stroke patients, although the effect is not very significant (Linggi et al, 2018).

The benefits of a Motor Relearning Program (MRP) are greater in terms of balance restoration because it integrates stimuli from the external environment, generates internal motor responses while performing functional tasks, and improves an individual's motor performance in a real-world environment through motor relearning. (Hirazon, 2020). Motor Relearning Program (MRP) training in the early stages of stroke is beneficial for the recovery of the patient's motor function and is more effective because it can encourage the development of cognition, association and autonomic nerves as well as improve standing balance in post-stroke patients (Mufida, 2020).

METHOD

This research is a quasi-experimental research with a pre-experimental design. This research uses a one-group pre-test post-test design method, where treatment is given over a certain period of time and is measured through tests before treatment (pre-test) and after treatment (post-test). The use of a pre-test before giving treatment aims to understand the effects of the treatment more accurately by comparing it with the conditions before treatment

The population in this research is all post-stroke patients who come to one of the private hospitals in the city of Semarang for 300 visits every month. The sampling technique used purposive sampling, totaling 35 respondents who met the inclusion criteria. This research was carried out in the Physiotherapy Unit of a Private Hospital in the city of Semarang on March 1-30 2024.

Data analysis in this research used the Statistical Program for Social Science (SPSS). Data analyzed:

1. Univariate analysis is describing the characteristics of each variable being studied. for numeric data, use the mean, median, standard deviation, and interquartile range, as well as minimum and maximum values. Meanwhile, categorical data uses a frequency distribution with percentages to measure proportions. In this study, the characteristics of the variables analyzed were age, gender, type of stroke.
- 2) Bivariate analysis in this research is to identify the influence between two variables, dependent (activity of daily living) and independent (motorcycle relearning program), so that during data analysis the influence between these two variables can be seen. Then a data normality test was carried out using Shapiro Wilk because the sample was less than 50. The normality test obtained a value before and after the treatment of $p = 0.000$, which means the data was not normally distributed, so the hypothesis test was continued using the non-parametric test with Wilcoxon.

RESULTS AND DISCUSSION

The research was conducted at a private hospital in the city of Semarang for 4 weeks from 1 to 30 March 2024. The research respondents were 35 post-stroke patients who met the inclusion criteria and were able to take part in the research from start to finish. The instrument in this study uses the Barthel Index to





measure the level of activity of daily living before treatment and after treatment. Then data processing using SPSS.

A. Research result

1. Respondent Characteristics

a. Characteristics of Respondents Based on Age

Table 1
Characteristics of Respondents Based on Age

Age	Amount	Percentage
40 – 50	7	20%
51 – 60	13	37.15%
61 – 70	15	42.85%
Total	35	100%

Source: Primary Data, 2024

Based on Table 1 above, data on the characteristics of respondents based on the age of post-stroke patients in this study, namely 7 patients aged 40-50 years (20%), 13 patients aged 51-60 years (37.15%), and 61- 70 years old amounted to 15 patients (42.85%).

b. Characteristics of Respondents Based on Gender

Table 2
Characteristics of Respondents Based on Gender

Gender	Amount	Percentage
Man	22	62.85%
Woman	13	37.15%
Total	35	100%

Source: Primary Data, 2024

Based on table 2 above, data on the characteristics of respondents based on gender in this study, namely 22 post-stroke patients were male (62.85%) and 13 post-stroke patients were female (37.15%).

c. Characteristics of Respondents Based on Stroke Type

Table 3
Characteristics of Respondents Based on Stroke Type

Types of Strokes	Amount	Percentage
<i>Ischemic</i>	20	57.15%
<i>Hemorrhagic</i>	15	42.85%
Total	35	100%

Source: Primary Data, 2024

Based on table 3 above, data on the characteristics of respondents based on the type of stroke in this study, namely ischemic stroke, amounted to 20 patients (57.15%), and hemorrhagic stroke, amounted to 15 patients (42.85%).

2. Respondent Research Data

Table 4
Pre-Test and Post-Test Barthel Index Values

Descriptive Statistics					
Pretest-posttest					
	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	35	7	16	10.54	2,780
Posttest	35	8	18	11.71	2,886





Difference	35	0	3	1.17	,954
Valid N (listwise)	35				

Source: Primary Data, 2024

Table 4

above shows the average Barthel Index assessment. The Barthel Index is used to evaluate the level of independence in self-care and mobility, and can be used as a criterion to assess the functional abilities of patients with impaired daily activities (Gustinerz, 2020). Before intervention, the average Barthel index was 10.54 with a standard deviation of 2.780. After intervention, the mean increased to 11.71 with a standard deviation of 2.886.

3. Data Normality Test

Table 5.
Data Normality Test
Data Normality Test

	Shapiro-Wilk		
	Statistic	Df	Sig.
Pretest	,919	35	.013
	,918	35	.012

Source: Primary Data, 2024

From table 5 above, the normality test shows that the pretest and posttest values are less than 0.05, which means the data is not normally distributed, so the hypothesis test is continued using Wilcoxon.

4. Hypothesis Testing

Table 6.
Hypothesis Testing
Hypothesis Testing

	Amount	Mean		Sig (2-tailed)	Information
		Pre	Post		
MRP	35	0.013	0.012	0,000	Ha accepted

Source: Primary Data, 2024

Table 6 Hypothesis test using non-parametric test to determine the effect between 2 variables using Wilcoxon. The Wilcoxon results before and after treatment obtained a p value = 0.000, meaning the p value < 0.05, which means Ha is accepted, so the hypothesis states that there is an effect before and after treatment. From this hypothesis test, it can be concluded that the motor relearning program (MRP) has an effect on increasing activity of daily living (ADL) in post-stroke patients.

B. Discussion

1. Respondent Characteristics

a. Characteristics of Respondents Based on Age

Respondent data shows that there are 7 people aged 40-50 years, 13 people aged 51-60 years, and 15 people aged 61-70 years. The prevalence of stroke diagnosed by health workers shows an increase with age, reaching a peak at age ≥75 years with a diagnosis rate of 43.1% and a diagnosis with symptoms of 57.0%. A previous study showed that respondents aged >55 years had a 3.23 times higher chance of suffering a stroke than those aged <55 years, with a chance of 6.13 times higher. (Qolbi SN, 2021)

b. Characteristics of Respondents Based on Gender

Respondent data shows that there were 22 men and 13 women. Based on research by Natasia (2019), men tend to have a higher incidence of stroke (1.8%). However, the results of the analysis did not find a significant relationship between gender and stroke. This research is in line with the findings of Natasia (2019) which shows that this difference is not





statistically significant, even though men have a 1.38 times higher risk of suffering a stroke than women.

c. **Characteristics of Respondents Based on Stroke Type**

Data was obtained from respondents with 20 types of ischemic stroke and 15 types of hemorrhagic stroke. These results are consistent with various literature and previous research. Based on research by Irina Prima (2022) on 99 stroke patients, it was found that more patients experienced ischemic strokes than hemorrhagic strokes. A total of 57 people (57.6%) were diagnosed with ischemic stroke, while 42 people (42.4%) were diagnosed with hemorrhagic stroke.

2. Description of the Influence of the Motorcycle Relarning Program on the Activity Level of Daily Living

The MRP method emphasizes specialized training for specific tasks. Providing feedback to patients during specific motor training can improve learning and recovery of motor function (Chung, 2016). This approach involves functional training and identification of primary motor tasks such as sitting, standing or walking. Each motor task is analyzed to identify areas that cannot be performed, the patient is trained in these areas, and the training is integrated into the patient's daily activities. (Hasanah, 2018)

Motorcycle Relearning Program (MRP) uses effective training methods including active training, specific activities, and movement variations. All of these exercises can help stroke patients regain muscle strength and train motor nerves to coordinate with the brain. This method facilitates learning for functional activities, based on the premise that the brain is capable of changes and adaptations (brain plasticity), allowing recovery and improvement in addition to learning through targeted training. Movement control is also considered to eliminate unnecessary movements and improve the ability to regulate posture and movement (Wardani, 2016).

Motor learning is an internal process that is linked to practice or experience and is then maintained permanently. The motor learning process consists of three stages, namely the cognitive stage, the association stage, and the autonomous stage. After the motor learning stage, stroke patients will have skills from the training applied (Suhartini, 2010).

Due to brain plasticity and the increase in the number of neurons after stroke, the repetitive MRP method training process is very important for brain regeneration. This brain image is formed due to repeated stimulation, both sensory and motor.

Based on the description of the research data, the activity of daily living (ADL) assessment using the Barthel index before and after receiving action using the motor relarning program (MRP) method showed changes, the mean Barthel index assessment before treatment was 10.54 and the standard deviation value was 2.780. Whereas The mean after treatment was 11.71 and the standard deviation value was 2.886.

Data normality test results before and after treatment using the Shahiro Wil test. The normality test shows that the pretest and posttest values are less than 0.05, which means the data is not normally distributed, so the hypothesis test is continued using Wilxocon.

Hypothesis testing uses non-parametric tests to determine the influence between 2 variables using Wilcoxon. The Wilcoxon results before and after treatment obtained a value of $p = 0.000$, meaning that the value of $p < 0.05$ which means H_a is accepted, so the hypothesis states that there is an effect before and after treatment. From this hypothesis test, it can be concluded that the motor relarning program (MRP) has an effect on increasing activity of daily living (ADL) in post-stroke patients.

CONCLUSION

From the results of research on the effect of the Motor Relearning Program (MRP) on increasing Activity of Daily Living (ADL) in post-stroke patients with 35 respondents in the period 1-30 March 2024, carried out with a frequency of 2 times a week for 15 minutes. Evaluation using the Barthel Index before and after the



study showed changes, so it was concluded that MRP had an influence on increasing ADL in post-stroke patients.

AUTHOR CONTRIBUTIONS

The author contributed fully to this research.

CONFLICT OF INTEREST

This research was conducted without any commercial relationships or association with sponsors.

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