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Effect Of Bobath Therapy On Extremity Muscle Strength In Post Stroke Infarced Patients

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ABSTRACT

Stroke is a disease that can cause weakness on one side of the body for sufferers, due to damage to the nervous system in the brain. One of the therapies to increase limb muscle strength in stroke patients is bobath therapy. This study aims to analyze the effect of bobath therapy on limb muscle strength in post-stroke infarction patients at RSI Jemursari Surabaya.The research design used a pre-experimental type with a one-group pre-post test design with a sample of 102 post-stroke infarction patient respondents using a non-probability sampling method with a purposive sampling technique. The independent variable in this study was bobath therapy, while the dependent variable was the muscle strength of the extremities of post-infarction stroke patients. The research instrument used an observation sheet containing a strength scale measuring instrument, namely the Manual Muscle Testing (MMT) score on measuring muscle strength with a score of 0-5. Data analysis used the Wilcoxon Signed Rank Test.The results of the study with the analysis of the Wilcoxon Signed Rank Test were obtained with a significance value of $\alpha = 0.05$, $\rho = 0.000$, which means $\rho < \alpha$, it can be concluded that H_0 is rejected and H_1 is accepted, which means that there is an effect of bobath therapy on limb muscle strength in postoperative patients. stroke infarction at RSI Jemursari Surabaya.Bobath therapy which was carried out 6 times within one month, and each movement was carried out for 3-5 minutes proved to be effective in increasing limb muscle strength in post-stroke infarction patients. It is hoped that bobath therapy can be applied by post-infarction stroke patients as a therapy to help increase limb muscle strength in accordance with Standard Operational Procedures.

Keyword : Bobath Therapy, Extremity Muscle Strength, Stroke Infarction

INTRODUCTION

Stroke is a disease that can cause permanent physical disability for sufferers (Rahmadani & Rustandi, 2019). In post-stroke infarction patients who occur in the field, it is usually difficult to carry out daily activities independently while at home and need the help of others because of impaired nerve function that affects muscle strength, body balance, and other bodily functions (Iqbal dkk., 2021).

Many sequelae are caused by disturbances from stroke, namely paralysis of the face or limbs (usually sudden hemiparesis), disturbance of sensibility in one or more limbs (hemiparesic disorder), sudden changes in mental status (confusion, delirium, lethargy, stupor, or coma), aphasia (difficulty or slurred speech, unable to understand speech), dysastria (slurred or slurred speech), visual disturbances (hemianopia and diplopia), ataxia (truncal or limbs), and vertigo, nausea, vomiting, and headache (Rendi & Margareth, 2012).

The prevalence of infarct stroke is higher than hemorrhagic stroke. The number of infarct stroke patients is 87%, while the remaining 13% is caused by cerebral hemorrhage (American Heart Association (AHA), 2016). According to data from Basic Health Research (Kemenkes RI, 2018), nationally the incidence of stroke in Indonesia in 2018 was 10.9% or around 2,120,362 people. Whereas in East Java Province according to Basic Health Research in 2018 it reached 12.4% or as many as 21,120 people and was ranked 8th in Indonesia (Kemenkes RI, 2018). At the Jemursari Surabaya Hospital in November-December 2022 there were 277 patients with stroke infarction.

Stroke sufferers usually have an impact in the form of weakness on one side of the body due to damage to the nervous system in the brain. Stroke sufferers who experience weakness in the body parts of the hands and feet will affect muscle contractions. This is due to a lack of blood supply to the brain which will result in more brain tissue damage (Wakhidah dkk., 2019). An obstructed blood supply to the hindbrain and midbrain will result in the conduction of the main pathways between the brain and the spinal cord becoming obstructed and will cause abnormal motor incapacitation (Ferawati dkk., 2020). The impact of an abnormal motor system at a point or several places on motor neuron cells reaches the muscle fibers which can result in weakness or paralysis.

Decreased value of muscle strength in stroke patients will be the main cause of disability in sufferers. In the treatment of post-stroke patients, it is necessary to take a long time in the recovery period to be able to carry out activities independently and improve movement abilities, and restore body functions to the fullest (Nabyl, 2012). In previous studies the bobath method was carried out by focusing on the upper extremities only, but in the current study the bobath method was measured on all parts, namely the upper and lower extremities (Nabyl, 2012).

The therapy used to speed healing after a stroke is bobath therapy. This therapy is a therapy that focuses on normal movement patterns of activity by increasing control over selective postural movements. The bobath concept focuses on movement analysis with respect to selective movement, postural control, and sensory roles to develop a movement diagnosis as a guide in intervention and evaluation. In the movement process, postural muscle tone has a significant impact on the effectiveness and efficiency of the resulting motion. It is hoped that with bobath therapy, the postural muscles will be more active again and can increase the strength of the extremity muscles (Wayan, 2015).

Bobath therapy is a therapy that is oriented towards normal movement pattern activities by increasing the ability to control postural and selective movements, so that after bobath therapy is carried out on movement activities, postural muscle tone will greatly determine the effectiveness and efficiency of the resulting movements (Irfan, 2012). By doing bobath therapy exercises six times within one month, it is more effective in improving functional disorders of the body in post-stroke patients, especially in increasing muscle strength, body balance and other bodily functions (Artha, 2011). Bobath therapy can also provide control over position and movement centered on body parts needed to control changes in weak body position, so that it can improve the performance of muscles that experience weakness and restore functional parts of the body in post-stroke patients (Kilinç dkk., 2016).

Based on this, researchers are interested in raising the topic above in the form of research and presenting it in a thesis proposal with the title "The Effect of Bobath Therapy on

Extremity Muscle Strength in Post Stroke Infarction Patients at RSI Jemursari Surabaya".

METHODS

In this study using the Pre-Experimental type with the One-group pre-post test design. In this research design, it was carried out by comparing one group of subjects by observing 2 times, namely before the intervention, then after the intervention was carried out (Nursalam, 2013). The independent variable in this study is Bobath Therapy. The dependent variable in this study was the strength of the limb muscles of post-infarction stroke patients.

The population of this study were post-infarction stroke patients at the Jemursari Islamic Hospital in Surabaya in the Az-Zahra room with a total of 102 patients. The sample size used was 102 post-infarction stroke patients, but out of 102 samples, only 100 met the requirements for data processing because 2 respondents did not meet the requirements. In this study, researchers used non-probability sampling with a purposive sampling technique. Purposive sampling is a sampling technique with certain considerations, while non-probability sampling is a sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample (Sugiyono, 2012). After that, a pre-test was carried out, namely the results of measuring muscle strength before bobath therapy was carried out in post-stroke infarction patients, then carrying out bobath therapy in post-infarction stroke patients, and finally a post-test was carried out, namely the results of measuring muscle strength after bobath therapy in patients after stroke infarction.

After the data is processed, the next step is to analyze the data. The analysis used is the Wilcoxon Signed Rank Test statistical test using the SPPS for windows program with a significance level of $\alpha = 0.05$. The statistical research hypothesis H_o is rejected and H_1 is accepted, if the statistical test results show <0.05, which means that there is an influence between the independent and dependent variables. This research is ethically qualified with No. 086/KEPK-RSISJS/VI/2023.

RESULTS

General data includes frequency distribution, namely age, gender, having a history of hypertension, and limb weakness of post-stroke infarction patients

Table 1 Frequency distribution of respondents based on age, gender, history of hypertension, and limb weakness of post-stroke infarction patients at Jemursari Hospital in Surabaya.

No	Variable	Frequency (n)	Percentage (%)
1.	**Age**		
	17-25 years old	0	0
	26-35 years old	0	0
	36-45 years old	2	2
	46-55 years old	34	34
	56-65 years old	50	50
	65 years old over	14	14
	Amount	100	100,0
2.	**Gender**		
	Male	60	60
	Female	40	40
	Amount	100	100,0
3.	**History of Hipertension**		
	Yes	55	55
	No	45	45
	Amount	100	100,0
4.	**Extremity Weaknesses**		
	Top Right	19	19
	Top Left	70	70
	Bottom Right	1	1
	Bottom Left	10	10
	Amount	100	100,0

Based on table 1 it shows that of the 100 respondents who met the criteria for research, the age group indicated that half (50%) were 50 respondents aged 56-65 years, in the gender group indicated that the majority (60%) of the 60 respondents were of the same sex For men, in the history of hypertension group it was shown that the majority (55%) of 55 respondents had a history of hypertension, and in the limb weakness group it was shown that most (70%) of the 70 respondents experienced limb weakness on the upper left side.

Table 2 Distribution of the frequency of respondents before being given bobath therapy in post-stroke infarction patients

Muscle Strength *MMT* Scale	Frequency (n)	Percentage (%)
Naught	0	0
Few	0	0
Bad	33	33
Currently	61	61
Good	0	0
Normal	6	6
Amount	100	100%

Based on table 5.2 it shows that before giving bobath therapy out of 100 respondents, the majority (61%) of the 61 respondents with the MMT scale of moderate muscle strength.

Table 3 Distribution of the frequency of respondents after being given bobath therapy in post-stroke infarction patients at Jemursari Hospital

Muscle Strength *MMT* Scale	Frequency (n)	Percentage (%)
Naught	0	0
Few	0	0
Bad	0	0
Normal	69	69
Currently	19	19
Good	12	12
Amount	100	100%

Based on table 3 it shows that after giving bobath therapy out of 100 respondents, the majority (69%) of 69 respondents with the MMT scale of normal muscle strength.

Table 4 Frequency distribution of respondents before and after being given bobath therapy in post-stroke infarction patients at Jemursari Hospital

	Pre-Test		*Post-Test*	
Muscle Strength *MMT* Scale	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Naught	0	0	0	0
Few	0	0	0	0
Bad	33	33	0	0
Currently	61	61	19	19
Good	0	0	12	12
Normal	6	6	69	69
Amount	100	100%	100	100%

Based on table 4, it shows that there is a change in the category of the Manual Muscle Testing (MMT) scale of muscle strength. Before being given bobath therapy in the bad category the percentage (33%) of 33 respondents was reduced to (0%) after treatment, in the medium MMT scale category the percentage (61%) of 61 respondents was reduced to (19%) by 19 respondents, in the good MMT scale category with a percentage of 0% increased to (12%) a total of 12 respondents, and the normal category with a percentage (6%) of 6 respondents increased to (69%) a total of 69 respondents after treatment.

Results of the *Wilcoxon Signed Rank Test*

	Negative Ranks	Positive Ranks	Ties	Z Value	Asymp Sig.
Post Test-Pre Test	0	91	9	-8,428	0,000

Based on table 5 from the results of the Wilcoxon Signed Rank Test using SPPS for Windows, Negative Ranks are obtained which are post-test values that are lower than pre-test values or the number of respondents experienced a decrease in limb muscle strength after therapy, while Positive Ranks are post-test values. -test which is higher than the pre-test or the number of respondents experiencing an increase in limb muscle strength after therapy, while Ties is the same value between the post-test and pre-test. In the post-test obtained Negative Ranks 0 respondents, Positive Ranks 91 respondents, and Ties 9 respondents, obtained a value of 0.000 <0.05. From the results of the analysis based on the Wilcoxon Signed Rank Test with a significance value of $\alpha = 0.05$, it was obtained $\rho = 0.000$, which means $\rho < \alpha$, it can be concluded that H_0 is rejected and H_1 is accepted, which means that there is an effect of bobath therapy on limb muscle strength in post-stroke patients infarction

DISCUSSION

1. Extremity Muscle Strength Before Being Given Bobath Therapy

Based on table 5.2, it shows that before being given bobath therapy, the results of the majority of 100 respondents (61%) were 61 respondents in the Manual Muscle Testing or MMT percentage scale category with a value of 50 or moderate (score 3), which means that muscle movement can only fight gravity.

Stroke risk factors are divided into two, namely factors that can be modified or modified, and factors that cannot be modified or cannot be changed. Factors that can be modified or changed are smoking, alcohol, unhealthy lifestyle, diabetes, hypercholesterolemia, and obesity. Meanwhile, the factors that cannot be modified or changed are age and gender (Zahro dkk., 2021). Age is divided into several sections according to the Indonesian Ministry of Health, namely late adolescence 17-25 years, early adulthood 26-35 years, late adulthood 36-45 years, early elderly 46-55 years, late elderly 56-65 years, and seniors > 65 years and over. Based on table 5.1 it shows that out of 100 respondents half (50%) some 50 respondents are aged 56-65 years. An elderly person will experience an increase in amyloid production related to estradiol metabolism which will reflect the presence of arrhythmic substrates, thereby increasing the thrombogenic environment (Amin & Juniati, 2017). Another factor that cannot be modified or changed is gender.

Table 5.1 shows that out of 100 respondents, the majority (60%) of 60 respondents were male. Gender greatly affects a person having a stroke, generally this risk is higher in men than women, because the hormone estrogen plays an important role as a blood vessel vasodilator in women, so that they are less likely to have a stroke than men (Zahro dkk., 2021). Another stroke risk factor is hypertension. Based on table 5.1 it shows that out of 100 respondents the majority (55%) of 55 respondents had a history of hypertension. This is in line with research conducted by (Puspitasari, 2020) which states that there is a relationship between hypertension and the incidence of stroke, because hypertension is the main trigger for stroke. Hypertension causes an increase in peripheral blood pressure, causing a poor hemodynamic system and thickening of blood vessels and hypertrophy of the heart muscle (Sundari & Merah, 2015). Stroke also has an impact on weakness on one side of the body due to damage to the nervous system in the brain. Post-stroke sufferers who experience weakness in the body parts of the hands and feet will affect muscle contractions. This is due to a lack of blood supply to the brain which will result in more brain tissue damage (Wakhidah dkk., 2019).

Table 5.1 shows that out of 100 respondents, the majority (70%) of 70 respondents experienced limb muscle weakness on the upper left side. This is related because most patients with post-stroke infarction experience damage to the right side of the brain which will have an impact on weakness on the left side of the body, conversely if you experience damage to the left side of the brain it will have an impact on weakness on the right side of the body (Ghani dkk., 2016).

Weakness of limb muscles can be caused by one or several underlying factors, one of which is stroke. Where the individual experiences a decrease or weakness of the limb muscles. For this reason, individuals after stroke infarction need non-pharmacological therapy, one of which is bobath therapy according to Standard Operating Procedures or SOP (Wayan, 2015).

2. Extremity Muscle Strength After Being Given Bobath Therapy

Based on table 5.3, it shows that after being given bobath therapy, the results of the majority of 100 respondents (69%) were 69 respondents with the Manual Muscle Testing or MMT percentage scale category having a value of 100 or normal (score 5), which means that there is no muscle paralysis or normal muscles.

The results of this study support the hypothesis which states that there is an increase in limb muscle strength in post-stroke infarction patients at Jemursari Surabaya Hospital after bobath therapy. This can be interpreted that giving bobath therapy can increase the strength of

the extremity muscles. This happened because the respondent did the bobath therapy intervention properly and correctly in accordance with the Standard Operating Procedures or SOP. This research is also strengthened by doing it 6 times in a period of one month, and each movement is carried out for 3-5 minutes, so that it is more effective in increasing functional disorders of the body in post-stroke infarction patients, especially in increasing muscle strength, body balance, and other body functions (Artha, 2011).

In increasing the strength of the extremity muscles in post-stroke infarction patients, bobath therapy is required according to the procedure so that it can increase the strength of the extremity muscles. Post-infarction stroke patients who do bobath therapy properly will be able to recover their extremity muscle strength so that their muscle strength scale becomes normal. So that when an individual has a stroke and their muscle strength weakens, the individual knows more quickly how to increase the strength of their extremity muscles so that they return to normal (Ferawati dkk., 2020).

Bobath therapy can also provide control over position and movement centered on body parts needed to control changes in weak body position, so that it can improve the performance of muscles that experience weakness and restore functional parts of the body in post-stroke infarction patients (Kilinç dkk., 2016).

3. Analysis of the Effect of Bobath Therapy on Extremity Muscle Strength in Post-Infarction Stroke Patients

Based on table 5.3, it shows that there is a change in the category of the Manual Muscle Testing (MMT) scale of muscle strength. Before being given bobath therapy in the non-existent scale category with a percentage (0%), in the slight scale category with a percentage (0%), in the bad category with a percentage (33%) a number of 33 respondents became (0%) after treatment, in the medium with a percentage (61%) of 61 respondents to (19%) of 19 respondents, in the good scale category with a percentage of 0% increased to (12%) a number of 12 respondents, and the normal category with a percentage (6%) of 6 respondents increased to be (69%) a number of 69 respondents after treatment.

Based on the results of the Wilcoxon Signed Rank Test using SPPS for Windows, it was found that Negative Ranks were post-test values that were lower than pre-test scores or the number of respondents experienced a decrease in limb muscle strength after therapy, while Positive Ranks were post-test values that higher than the pre-test or the number of respondents experienced an increase in limb muscle strength after therapy, while Ties was the same value between the post-test and pre-test. In the post-test obtained Negative Ranks 0 respondents, Positive Ranks 91 respondents, and Ties 9 respondents, obtained a value of 0.000 <0.05. From the results of the analysis based on the Wilcoxon Signed Rank Test with a significance value of $\alpha = 0.05$, it was obtained $\rho = 0.000$, which means $\rho < \alpha$, it can be concluded that H_0 is rejected and H_1 is accepted, which means that there is an effect of bobath therapy on limb muscle strength in post-stroke patients infarction at RSI Jemursari Surabaya.

Based on table 5.2, it shows that before being given bobath therapy, the results obtained from the majority of 100 respondents (61%), a number of 61 respondents were in the category of moderate Manual Muscle Testing or MMT scale, which means that muscle movements can only fight gravity. Then after bobath therapy was carried out 6 times a month, in table 5.2 shows that before bobath therapy was given the results were obtained from the majority of 100 respondents (69%) a number of 69 respondents with the Manual Muscle Testing or MMT scale category normal, which means there is no muscle paralysis or normal muscles.

In stroke patients, infarction resulting in arterial occlusion caused by a thrombus that forms in an artery supplying the brain or intracranial vessels damages the wall, arteritis usually caused by cerebral thrombosis. This causes a lack of blood supply to the brain which will result in more brain tissue damage. An obstructed blood supply to the hindbrain and midbrain will result in the conduction of the main pathways between the brain and the spinal cord being

obstructed and will cause abnormal motor incapacity, which will impact the motor neuron cells down to the muscle fibers which can result in a weakness and paralysis of the limb muscles (McCance & Huether, 2014).

Bobath therapy is a therapy that focuses on normal movement patterns of activity by increasing control over selective postural movements. The bobath concept focuses on movement analysis with respect to selective movement, postural control, and sensory roles. In the movement process, postural muscle tone has a significant impact on the effectiveness and efficiency of the resulting motion. It is hoped that with bobath therapy, the postural muscles will be more active again and can increase the strength of the extremity muscles (Wayan, 2015). According to the researchers, non-pharmacological therapy in post-stroke infarction patients is used as an alternative to motion exercises so that it can increase the strength of the extremity muscles. Non-pharmacologically, bobath therapy can be used to determine changes in limb muscle strength in post-stroke infarction patients. This therapy is one of the activities oriented to normal movement pattern activities by increasing the ability to control postural and selective movements, so that after bobath therapy on movement activities, postural muscle tone will greatly determine the effectiveness and efficiency of the resulting movements so that the mobility function of the extremities relieved by adequate postural stability. By doing bobath therapy (Irfan, 2012).

The increase in limb muscle strength from bobath therapy is due to the concept of this therapy providing normal range of motion exercises through inhibition and facilitation treatment. By providing an inhibition position (a position that can inhibit the occurrence of hypertonus) and facilitation (a position that can reduce hypertonus) to overcome excessive muscle tone, then carry out normal pattern motion exercises in post-stroke infarction patients, so that the strength of the extremity muscles can increase (Yuliastuti, 2015).

CONCLUSION

Based on the results of the research that has been done, researchers can conclude several things as follows: There is an effect of bobath therapy on limb muscle strength before and after it is carried out in post-stroke infarction patients

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