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The Effect of Static Stretch and Static Contraction on Pain and Functional Ability of Knee Pain Sufferers

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ABSTRACT

Introduction: Knee pain is caused by various things, for example, excessive daily activities, obesity, osteoarthritis, trauma to the knee, age, post-surgery, and the work of housewives who often carry out excessive daily activities by squatting for a long time while washing. dishes and washing clothes, resulting in knee pain and decreased functional ability. **Methods:** This research is quantitative research with an experimental design (the one-group pretest-posttest) involving 10 samples of PKK mothers. The research began in May 2023-February 2024, and the intervention was carried out for 2 weeks with an intensity of 6 meetings. There are 2 instruments used, namely the visual analogue scale (VAS) to measure pain and the Jette scale to measure functional ability. Data analysis used SPSS with the Wilcoxon test. **Result:** Giving a combination of Static Stretch and Static Contraction can significantly reduce pain ($p<0.05$) and increase the functional ability of knee pain sufferers ($p<0.05$). **Conclusion:** There is an effect of the combination of Static Stretch and Static Contraction on reducing pain and increasing the functional ability of knee pain sufferers at PKK Rt 02 Dusun Manggung Sidoarjo.

Keywords: *Knee Pain, Activity Daily Living, Static Stretch, Static Contraction*

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INTRODUCTION

Knee pain is experienced by around 25% of adults and its prevalence has increased by almost 65% in the last 20 years (Bunt et al, 2018). Knee pain sufferers aged >65 years in Asia will double in the next two decades. In 2009 in Indonesia, there were 5% of knee pain sufferers aged 60 years (Paerunan et al, 2019). Knee pain is a degenerative joint disease which is one of the symptoms of osteoarthritis (Lestari, 2022). Knee pain can be caused by various things, for example, excessive daily activities, obesity, osteoarthritis, trauma to the knee, age, and post-surgery (Pristianto et al, 2022). In PKK Rt 02 Dusun Manggung Sidoarjo, as many as 60% of mothers experienced knee pain due to excessive daily activities due to sitting or squatting for a long time due to washing dishes and washing clothes, resulting in knee pain and decreased functional ability. This is because muscle performance is unbalanced which causes the gastrocnemius muscle to tense and cramp (Simanungkalit & Sitepu, 2020).

Knee pain has been shown to change many aspects of motor function including muscle coordination and gait. Decreased muscle function is related to the development of structural disease, resulting in adaptation to pain because decreased muscle function can be a source of pain that may occur due to structural changes (Duwa, 2020). Repetitive daily activities with heavy loads can also trigger knee pain. Activities carried out repeatedly over a long period will encourage the muscles to maintain optimal body position (Dewanti et al, 2022). There is a lack of knowledge in treating knee pain and there are no physiotherapists in the village, so they only get

massages and are left alone. However, many people get sicker after a massage and other complaints arise. It is important to get proper treatment by a physiotherapist with various exercise therapies and modalities. In previous research, knee pain was given Retro walking Exercises and static contraction interventions to improve daily activities (Dewanti et al, 2022).

Exercise therapy can reduce pain, prevent muscle atrophy and improve lower extremity motor function (Huang et al, 2018). Based on existing research subjects and various literature reviews, researchers determined a combination of Static Stretch and Static Contraction to reduce pain and increase functional ability for knee pain in PKK Rt 02 Dusun Manggung. Static Stretch training will stretch the muscles and achieve normal flexibility, thus affecting the widening of the capillaries in the muscles, then good blood circulation will reduce the buildup of irritant waste and metabolic waste and increase the oxygen supply to muscle cells so that pain will be reduced (Afia et al, 2018). Static Contraction exercises are exercises that involve contracting muscles without movement (Dewanti et al, 2022). Static Contraction exercises aim to strengthen the quadricep muscles to reduce pain in the knee joint to stabilize the joint in the appropriate position to avoid excessive pressure on the knee joint (Wiguna et al, 2016). This has encouraged researchers to innovate by combining Static Stretch and Static Contraction exercises to help reduce knee pain and increase functional ability (Dewanti et al, 2022; Nuari et al, 2022).

METHODS

This research is quantitative with an experimental design (the one group pretest post-test) involving 10 PKK Rt 02 Dusun Manggung Sidoarjo samples. The inclusion criteria for this study were knee pain with a VAS score of 4-6, housewife occupation, age 45-50 years, not taking medication, never having surgery, and not being pregnant. The exclusion criteria for this study were patients who had a history of injury, were taking medication, had surgery, were pregnant, and had a history of comorbidities. The research began in May 2023-February 2024, and the intervention was carried out for 2 weeks with an intensity of 6 meetings. There are 2 instruments used, namely the visual analogue scale (VAS) to measure pain and the jette scale to measure functional ability (Stephan and Abdul, 2022). Data analysis used SPSS with the Wilcoxon test.

Figure 1. Static Stretch (Lee et al, 2020)

The way to do the Static Stretch is to sit with the right leg extended and the left leg flexed, the right hand holding the big toe so that the hamstring is maximally extended and the left hand holding the knee for fixation. Do 3 sets, with a holding time of 15 seconds and a rest of 5 seconds, do it for 1 minute, then do it alternately. This dose is by research conducted by Lee et al in 2020.

Figure 2. Static Contraction (Pratama, 2021)

Then do the Static Contraction exercise as shown in the picture above. In the sitting position, the right leg knee is extended and the left leg is flexed knee. Don't forget to put a towel under the knee as fixation so that the knee joint remains stable. Then contact to full knee extension. Hold for 6 to 10 seconds and rest for 2-3 seconds, do 6

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times within 1.5 minutes, then alternate. This dose is by research conducted by Handini et al in 2022.

RESULTS

Table 1. Descriptive Test

Variable	N	Range	Rerata±SD
Age	10	45-50	47.50±1.581
Pain Complaints	10	4-6	4.50±0.707

The research was conducted at RT 02 Dusun Manggung, Sidoarjo. All respondents are PKK mothers who work as housewives. The age range of respondents starts from 45-50 years. Respondents were sufferers of knee pain caused by excessive daily living activities with complaints of pain with a VAS score of 4-6.

Table 2. Normality test

Variable	Rerata±SD	P value
Knee Pain Pretest	4.50±0.707	0.002
Posttest Knee Pain	0.50±0.707	0.002
Functional Ability Pretest	16.50±1.179	0.157
Functional Ability Posttest	9.60±0.516	0.001

The normality test above uses the Shapiro-Wilk test to show data distribution (α=0.05). The results of the normality test showed that all data were not normally distributed ($p<0.05$) except for the functional ability pretest data which was normally distributed ($p>0.05$). Because the data is not normally distributed, the hypothesis test uses the Wilcoxon test.

Table 3. Hypothesis testing

Variable	Rerata±SD	' value
Knee Pain Pretest	4.50±0.707	0.005
Posttest Knee Pain	0.50±0.707	
Functional Ability Pretest	16.50±1.179	0.005
Functional Ability Posttest	9.60±0.516	

From the description of the table above, the hypothesis results are accepted because $p<0.05$, there is an effect of the combination of Static Stretch and Static Contraction on reducing pain and increasing the functional ability of knee pain sufferers at PKK Rt 02 Dusun Manggung Sidoarjo.

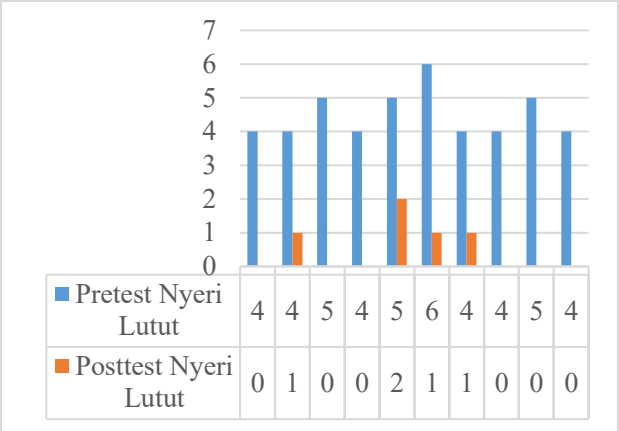

Figure 3. Pain Measurement Results

Based on the pain measurement results above, in the pretest knee pain measured using VAS from 10 respondents showed a pain scale score of 4 in 6 people, a score of 5 in 3 people and a score of 6 in 1 person. After giving a combination of Static Stretch and Static Contraction exercises with an intensity of 6 meetings for 2 weeks with a duration of 2.5 minutes per meeting. The knee pain post-test results showed that the pain scale was 2 in 1 person, 1 in 3 people and 0 in 6 people. The lower the VAS value, the less pain, if the value is 0, there is no pain. From the knee pain measurement results above and supported by the results of statistical analysis in Table 3, it can be seen that giving a combination of Static Stretch and Static Contraction exercises can reduce knee pain significantly ($p<0.05$).

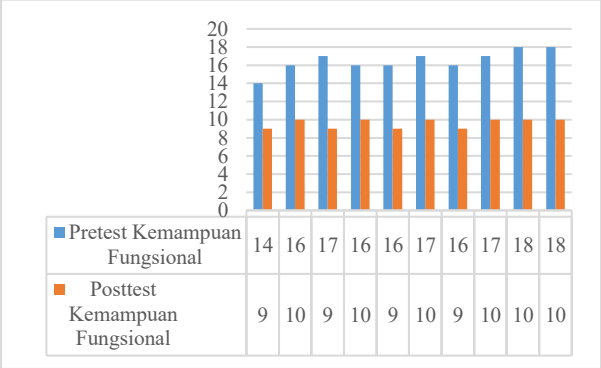

Figure 4. Functional Ability Measurement Results

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Based on the results of measuring functional abilities above, in the pretest functional abilities measured using the jette scale from 10 respondents showed a total score of 14 for 1 person, 16 for 4 people, 17 for 3 people, and 18 for 2 people. After giving a combination of Static Stretch and Static Contraction exercises with an intensity of 6 meetings for 2 weeks with a duration of 2.5 minutes per meeting. The posttest results obtained for measuring functional abilities were measured using the Jette scale, namely a total score of 9 in 4 people and a score of 10 in 6 people. The lower the total score, the more functional ability increases. From the results of measuring functional ability above and supported by the results of statistical analysis in Table 3, it can be seen that giving a combination of Static Stretch and Static Contraction exercises can significantly improve functional ability in knee pain sufferers ($p<0.05$).

Based on the description of the research results above, it is proven that administering a combination of Static Stretch and Static Contraction to 10 knee pain respondents aged 45-50 years with pain complaints of VAS 4-6 can reduce pain ($p<0.05$) and increase functional ability ($p<0.05$) sufferers of knee pain significantly (Matsuo et al, 2019; Rahmah, 2023).

DISCUSSION

Based on the research results in Table 1, the respondents consisted of 10 PKK mothers aged 45-50 years with complaints of knee pain on a scale of 4-6 due to excessive daily activities. Knee pain can be caused by various things, for example, excessive daily activities, obesity, osteoarthritis, trauma to the knee, age, and post-surgery (Pristianto et al, 2022). This is because knee pain is a degenerative joint disease which is one of the symptoms of osteoarthritis (Lestari, 2022). Repetitive daily activities with heavy loads can also trigger knee pain. Because activities carried out repeatedly over a long period will encourage the muscles to maintain optimal body position (Dewanti et al, 2022). Knee pain in the long term will affect functional ability because it is difficult to carry out activities due to pain in the knee so functional ability decreases. So it is necessary to carry out exercise therapy to reduce pain, prevent muscle atrophy and improve motor function of the lower extremities (Huang et al, 2018). Exercise is very important for managing knee pain. However, one exercise alone is not enough, so researchers combine exercises to speed up the healing of knee pain (Dewanti et al, 2022)

The combination of exercises in this research is Static Stretch and Static Contraction. Static Stretch training aims to increase blood flow, bring nutrients to the muscles remove metabolic waste from the muscles and speed up recovery from muscle injuries (Handini et al, 2022). Static Contraction training aims to stimulate more active muscle intensity so that muscle strength increases. The benefits resulting from both exercises are interrelated so they are suitable to be combined. Static Stretch exercises lengthen the muscles so they relax, while Static Contraction exercises to strengthen the muscles and stabilize the knee joint so that pain is reduced and functional ability increases (Dewanti et al, 2022; Nuari et al, 2022).

The results of this study proved that administering a combination of Static Stretch and Static Contraction to 10 knee pain respondents aged 45-50 years with VAS scores of 4-6 could reduce pain (Nuari et al, 2022; Matsuo et al, 2019; Lee et al, 2020) and improve the functional ability of knee pain sufferers (Dewanti et al, 2022; Rahmah, 2023).

CONCLUSION

Based on the research results, it can be concluded that the combination of Static Stretch and Static Contraction which is carried out with an intensity of 6 times in 2 weeks with a duration of 2.5 minutes per meeting can reduce knee pain and increase the functional ability of knee pain sufferers in the women of PKK Rt 02 Dusun Manggung Sidoarjo.

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