

## MIRROR THERAPY IMPROVES EXTREMITY MUSCLE STRENGTH IN ISCHEMIC STROKE PATIENTS

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### Keywords

Mirror therapy, muscle strength of ischemic stroke patients

### ABSTRACT

#### Introduction

Stroke is described as a state of acute neurological deficit caused by a sudden disruption of the cerebral blood vessels and causes signs and symptoms that correspond to the affected brain area. In general, the problems that are often experienced by stroke patients are physical mobility barriers with hemiparesis. One of the therapies that can increase the muscle strength of stroke patients is mirror therapy. The purpose of this study is to determine the effect of mirror therapy on upper extremity muscle strength.

#### Method(s)

This type of research is quantitative, using a quasi-experimental design, non-randomized control group pretest posttest design. The population in this study were all patients with ischemic stroke who were treated at the Yukum Medical Center Hospital within a span of 2 months totaling 130 people, 26 samples were taken, 13 people in the intervention group and 13 in the control group using purposive sampling technique. using the independent t-test.

#### Result(s)

The results of statistical tests showed that the average muscle strength of ischemic stroke patients in the pretest intervention group was  $2.23 \pm 1.092$ , posttest  $3.15 \pm 1.068$ , while for the control group the pretest was  $2.08 \pm 0.954$  and the posttest was  $2.31 \pm 0.855$ . The results of the independent t test obtained a p-value of 0.036 ( $p < 0.05$ ).

#### Conclusion(s)

So it can be concluded that there is an effect of mirror therapy on muscle strength. With the results of this study, it is hoped that mirror therapy can be used as an alternative to increase muscle strength in ischemic stroke patients who experience hemiparase.

## INTRODUCTION

Stroke is an acute neurological deficit disease caused by brain blood vessel disorders that occur suddenly and cause symptoms and signs in accordance with the disturbed brain area (Bustan, 2015). Stroke can be hemorrhagic where the incidence is about 15% and ischemic/non-hemorrhagic stroke occurs around 85%. Ischemic stroke is categorized according to its cause, namely arterial

thrombotic stroke 20%, small penetrating arterial thrombotic stroke 25%, cardiogenic embolic stroke 20%, cryptogenic stroke 30%,

and other causes 5% (Smeltzer, 2018).

The prevalence of stroke in Indonesia also tends to increase, according to the results of the 2013 Riskesdas, the incidence of stroke in Indonesia was 7 per 1,000 population, and in the results of the 2018 Riskesdas it increased to 10.9 per 1,000 population. The prevalence of stroke in the Lampung Province has also increased where in the 2013 Riskesdas results, it was 5.4 per 1,000 population, increasing to 8.3 per 1,000 population at Riskesdas 2018 (Kemenkes RI, 2018). The report from the Data and Information Center of the Ministry of Health of the Republic of Indonesia stated that the highest prevalence of stroke in Lampung Province occurred in Waykanan and Central Lampung districts, each at 0.9%, and the lowest was in Tulangbawang district at 0.2% (Kemenkes RI, 2016).

The problem that is almost always experienced by stroke patients is the occurrence of problems with physical mobility barriers associated with hemiparesis (Smeltzer, 2018). In the early stages, stroke patients may be completely immobile and require assistance even lying in bed. Later in the healing period, mobility impairment may only occur in one extremity. This can be due to loss of muscle tone due to weak paralysis or muscle weakness and the client refuses to move for fear of injuring himself or not being trained to move (Black & Hawks, 2014).

Based on the description of the phenomenon above, the authors are interested in conducting research on "The Effect of Mirror Therapy on extremity muscle strength in ischemic stroke patients at Yukum Medical Center Hospital Central Lampung in 2021".

**METHODS**

This type of research is quantitative, with a quasi-experimental design, non-randomized control group pretest posters design. The

	Variable	Mean	SD	Min-Max	CI; 95 %	N
Pretest	Intervention group	2,23	1,092	1-4	1,57 - 2,89	13
	Control; group	2,08	0,954	1-4	1,50 - 2,65	13

independent variable in this study is mirror therapy and the dependent variable, or the variable that is affected, is the muscle strength of the upper extremity of ischemic stroke patients.

The population in this study were ischemic

stroke patients who were treated at the Yukum Medical Center Hospital, Central Lampung, amounting to approximately 130 people.

The sample size is 13 people for the intervention group and 13 people for the control group so that the total sample used is 26 people, the sampling technique used is purposive sampling.

**RESULTS**

Table 1. Respondents Characteristics based on Age

Group	N	Mean±SD	Min-Max	CI;95%	Sig.
Intervention	13	59,54±4,539	52-67	56,80-62,28	0,725
Control	13	60,15±4,279	53-67	57,57-62,74	

The average age of respondents in the intervention group was 59,544,539 years, the youngest age was 52 years and the oldest was 67 years, while the average age of the control group was 60.15±4.279 years, the oldest age was 53 years and the oldest was 67 years. There was no difference in age in the two groups.

Table 2. Respondents Characteristics based on Gender

Sex	Group				Total		Sig.
	InIntervention		Control		f	%	
Laki-laki	5	38,5	6	46,2	11	42,3	1,000
Perempuan	8	61,5	7	53,8	15	57,7	
Σ	13	100	13	100	26	100	

Most of the respondents were female, namely 15 people (57.7%) and of these 8 people (61.5%) were in the intervention group, 7 people (53.8%) were in the control group. Meanwhile, of the 11 (42.3%) respondents who were male, 5 (38.5%) were in the intervention group and 6 (46.2%) were in the control group. The results of the analysis showed that there was no gender difference between the intervention group and the control group (p-value 1,000) or had equality.

Table 3. Univariate Analysis

The average muscle strength of ischemic stroke patients in the intervention group before the intervention was 2.23±1.092 (95%CI: 1.57-2.89), the lowest muscle strength score was 1 and the highest was 4. While the average

muscle strength was in the control group. before treatment was  $2.08 \pm 0.954$  (95%CI: 1.50-2.65), the lowest muscle strength score was 1 and the highest was 4.

Table 4. Bivariate Analysis

Muscle Strength	Group		Mean Difference	p-value
	Intervention Mean $\pm$ SD	Control Mean $\pm$ SD		
Pretest	2,23 $\pm$ 1,092	2,08 $\pm$ 0,954	0,154	0,705
Posttest	3,15 $\pm$ 1,068	2,31 $\pm$ 0,855	0,846	0,035

The average muscle strength of ischemic stroke patients in the intervention group before the intervention was 2,231,092, and the control group was 2,080,954 with an average difference of 0.154. The results of the independent t-test analysis showed a p-value of 0.705 ( $p > 0.05$ ), meaning that before treatment there was no difference in muscle strength between the intervention group and the control group. Meanwhile, after the intervention, the average muscle strength of the intervention group was 3,151,068 and the control group was 2,310,855 with an average difference of 0,846. In the results of the independent t-test analysis, the p-value was 0.036 ( $p < 0.05$ ), meaning that there was a significant difference in the increase in muscle strength between the intervention group and the control group, where the upper extremity muscle strength in the group given mirror therapy had a higher increase than the group. who were not given morror therapy.

## DISCUSSIONS

### Average Upper Extremity Muscle Strength in Ischemic Stroke Patients After (Posttest) Giving Mirror Therapy

Based on the results of data processing, it was found that the average muscle strength of ischemic stroke patients in the intervention group after the intervention was  $3.15 \pm 1.068$  (95%CI: 2.51-3.80), the lowest muscle strength score was 1 and the highest was 5. The mean muscle strength of the control group in the second measurement (posttest) was  $2.31 \pm 0.855$  (95%CI: 1.79-2.82), the lowest muscle strength

score was 1 and the highest was 4.

The results of this study are in line with research conducted by Sinaga, (2019) which reported that the average muscle strength of ischemic stroke patients before mirror therapy was  $2.93 \pm 0.884$ , an increase of  $3.73 \pm 0.799$  after the intervention. Agusman & Kusgiarti's research (2017) also informs that the average muscle strength of non-hemorrhagic stroke patients after mirror therapy has increased, before intervention from  $1.60 \pm 0.516$  to  $2.60 \pm 1.074$ .

Based on the description of the results of the study above, it can be explained that the average muscle strength of ischemic stroke patients in the intervention group and control group has increased, where the average extremity muscle strength in ischemic stroke patients in the intervention group after mirror therapy exercise 1 time a day, for 7 days with the duration of each treatment is 30 minutes and every 15 minutes given a short rest period (5 minutes) the respondent is able to move the joints and the average muscle strength of the patient can also resist the influence of gravity even though it is not strong against the resistance given by the assessor. Meanwhile in the control group, the respondent's muscle strength also increased, but this increase was not able to resist the influence of gravity.

### Effect of Mirror Therapy on Upper Extremity Muscle Strength in Ischemic Stroke Patients

The results of the analysis obtained that the difference in the average muscle strength of ischemic stroke patients before treatment between the intervention group and the control group was 0.154 and the results of the independent t-test obtained p-value 0.705 ( $p > 0.05$ ), meaning that before treatment, there was no significant difference between muscle strength between the intervention group and the control group. Meanwhile, after treatment (posttest), the average difference in muscle strength between the intervention group and the control group was 0.846. The results of the independent t-test analysis showed a p-value of 0.036 ( $p < 0.05$ ), meaning that after treatment, it was statistically proven that there was a significant difference in the increase in upper extremity muscle strength between the intervention group and the control group.

The results of this study are in line with research conducted by Arif et al (2019) who reported that there was a significant effect between mirror therapy on the ability to move

in stroke patients. The research of Setiyawan, Nurlely, & Harti, (2019) also shows that giving mirror therapy to ischemic stroke patients is effective in increasing upper and lower extremity muscle strength. A similar study was also conducted by Baby et al., (2014) which informed that the mirror therapy exercise program was proven to be significant for improving functional hand recovery in sub-acute stroke patients.

## CONCLUSIONS

The mean muscle strength of the ischemic stroke patients in the intervention group before the pre-treatment (pretest) was  $2.23 \pm 1.092$  and for the control group it was  $2.08 \pm 0.954$ . The average muscle strength of ischemic stroke patients in the intervention group after treatment (posttest) was  $3.15 \pm 1.068$  and for the control group was  $2.31 \pm 0.855$ . There is an effect of mirror therapy on the muscle strength of ischemic stroke patients (p-value 0.036), where the upper extremity muscle strength of the group that was given mirror therapy increased higher than the group that was not given mirror therapy with an average difference in muscle strength of  $0.846 \pm 0.379$ .

Non hemorrhagic stroke patients should be able to do mirror therapy independently accompanied by family to help increase muscle strength so that they are expected to be able to carry out daily life activities independently. Health workers should be able to continue to provide motivation and information to stroke patients and their families so that they can apply mirror therapy independently. For other researchers who want to conduct research related to ischemic stroke (non-hemorrhagic) should be able to take a different research location so that it can provide wider benefits.

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