


The Effectiveness of Cognitive Muscle Therapy for Improving Lumbar Function in Low Back Pain

Astrid Komala Dewi¹, Catherine Hermawan Salim², Ratu Chairunisa³, Elyin Artha Karlina Lumban Gaol⁴

Department of Physiotherapy, STIKES RS HUSADA

Article Info	ABSTRACT
<p>Keywords: Cognitive Muscle Therapy, Improving Lumbar Function, Low Back Pain</p>	<p>Objective: This study aims to determine the effect of cognitive muscle therapy on improving lumbar function in low back pain. The sample consisted of 40 people and was selected based on random sampling techniques using the available questionnaire. The sample was grouped into two treatment groups, treatment group I consisted of 20 people with Cognitive Muscle Therapy and treatment group II consisted of 20 people with Cognitive Muscle Therapy. Method: This study is a type of quasi-experimental pre-post test design. Statistical analysis of this study used the Related T-Test test and the Independent T-Test test. The results of the homogeneity test of the treatment group before exercise with a p value = 0.008. The results of the Related T-Test test in treatment group I with a p value = 0.001 and in treatment group II with a p value = 0.001 means that the exercise given to each group has an effect on improving Lumbar Function. And the results of the Independent T-Test showed a p value = 0.001 which means there is a very significant effect between treatment group I and treatment group II. It can be concluded that there is a very significant effect of Cognitive Muscle Therapy for Improving Lumbar Function in Low Back Pain. In this study, it is recommended that the exercise method can be applied with the correct procedure, carried out for more than 1 month because the improvement of Lumbar Function will be better if done for 2-3 months, and it is hoped that things that can affect the results of the study can be minimized in order to achieve optimal results.</p>
<p>This is an open access article under the CC BY-NC license</p> 	<p>Corresponding Author: Astrid Komala Dewi STIKES Rs Husada Tomang astridkd91@gmail.com</p>

INTRODUCTION

Low Back Pain (LBP) is one of the most common musculoskeletal problems worldwide. According to data from the World Health Organization (WHO), more than 80% of the population has experienced LBP at least once in their lives. LBP not only causes pain but also reduces lumbar function, causing limitations in daily activities, reducing productivity, and increasing the economic burden on individuals and society. Physiotherapy management of LBP generally uses conventional therapies, such as physiotherapy modalities (TENS, ultrasound, hot packs), muscle strengthening exercises, stretching, and posture and ergonomics education. This approach has been proven to reduce pain and improve function, but often the results are not optimal because LBP is also influenced by psychological factors,

pain perception, and the patient's cognitive control over body movements. In recent years, a new approach has developed, namely cognitive muscle therapy. This therapy integrates core muscle exercises (core stability) with cognitive strategies, such as relaxation, motor imagery, cognitive education, and attention control over movements. This approach is believed to increase activation of the lumbar stabilizer muscles while changing the patient's perception of pain, thereby improving lumbar function more comprehensively.

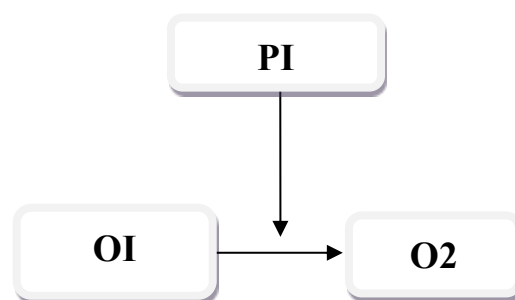
METHODS

This research method is quasi-experimental, examining the causal correlation between the two treatment groups. The study also aims to examine the differences in the effects of cognitive muscle therapy on improving lumbar function in low back pain. The study used a pre-test/post-test control group design. The subjects were divided into two groups. The first group received cognitive muscle therapy, while the second group received cognitive muscle therapy. The purpose of this study was to examine the differences between cognitive muscle therapy in treatment group I and cognitive muscle therapy in treatment group II on improving lumbar function in low back pain, as measured by the Oswestry Disability Index. The results of the Oswestry Disability Index measurements will be analyzed and compared between the first and second treatment groups.

a) Treatment Group I

In Group I, before receiving the exercise, the Oswestry Disability Index was measured. Afterward, the subjects were given Cognitive Muscle Therapy. At the end of the study, the results of the measurement were evaluated based on improvements in lumbar function for low back pain.

Scheme 3.1. Treatment Group I



Description:

PI: Cognitive Therapy

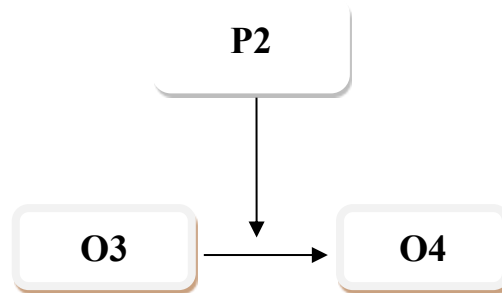
OI: Lumbar Functional Ability Before Cognitive Muscle Therapy

O2: Improvement in Lumbar Function After Cognitive Muscle Therapy

b) Treatment Group II

In Treatment Group II, before receiving training, the Oswestry Disability Index was measured. Afterward, the participants received Cognitive Therapy. At the end of the study, the results of the Lumbar Function Improvement Measurement were evaluated.

Figure 3.2. Treatment Group II



Description:

PI: Cognitive Therapy

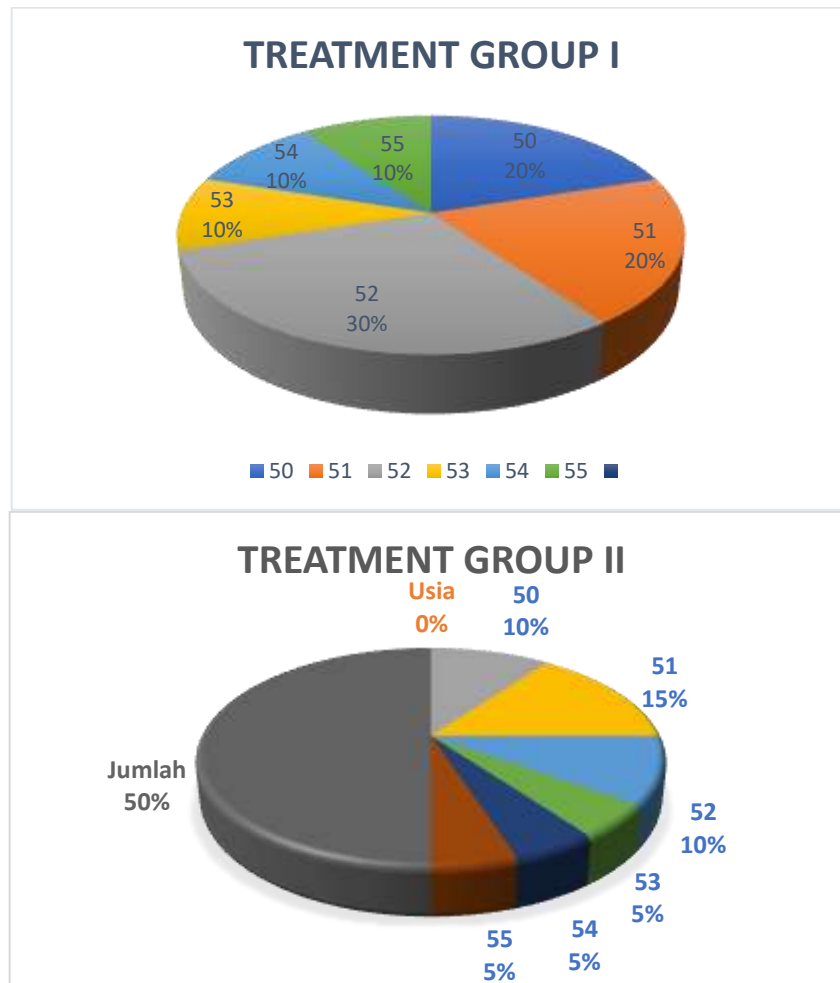
O3: Lumbar Functional Ability Before Cognitive Muscle Therapy

O4: Improvement in Lumbar Function After Cognitive Muscle Therapy

RESULTS AND DISCUSSION

The sample consisted of men and women with low back pain. Random sampling was used to select subjects from a population that met the criteria, ensuring that each subject in the population had an equal chance of being selected.

The selected subjects then completed a questionnaire provided by the researcher. After meeting the criteria, the researcher explained the purpose and intent of the study. The researcher then provided a written statement to be signed by the subjects, indicating their willingness to participate. Two subjects were excluded due to non-return. Before receiving Cognitive Muscle Therapy, the Oswestry Disability Index (ODI) was measured to determine the lumbar function of each subject. The sample was then given a 4-week training program. In week 1, the training was given twice a week, then in weeks 2 through 4, the training was given 3 times a week with an increase in the training dose each week for both exercises. Then, the Oswestry Disability Index (ODI) was measured in week 1 before the training was given, then at the end of each week of training, both 2 and 4 to determine the success of the training that had been given. Overall, the sample consisted of 20 people divided into two treatment groups: treatment group I and treatment group II, with each group consisting of 10 people. Treatment group I was given Cognitive Muscle Therapy, and treatment group II was given Cognitive Muscle Therapy.

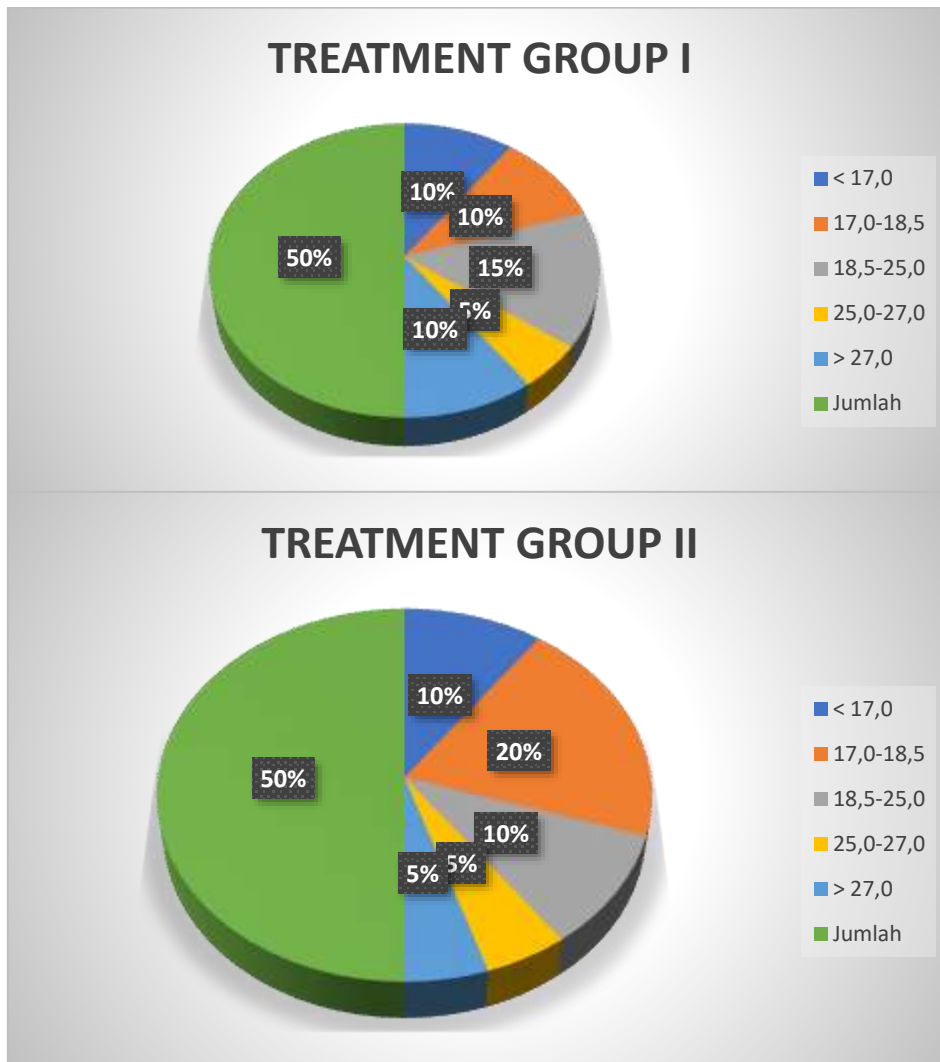


Graph 1. Sample distribution by age

In treatment group I and treatment group II

Based on Graph I in treatment group I, the sample aged 50 years was 2 people (10%), aged 51 years was 2 people (10%), aged 52 years was 3 people (15%), aged 53 years was 1 person (5%), aged 54 years was 1 person (5%) and aged 55 years was 1 person (5%) with the total number of samples in treatment group I being 10 people (50%). In treatment group II, the age of 50 years was 2 people (10%), the age of 51 years was 3 people (15%), the age of 52 years was 2 people (10%), the age of 53 years was 1 person (5%), the age of 54 years was 1 person (5%) and the age of 55 years was 1 person (5%) with the total number of samples in treatment group II being 10 people (50%). So the total number of samples in treatment group I and treatment group II was 20 people (100%). It can be concluded that in this study most of the samples were between 50-52 years old.

To determine the sample distribution value based on body mass index in treatment group I and treatment group II



Graph 2. Sample distribution based on BMI
In treatment group I and treatment group II

Based on Graph 2 in treatment group I, samples with BMI <17.0 were 2 people (10%), 17.0-18.5 were 2 people (10%), 18.5-25.0 were 3 people (15%), 25.0-27.0 were 1 person (5%), >27.0 were 2 people (10%) with the total number of samples in treatment group I being 10 people (50%). In treatment group II, samples with BMI <17.0 were 2 people (10%), 17.0-18.5 were 4 people (20%), 18.5-25.0 were 2 people (10%), 25.0-27.0 were 1 person (5%), >27.0 were 1 person (5%) with the total number of samples in treatment group II being 10 people (50%). So the total number of samples in treatment group I and treatment group II was 20 people (100%).



Graph 3. Sample distribution by hobby

In treatment group I and treatment group II

Based on Graph 3 in treatment group I, the samples that have a hobby of jogging are 5 people (25%), cycling is 4 people (20%), fitness is 1 person (5%) so that the total number of samples in treatment group I is 10 people (50%). In treatment group II, the samples that have a hobby of jogging are 4 people (20%), cycling is 4 people (20%), fitness is 2 people (10%) so that the total number of samples in treatment group II is 10 people (50%). So the total number of samples in treatment group I and treatment group II is 20 people (100%).

Table 1. Normality Test (Shapiro-Wilk Test) and Homogeneity Test (Levene's Test)

Variable	p-value	Description	p-value	Description
	<i>Shapiro Wilk Test</i>			
Before I	0,300	Normal		
After I	0,727	Normal		
Before II	0,221	Normal	0,008	Homogen
After II	0,903	Normal		(>0,05)
Difference I	0,441	Normal		
Difference II	0,318	Normal		

Based on table 4.6 the results of the calculation of the normality test and homogeneity test in treatment group I and treatment group II, the results of the statistical test with the Levene's Test in treatment group I and treatment group II are $p = 0.008$ where the $P \text{ value} > 0.05$, this means the sample is homogeneous. Based on the results of the T-Test Related data in treatment group I, the p value was obtained = 0.001 where $p < \alpha$ value (0.05). This means that H_0 is rejected so that there is an increase in Lumbar Function in Low Back Pain. Based on the results of the T-Test Related data in Treatment Group II, the p value was obtained = 0.001 where $p < \alpha$ value (0.05), this means that H_0 is rejected. This means that there is an increase in Lumbar Function in Low Back Pain. Based on the results of the Independent Sample T-Test, the p value was obtained = 0.008 where $p < \alpha$ value (0.05), this means that H_0 is rejected. Based on this, there is a difference in the effect of providing Cognitive Muscle Therapy to Improve Lumbar Function in Low Back Pain. Based on the results of statistical tests of the data between the two treatment groups, the following conclusions can be drawn:

1. Hypothesis I: "Cognitive Muscle Therapy can improve lumbar function" with a p -value of 0.001 ($p < 0.05$).
2. Hypothesis II: "Cognitive Muscle Therapy can improve stabilization" with a p -value of 0.001 ($p > 0.05$).
3. Hypothesis III: "Effectiveness of Cognitive Muscle Therapy for Improving Lumbar Function in Low Back Pain" with a p -value of 0.008 ($p < 0.05$).

CONCLUSION

From the results of this study conducted for 1 month, it shows that the Improvement of Lumbar Function in Low Back Pain in the sample experienced a relevant increase, the value of the increase in Lumbar Function in Low Back Pain in a person can be measured by the Oswestry Disability Index (ODI) using the test. After being measured, the value of the Improvement of Lumbar Function in Low Back Pain is obtained. then the hypothesis is tested. In this study, there are three hypotheses where each hypothesis is tested to determine whether there is a difference in the increase in Lumbar Function in Low Back Pain before and after the administration of Cognitive Muscle Therapy in treatment group I and treatment group II. In the Hypothesis I test using the Related T-Test test in treatment group I, the p value = 0.001 is obtained with the H_0 hypothesis being rejected if $p < \alpha$ value (0.05). In the Hypothesis II test using the Related T-Test test in treatment group II, the p value = 0.001 is

obtained with the H_0 hypothesis being rejected if $p < \alpha$ value (0.05). In the third hypothesis test using the Independent Sample T-test in treatment groups I and II, a p-value of 0.008 was obtained. The hypothesis H_0 was rejected if $p < \alpha$ (0.05). However, in the third hypothesis test, the p-value was found to be $> \alpha$ (0.05), meaning H_0 was accepted. In other relevant research, the calculated coefficient value for testing the difference between treatment groups I and II was found to be ($p < 0.05$). Other research showed that the Lumbar Function score in the ODI measurement was significantly better than the Roland-Morris Disability Questionnaire test. Based on the research results, it is hoped that the training method can be applied with the correct procedures to achieve optimal results. When providing training, physiotherapists must pay attention to the physical condition of the subjects being trained. This is necessary to identify signs of fatigue and injury. It is hoped that fellow physiotherapists and students can develop further research on this method. This should be conducted over a period of more than one month, as improvements in lumbar function for low back pain are best achieved over a period of 2-3 months. To achieve optimal results, it is hoped that the training method can be applied with the correct procedures and that factors that could affect the research results can be minimized to achieve optimal results.

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