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Fisiomu. 2024, Vol 4(3) : 69-77
DOI : https://10.23917/fisiomu.v5i1.2771

Differences in the Effects of *Neck Calliet Exercise* and *Myofascial Release* on Reducing Pain in Muscle *Neck Pain* Sufferers

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Submission Date 07/17/2023 ; Receipt date: 06/12/2023

ABSTRACT

Background: *Neck pain* is an uncomfortable sensation in the neck area. *Neck pain* is one of the most prevalent diseases in the world. The impact that occurs will be experiencing stiffness in the neck, limited movement of the neck, and neck pain resulting in a decrease in functional neck Objective: To determine whether there is a difference in the effect of the neck called workout and myofascial release on pain reduction in patients with upper trapezius muscle neck pain. **Purpose:** To determine whether there is a difference in the effect of *neck exercise* and *myofascial release* on reducing pain in patients with *neck pain of the upper trapezius* muscle. **Methods:** This study is experimental with *a pre-test and post-test two-group design*. A total of 16 respondents were determined using the sample random sampling technique. This study was divided into 2 groups of 8 respondents each: the first treatment group with neck called exercises and the second with *myofascial release* e. The exercise was carried out for 2 weeks with a frequency of exercise 3 times a week. The measuring tool used is *the Visual analogue scale (VAS)*, normality test using *the Shapiro-Will test*. Homogeneity test using *Lavene's test*, hypothesis testing I and II using *paired sample t-test*, and hypothesis testing III using *independent sample t-test*. **Conclusion:** There is no significant difference in the effect of *neck exercise* and *myofascial release* on reducing pain in patients with *neck pain of the upper trapezius* muscle.
***Keywords**: neck called exercise, myofascial release, neck pain, upper trapezius muscle.*

ISSN 2722 – 9610
E –ISSN 2722 - 9629

INTRODUCTION

Musculoskeletal disorders (MSDs) are injuries that cause abnormalities or disrupt human movement systems such as muscles, tendons and ligaments. (Tam *et al*., 2021). One of the MSD complaints most frequently experienced by workers, especially adults, is pain in the neck muscles (Dewi *et al*., 2020). According to the World Health Organization (WHO), one of the causes of death and morbidity in the world is due to occupational risks (Panjaitan *et al*., 2021).

Data from the *International Labor Organization* (ILO) (2013) showed that approximately 2 million workers died due to work accidents or work-related diseases and around 2.02 million cases of death were related to work-related diseases. Work accidents cause the death of at least one worker every 15 seconds in the world and work-related consequences are experienced by 160 workers (Rahmah & Herbawani, 2022).

Occupational diseases are diseases that arise in the workplace either from unergonomic work postures, such as *static* work postures or repetitive work (Aprianto *et al*., 2021). Workers who are at risk of developing neck pain include garment workers, especially sewing machine operators, who sit in a static, long-term sitting position, with their heads bowed for a long time (Ajhara *et al*., 2022).

In a bent position while working, namely with the head positioned forward, which functions to stabilize the neck and shoulders, causing the neck muscles to experience continuous static contractions. The main driving muscle used in this condition is the *upper*

DOI : https://10.23917/fisiomu.v5i1.2771

trapezius (Kadek Pradnya Prameitha Pratiwi Nartha, 2023). This can affect working hours, reduce work productivity, reduce alertness, increase the risk of work accidents and when complaints reach the final stage they require costs for recovery (Pt *et al*., 2018).

Neck pain is a disease that has a major impact on individuals, society and business life. The impact that occurs on workers is that they will experience stiffness in the neck, limited neck movement, and neck pain, causing a decrease in neck function and resulting in a person being unable to work. Neck function is a person's ability to carry out neck movements such as turning the head, turning and looking down independently (Rahim et al., 2019).

Neck pain is a *musculoskeletal* disorder that commonly occurs in adults. Neck pain is an uncomfortable sensory and emotional condition with damage to the tissue or structure of the neck. Neck pain is a complex condition with various causes and factors that can trigger neck pain (Nafisah *et al*., 2023). *Neck pain* is a pain in the area above the spine. This complaint is caused because the joints, muscles or parts of the neck are injured, tense or functioning improperly (Jehaman *et al*., 2022).

The annual incidence percentage is estimated at 16.6% of the world's adult population who complain of discomfort in the neck, even 0.6% will progress to severe neck pain (Nadhifah *et al*., 2019). The incidence of neck pain in Indonesia in a month is 10%, in a year it reaches 40%, the prevalence of neck pain in workers reaches the range of 6-67% and is more experienced by women (Sunyiwara *et al*., 2019). In Yogyakarta, the prevalence of neck pain in workers reached 68.7% according to Rahdini 2016 (Khusnaini, 2020). BLS (*Bureau of Labor Statistics*) research results show that there are 365,580 cases of MSDs in America for all workers in the United States (Jehaman *et al*., 2020).

Neck called exercise is a treatment that uses isometric techniques by holding a maximum load ends with relaxation and continues with stretching. This exercise can be done independently. This treatment has many benefits, namely reducing pain, returning joint movement to full *range of motion* (ROM) and eliminating spasms (Jehaman et al., 2020).

Myofascial release is a technique that is applied by pressing manually with a combination of stretching the affected muscles to stretch the tissue bundles that are experiencing adhesions (Buana, 2017). The *myofascial* movement itself is a massage movement combined with pressing and stretching which aims to stretch or stretch the *fascia* structure to release adhesions which will reduce pain and restore the lubricating quality of the *fascia tissue* (Adinda Riestiani Hernatha Putri, 2019).

From the background above, researchers are interested in researching the differences in the effect of *neck exercise* and *myofascial release* on reducing pain in sufferers of *upper trapezius* muscle *neck pain.*

RESEARCH METHOD

This research was carried out in Jogja Konveksi and Arleta. This type of research is experimental, the form of experimental design used is *Quasi-Experimental Design*. Meanwhile, the research design is with a *pre-test* and *post-test two-group design*. The total number of samples is 16 people. The sample will be divided into 2 groups, namely group 1 will be treated with *neck-called exercises* and Group 2 will be given *myofascial release* treatment. Before being given treatment, both sample groups will have their pain level measured using a *Visual analogue scale* (VAS). first to determine the degree of pain before treatment. This training will be given for 2 weeks with a training frequency of 3 times a week. After being given 6 exercises, pain measurements are taken again to evaluate or find out the *pre-post test*, then the results will be analyzed. The number of samples used in this research was 16 people, namely in group 1 there were 8 people and in group 2 there were 8 people. Sampling in this study used a *purposive sampling* technique, namely a sample determination technique by selecting samples from among the population that meet the inclusion and exclusion criteria.

a. Inclusion Criteria
1) Samples aged 20-40 years.
2) There is neck pain.

DOI : https://10.23917/fisiomu.v5i1.2771

3) Willing to take part in a research program.
4) Experiencing acute pain for less than 6 months.

b. Exclusion Criteria
1) Taking pain relievers.
2) Carrying out therapy or exercises other than those provided by the researcher.
3) There is trauma to the neck such as injury, fracture and others.

c. *Drop Out* Criteria
1) Respondents did not continue the research according to the research time limit for certain reasons.
2) Respondents did not take part in the research twice in a row.
3) Respondents during the research did not regularly follow research procedures.

In analyzing the data obtained, researchers used several statistical tests, including:

a. Descriptive statistics are used to provide an overview of the distribution of respondents' characteristics based on gender, age, and Analog Scale (VAS). 40

b. Data normality test using the Shapiro-Wilk Test, which aims to determine the distribution of data from each treatment group. Data normality test if the p value is 0.05 then the data is distributed normally.

c. Data homogeneity test with the Levene Test, aims to determine data variations. Data homogeneity test if the p value is 0.05 then the data is homogeneously distributed.

d. Test Hypotheses I and II using a parametric comparison test (paired sample t-test) if the data is normally distributed and using the Wilcoxon Test if the data distribution is not normal. Ho is rejected if p>0.05, and Ha is accepted if p0.05, and Ha is rejected if p<0.05.

RESULT

a. Respondent Characteristics

1) Distribution of Respondents Based on Age

Table 1 Distribution of Respondents Based on Age

Age	Group 1		Group 2	
	F	%	F	%
20-30	4	50,0	4	50,0
31-40	3	37,5	3	37,5
41-50	1	17,3	1	17,3
Total	8	100	8	100

Based on Table 1, the ages of respondents in this study ranged from 20-50 years. The highest age is 20-30 years old and the lowest age is 41-50 years old, both group 1 and group 2.

2) Distribution of Respondents Based on Gender

Table 2 Distribution of Respondents Based on Gender

Gender	Group 1	%	Group 2	%
Man	7	87,5	5	62,5
Woman	1	12,5	3	37,5
Total	8	100	8	100

Based on Table 4.2, the most common gender in groups 1 and 2 was 7 (87.5%) and 5 (62.5%) in group 2.

a. Test Data Analysis

1) Normality test results

Table 3 Data Normality Test with *Shapiro Wilk Test*

Group	*p-value* (Shapiro Wilk Test)	
	Pre-post	
Group 1	.893	.120
Group 2	.301	.197

Table 3 explains that based on the results of the analysis, the *p-value* = <0.05 means the distribution is not normal, if the *p-value* = >0.05 then the data is normally distributed. It can be concluded that the probabilities in the *post-test* and *pre-test* for both data groups are normally distributed.

2) Homogeneity Test

Table 4. 4 Normality Test with *Lavene's*

Group	Value (p)
Group *pre 1&2*	.265
Group *post 1&2*	.028

The results of the vase value data homogeneity test using *Lavene's test* before treatment in groups 1 and 2 were 0.265 and after treatment in both groups it was 0.028, thus the data was homogeneous because the *p-value* was more than 0.05 (p>0.05).

3) Hypothesis Test I

Table 5 Test Hypothesis I in treatment group 1

Group	Mean	*SD*	*P*
Group 1 *pre* & *post*	3,625	1,847	.001

Based on the results of the 4 *paired sample t-tests*, it is *p* = 0.001 (p<0.05), which means Ho is rejected, so hypothesis I which states that there is an effect of the *neck called exercise* on reducing pain in sufferers of *upper trapezius* muscle *neck pain* is accepted.

4) Hypothesis Test II

Table 6 Hypothesis II test on groups treatment 2

Group	Mean	*SD*	*p*
Group 2 *pre* & *post*	3,125	1,885	.002

Based on Table 6, the results of the *paired sample t-test* are *p* = 0.002 (*p*<0.05), which means that Ho is rejected, so hypothesis II which states that there is an effect of *myofascial release* on reducing pain in sufferers of *neck pain* in the *upper trapezius* muscle is accepted.

5) Hypothesis Test III

Group	*Independent T-test*	
	Mean	*p*
Post group 1	.375	.028
Post group 2	.375	

Table 7 Hypothesis Test III in treatment groups 1 and 2

Based on Table 7, the probability 8 (p-value) is 0.028. This means that if the probability is greater than 0.05, then he is rejected and he is accepted. From this statement, it means that there is no difference in the effect of the neck *called exercise* and *myofascial release* on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.

DISCUSSION

1. Sample characteristics based on age

In this study, the sample consisted of 16 people who were Jogja convection workers and tailors in the Giwangan area who experienced pain in the *neck pain* sufferers from the *upper trapezius* muscle. based on data 1. There is a sample with the highest age, namely 20-30 years old and the least age, 41-50 years old, both group 1 and group 2.

Based on the results of research conducted by Nadhifah *et al*., (2021) which states that those aged less than 30 years experience more neck pain. In line with the results of research conducted by Ridlo *et al*., (2023), the age of the respondents in this study was 20-40 years, where the majority of respondents were 20-30 years old (60%). *Flexion* of the neck causes weight and pressure on the cervical spine which causes pain. One of the risk factors causing this is due to tension in the neck muscles, incorrect posture and position of the neck for a long duration of time (Situmorang *et al*., 2020).

2. Sample characteristics based on gender

In this study, the sample consisted of 16 people who were Jogja convection workers and tailors in the Giwangan area who experienced pain in those suffering from *neck pain* in the *upper trapezius* muscle. Based on data from 2, there are the most gender samples, namely men with a total of 12 people and women with a total of 4 people.

Based on research results from Salsabila *et al*., (2020), 53.3% of 60 Bank Mandiri Tebet Supomo branch office workers

were men. Among these workers, musculoskeletal complaints were more common among male workers (96.9%) compared to female workers (85.7%). This research is in line with research (Huda, 2021). Which states that of the 89 respondents there are 33 (61%) are male and 21 (39%) so it can be concluded that male respondents are more likely than female, the work done by men tends to be heavier than by Women, of course, exert more energy which increases the workload on the muscles, resulting in muscle tension and weakness which can be at risk of experiencing *neck pain.*

3. based on test data results
   a. Hypothesis I test results

      The *client exercise* intervention was carried out on respondents in group 1 based on the results of VAS data processing before and after treatment in group 1 using the *paired sample t-test* and obtained a value of $p = 0.001$ ($p<0.05$) so it can be concluded that there is an effect of the neck called exercise on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.

      Based on the research results of Rahmanto *et al*., (2020), the results were $p<0.05$, which means there was a *post-isometric* effect, there was a reduction in pain. From the final results, it can be concluded that *post-isometric* reduces pain. descending pain occurs because the force of muscle contraction against the same resistance can trigger an *organ's Golgi tendon* reaction (an *organ's Golgi tendon* reaction can occur due to excessive muscle tension). *Afferent nerve impulses* from the *Golgi tendon* organ will enter the *dorsal spinal cord* and will later meet *inhibitory motor neurons*. This can then stop *afferent motor neuron* impulses which can prevent further muscle contractions, resulting in muscle relaxation which can reduce pain. Pain usually occurs due to tissue adhesions and an inadequate supply of oxygen in the blood which can later cause muscle tension.

      Researchers Auckland & Ghou, (2021) stated that acute mechanical neck pain treated with *post-isometric relaxation* techniques had a greater and faster effect in reducing pain. *Isometric relaxation* is a form of muscle energy technique (MET) in which the patient's muscles are moved in a specific direction against the opposing force of the therapist, mediated by the *Golgi tendon organ* (GTO) when the muscles contract *isometrically*. GTO activates and responds with reflex inhibition and contracting antagonist muscles (with submaximal muscle contraction followed by stretching of the same muscle). It is used in the management of various *musculoskeletal* conditions working on the principle of restoring *biomechanics* and reducing movement restrictions and pain.

   b. Hypothesis test results II

      The *myofascial release* intervention was carried out on respondents in group 2 based on the results of VAS data processing before and after treatment in group 2 using the *paired sample t-test*, obtained a value of $p= 0.002$ ($p<0.05$) so it can be concluded that there is an effect of *myofascial release* on the decline pain in sufferers of *neck pain* in the *upper trapezius* muscle.

      Malik's research results, (2020) stated that there were differences in pain levels in non-specific neck pain patients after MRT intervention. Apart from that, TENS also helps reduce non-specific neck pain. There is no significant difference between the *Myofascial Release* and *Transcutaneous Electrical Nerve Stimulation* techniques on the level of pain in patients with non-specific neck pain. This MRT uses hand modalities to mobilize soft tissue which aims to release *myofascial* adhesions, relax the *myofascial*, increase the range of motion of joints, reduce pain, and close or improve the *myofascial* structure which aims to restore the quality of fluid or lubricant from the *myofascial* tissue, *vasodilate* blood flow,

DOI : https://10.23917/fisiomu.v5i1.2771

tissue mobility and normal function. MRT plays a role in providing stretching or lengthening of muscles and *myofascial* structures to eliminate adhesions, reduce pain with *gate control theory*, restore the quality of lubricating fluid from myofascial tissue, normal mobility and function of joint tissue.

Based on research conducted by Werenski (2011), Laksmi *et al*., (2016) stated that *myofascial release* can reduce the level of pain due to *musculoskeletal* complaints which is supported by the *gate control theory* with the statement that when the human body is given stimulation in the form of stimulation. sensory, the performance of the nervous system is faster than the perception of pain, so the stimulation of sensory stimuli will affect the reception and sending of pain receptors that go to the brain, this can have an effect in the form of decreasing pain receptors due to the parasympathetic response which releases *stress* and pain hormones.

c. Hypothesis test results III

The results of the Independent *Sample T-test* were obtained (*p-value*) of 0.028. This means the probability is greater than 0.05 (>0.05). This means that there is no difference in the effect of *neck exercise* and *myofascial release* on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.

Post-isometric relaxation and muscle lengthening so that it can activate the *Golgi tendon* organs and muscle spindles to reduce muscle tone or muscle tension. The gradual lengthening of muscle fibres will cause decreased *adhesion* between muscle fibres and *fascia*. This therapeutic effect causes muscle fibres to return to elasticity and contract lengthwise and shorten easily so that muscle pain can be reduced. stimulates *afferent nerve* impulses that enter the dorsal roots of the spine meet *inhibitory motor neurons* and stop at the *afferent motor neurons*, impulses that prevent them from working by releasing tissue that has adhesions, so that blood circulation in the area becomes a continuous contraction to relax the agonist's muscles (Anwar *et al*. ., 2023).

Myofascial release is smooth so it will reduce spasm and pain. The movement of *myofascial release* itself is a massage movement with a combination of pressing and *stretching*, which stretches the fascia structure to release adhesions which will reduce pain and restore the quality of the lubricating fluid from the *fascia* tissue (Arifin &, Yohanes Deo Fau, Fransisca Xaveria Hargiani, 2023).

Based on the results of this study, it can be concluded that these two exercise therapy treatments do not have different effects in terms of reducing pain in sufferers of *upper trapezius* muscle *neck pain*. These two exercises have the same mechanism and work targets, so they can reduce pain in sufferers of *upper trapezius* muscle *neck pain*. In this study, the results obtained were that there was no difference in the effect of the *neck called exercise* and *myofascial release* on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.

CONCLUSION

Based on the results and discussion of the thesis entitled "The Difference in the Effects of *Neck Calliet Exercise* and *Myofascial Release* on Reducing Pain in Patients with *Upper Trapezius* Muscle *Neck Pain*" it can be concluded as follows:

1. There is an effect of the *neck called exercise* on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.
2. There is an effect of *myofascial release* on reducing pain in sufferers of *neck pain* in the *upper trapezius* muscle.
3. There is no difference in the effect of *neck exercise* and *myofascial release* on reducing pain in sufferers of *upper trapezius* muscle *neck pain*.

SUGGESTION

Suggestions for further research

a) In future researchers, it is hoped that they will be able to control the respondents' daily

activities such as posture and duration of work which can cause pain in the *upper trapezius* muscle.

b) It is hoped that future researchers will be able to add to the causal factors for cases of *neck pain*.

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DOI : https://10.23917/fisiomu.v5i1.2771

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KETERANGAN LAYAK ETIK
DESCRIPTION OF ETHICAL APPROVAL

"ETHICAL APPROVAL"

No.3008/KEP-UNISA/VI/2023

Protokol penelitian yang diusulkan oleh :
The research protocol proposed by

Peneliti utama : Wulan Octari
Principal In Investigator
Nama Institusi : Universitas 'Aisyiyah Yogyakarta
Name of the Institution

Dengan judul:
Title

"PERBEDAAN PENGARUH NECK *CALLIET EXERCISE* DAN *MYOFASCIAL RELEASE* TERHADAP PENURUNAN NYERI PADA PENDERITA *NECK PAIN* OTOT *UPPER TRAPEZIUS*"

Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Concent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 23 Juni 2023 sampai dengan tanggal 24 Juni 2024.

This declaration of ethics applies during the period June 23, 2023 until June 24, 2024.

June 23, 2023
Chairperson,

KEP

Ns. Yuni Kurniasih, S.Kep., M.Kep.

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