



Variations in the Impact of Neck Calliet Exercise and Myofascial Release on Alleviating Discomfort in Individuals with Neck Pain

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ABSTRACT

Background: Neck pain, an unpleasant feeling in the neck region, is a highly common ailment worldwide. It manifests as stiffness, restricted mobility, and discomfort in the neck, leading to a decline in neck function.

Objective: To assess whether there is a distinction in the impact of neck exercises and myofascial release in alleviating pain among patients with neck pain in the upper trapezius muscle.

Methodology: This research employs an experimental approach with a pre-test and post-test two-group design. A total of 16 participants were selected using a random sampling technique. The participants were divided into two groups, with 8 individuals in each group. The first group received neck exercises as treatment, while the second group underwent myofascial release. The exercise regimen was conducted over a period of 2 weeks, with a frequency of 3 sessions per week. The Visual Analogue Scale (VAS) was utilized as the

measurement tool, and the normality of the data was assessed using the Shapiro-Will test. The homogeneity of the groups was examined using Lavene's test. Hypothesis testing, I and II were conducted using paired sample t-tests, while hypothesis testing III employed an independent sample t-test.

Conclusion: The findings indicate that there is no significant distinction in the impact of neck exercises and myofascial release in reducing pain among patients with neck pain in the upper trapezius muscle.

Keywords: neck calliet exercise, myofascial release, neck pain, upper trapezius muscle.

INTRODUCTION

Neck pain refers to injuries that cause abnormalities or disrupt the movement systems of the human body, such as muscles, tendons, and ligaments (Tam et al., 2021). Among the various complaints associated with, neck muscle pain is one of the most commonly experienced by workers, particularly adults (Dewi et

al., 2020). The World Health Organization (WHO) identifies occupational risks as one of the leading causes of death and morbidity worldwide (Panjaitan et al., 2021). According to data from the International Labor Organization (ILO) in 2013, approximately 2 million workers lost their lives due to work accidents or work-related diseases, with around 2.02 million deaths attributed to work-related diseases (ILO, 2013). Shockingly, work accidents claim the life of at least one worker every 15 seconds globally, while 160 workers suffer from work-related consequences (Rahmah & Herbawani, 2022). While working in a hunched position, specifically with the head pushed forward, the neck and shoulder muscles are engaged to stabilize the body. This can lead to continuous static contractions in the neck muscles, with the upper trapezius being the primary muscle involved (Kadek Pradnya Prameitha Pratiwi Nartha, 2023). This condition can have negative effects on work hours, productivity, alertness, and increase the risk of work-related accidents. In severe cases, it may also require costly recovery treatments (Pt et al., 2018).

Neck pain is a condition that significantly impacts individuals, society, and business life. Workers affected by neck pain may experience stiffness, limited movement, and pain in the neck, which can impair their ability to work effectively. Neck function refers to the ability to perform movements such as turning the head, rotating, and looking down independently (Rahim et al., 2019). Neck pain is a common musculoskeletal disorder among adults. It is characterized by discomfort and emotional distress caused by damage to the neck's tissues or structures. The causes of neck pain are multifaceted and can be triggered by various factors (Nafisah et al., 2023).

Neck pain typically originates above the spine and can be attributed to injuries, muscle tension, or improper functioning of the neck's components (Jehaman et al., 2022). The global annual incidence of neck pain among adults complaining of discomfort is estimated to be 16.6%, with 0.6% progressing to severe neck pain (Nadhifah et al., 2019). In Indonesia, the monthly incidence of neck pain is 10%, reaching 40% annually. Neck pain prevalence among workers ranges from 6% to 67%, with a higher prevalence among women (Sunyiwara et al., 2019). In Yogyakarta, the prevalence of neck pain among workers is reported to be 68.7% according to Rahdini in 2016 (Khusnaini, 2020). According to the Bureau of Labor Statistics (BLS),

Myofascial release is a manual technique that combines stretching and pressure to address adhesions in the affected muscles and promote full range of motion (ROM) while reducing spasms (Jehaman et al., 2020). This technique involves applying pressure and stretching to the fascia structure to release adhesions, alleviate pain, and restore the lubricating quality of the fascia tissue (Adinda Riestiani Hernatha Putri, 2019). In this study, researchers are interested in investigating the differential effects of neck exercises and myofascial release on reducing pain in individuals with upper trapezius muscle neck pain.

METHODOLOGY

The research was conducted at Jogja Konveksi and Arleta using a Quasi-Experimental Design. The study employed a pre-test and post-test two-group design, with a total of 16 participants. The participants were divided into two groups: Group 1 received neck exercises, while Group 2 received myofascial release

treatment. Prior to the treatment, the pain levels of both groups were measured using a Visual Analogue Scale (VAS) to establish a baseline. The training was conducted over a period of 2 weeks, with a frequency of 3 times per week. After completing 6 sessions of treatment, pain measurements were taken again to assess the pre-post-test results, which were then analyzed. The sample size for this study consisted of 16 individuals, with 8 participants in each group. A purposive sampling technique was employed, wherein samples were selected based on specific criteria that met the inclusion and exclusion criteria.

a. Inclusion Criteria:

- 1) Participants aged between 20-40 years old.
- 3) Interested in participating in a research program.
- 4) Currently experiencing severe pain for a duration of less than 6 months.

b. Exclusion Criteria

- 1) Currently taking any pain relievers.
- 2) Engaging in therapy or exercises other than those provided by the researcher.
- 3) Presence of neck trauma such as injury, fracture, or other related conditions.

c. Drop Out Criteria

- 1) Participants who do not continue with the research within the specified time limit due to certain reasons.
- 2) Participants who fail to participate in the research twice in a row.
- 3) Participants who do not consistently follow the research procedures during the study.

When analyzing the collected data, the researchers utilized various statistical tests, which included:

- a. Descriptive statistics were employed to provide an overview of the distribution of participants' characteristics based on gender, age, and the Visual Analog Scale (VAS).
- b. The Shapiro-Wilk Test was used to assess the normality of the data in each treatment group. If the p-value is 0.05 or higher, it indicates that the data is normally distributed.
- c. The Levene Test was conducted to examine the homogeneity of the data. If the p-value is 0.05 or higher, it suggests that the data is homogeneously distributed.
- d. For Hypotheses I and II, a parametric comparison test (paired sample t-test) was employed if the data followed a normal distribution. If the data distribution was not normal, the Wilcoxon Test was used. The null hypothesis (H_0) is rejected if the p-value is greater than 0.05, while the alternative hypothesis (H_a) is accepted if the p-value is less than 0.05.

RESULT

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

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

Table 3: Data Normality Test with Shapiro Wilk Test

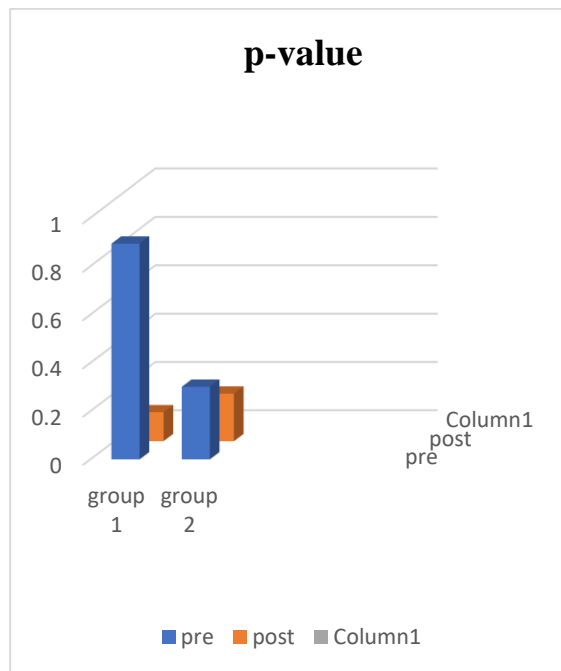


Table 4: Normality Test with Lavene's

Group	Value(p)
Group pre-1&2	0.265
Group post 1&2	0.028

Table 5: Test Hypothesis I in treatment group 1

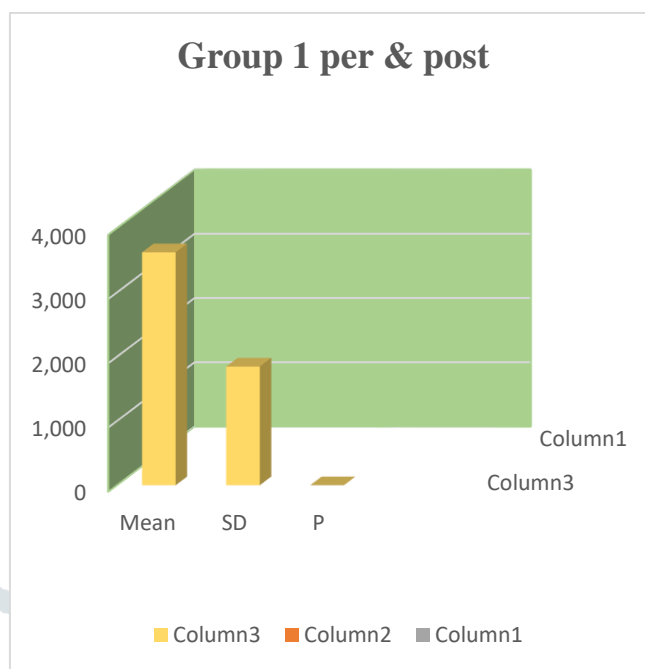


Table 6: Test Hypothesis II in treatment group 2

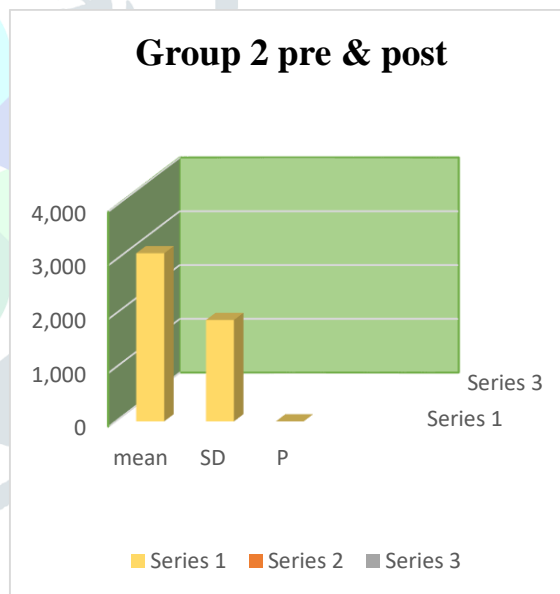


Table 6: Hypothesis Test III

Group	Independent T-test	
	Mean	P
Post group 1	0.375	0.028
Post group 2	0.375	

DISCUSSION

1. Sample characteristics based on age

The study included a sample of 16 individuals who were Jogja convection workers and tailors in the Giwangan area. These individuals were experiencing neck pain specifically from the upper trapezius muscle. The data revealed that the sample consisted of individuals ranging from 20 to 50 years old, with the highest age group being 20-30 years old and the least age group being 41-50 years old. This distribution was observed in both group 1 and group 2. According to a study conducted by Nadhifah et al. (2021), it was found that individuals below the age of 30 tend to experience more neck pain. This finding aligns with the research conducted by Ridlo et al. (2023), where the majority of respondents in their study were between 20-30 years old (60%). The flexion of the neck, along with factors such as tension in the neck muscles, incorrect posture, and prolonged neck positions, can contribute to the weight and pressure on the cervical spine, leading to pain (Situmorang et al., 2020).

2. Sample characteristics based on gender

The study included a sample of 16 individuals who were Jogja convection workers and tailors in the Giwangan area. These individuals were experiencing neck pain specifically from the upper trapezius

muscle. Based on the data from 2, it was observed that the sample consisted of 12 men and 4 women, making men the majority gender in the study. According to the research conducted by Salsabila et al. (2020), out of 60 Bank Mandiri Tebet Supomo branch office workers, 53.3% were men. Among the workers, musculoskeletal complaints were more prevalent in male workers (96.9%) compared to female workers (85.7%), according to research conducted by Huda in 2021. The study included 89 respondents, of which 33 (61%) were male and 21 (39%) were female. This suggests that male respondents are more likely to experience musculoskeletal issues, possibly due to the heavier workload typically performed by men, requiring more energy and putting additional strain on the muscles. This increased workload can lead to muscle tension and weakness, increasing the risk of neck pain.

3. Based on the test data results

a) Hypothesis I test results

The client exercise intervention was implemented on respondents in group 1, and the VAS data was processed before and after treatment using the paired sample t-test. The analysis revealed a p-value of 0.001 ($p < 0.05$), indicating a significant effect of neck exercises in reducing pain among individuals with upper trapezius muscle neck pain.

The research conducted by Rahmanto et al. in 2020 also showed a p-value of less than 0.05, indicating a post-isometric effect and a reduction in pain. The final results suggest that post-isometric exercises can effectively alleviate pain. This is because the force of muscle contraction against resistance can trigger the

Golgi tendon reaction, which in turn activates inhibitory motor neurons in the dorsal spinal cord. These neurons can inhibit further muscle contractions, leading to muscle relaxation and a reduction in pain. Pain often arises from tissue adhesions and inadequate oxygen supply in the blood, which can result in muscle tension.

According to a study conducted by Auckland & Ghou (2021), the use of post-isometric relaxation techniques in treating acute mechanical neck pain has been shown to have a more significant and faster impact in reducing pain. Post-isometric relaxation is a type of muscle energy technique (MET) where the patient's muscles are moved in a specific direction against the therapist's opposing force, utilizing the Golgi tendon organ (GTO) to contract the muscles isometrically. The GTO then activates and responds by reflexively inhibiting and contracting antagonist muscles, followed by stretching of the same muscle with submaximal muscle contraction. This technique is commonly used in managing various musculoskeletal conditions by restoring biomechanics and reducing movement restrictions and pain.

b) Hypothesis test results II

In another study by Malik (2020), it was found that there were differences in pain levels among non-specific neck pain patients after undergoing myofascial release technique (MRT) intervention. Additionally, Transcutaneous Electrical Nerve Stimulation (TENS) was also found to be effective in reducing non-specific neck pain. However, there was no significant difference observed between the Myofascial Release and TENS techniques in terms of pain levels in patients with non-specific neck pain.

MRT involves the use of hand modalities to mobilize soft tissue, aiming to release myofascial adhesions, relax the myofascial, improve joint range of motion, reduce pain, and enhance the myofascial structure to restore the quality of fluid or lubricant in the myofascial tissue and promote vasodilation of blood flow.

Tissue mobility and normal function are crucial for maintaining overall health and well-being. Magnetic Resonance Therapy (MRT) plays a significant role in achieving these goals by providing stretching and lengthening of muscles and myofascial structures, thereby eliminating adhesions and reducing pain through the gate control theory. Additionally, MRT helps restore the quality of lubricating fluid in myofascial tissue, promoting normal mobility and function of joint tissue.

According to research conducted by Werenski (2011) and Laksmi et al. (2016), myofascial release has been found to effectively reduce pain associated with musculoskeletal complaints. This is supported by the gate control theory, which suggests that sensory stimulation can override the perception of pain. By stimulating sensory receptors, the nervous system responds faster than the perception of pain, leading to a decrease in pain receptors. This parasympathetic response also helps release stress and pain hormones, further contributing to pain reduction.

c) Hypothesis test results III

In results, the Independent Sample T-test yielded a p-value of 0.028, indicating that there is no significant difference in the effect of neck exercise and myofascial release on reducing pain in individuals with upper trapezius muscle neck pain. This suggests

that both interventions can be equally effective in alleviating pain in this population. Post-isometric relaxation and muscle lengthening are important techniques used in MRT. These techniques activate the Golgi tendon organs and muscle spindles, leading to a reduction in muscle tone and tension. Gradual lengthening of muscle fibers helps decrease adhesion between muscle fibers and fascia, restoring elasticity and promoting ease of muscle contraction. As a result, muscle pain is reduced. Furthermore, MRT stimulates afferent nerve impulses that enter the dorsal roots of the spine. These impulses interact with inhibitory motor neurons and prevent them from working, ultimately releasing tissue adhesions. This process contributes to the overall effectiveness of MRT in improving tissue mobility and function. The study conducted by Anwar et al. (2023) suggests that myofascial release can help relax the agonist's muscles by promoting continuous contraction in the area. This technique involves a combination of massage movements, including pressing and stretching, which effectively stretches the fascia structure and releases adhesions. As a result, pain and spasms are reduced, and the quality of the lubricating fluid from the fascia tissue is restored.

CONCLUSION

Furthermore, the study concludes that both neck calliet exercise and myofascial release have similar effects in reducing pain for individuals with upper trapezius muscle neck pain. These two treatments target the same mechanisms and work towards alleviating pain in this specific area. Therefore, there is no significant difference in the effectiveness of neck exercise and myofascial release in reducing pain for individuals with upper trapezius muscle neck

pain. In summary, the findings of this study highlight the positive effects of both neck calliet exercise and myofascial release in reducing pain for individuals with upper trapezius muscle neck pain. These treatments can be considered viable options for managing and alleviating pain in this specific population.

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