

The Effect Of Leg Muscle Strength Exercise On The Intensity Of Prelansian And Elderly Knee Pain In The Village Of Pandean Lamper, Semarang

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ABSTRACT

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Studies using effective treatment/medication options for treating knee pain such as stretching, physiotherapy in the form of infrared, tens, neuromuscular taping, elderly exercise, medication and even surgery, it turns out that many patients do not experience long-term recovery from this treatment. So the formulation of the problem in this study is how to influence leg muscle strength training to treat knee pain. The purpose of this study was to determine the effect of leg muscle strength training to treat knee pain. This research uses quantitative research, the research design uses Pre-Experimental using One Group Pre-Test Post-Test Design. The population in this study were residents of Pandean Lamper Village aged 45 years and over who had experienced knee pain. The number of research samples was 31 people with a purposive sampling technique. The independent variable in this study was leg muscle strength training, the dependent variable was the intensity of knee pain. Data collection time for 6 weeks. The instruments used were Numerical Rating Scale pain scales and observation sheets. The statistical test used in this study was the Wilcoxon signed ranks test. The results of the Wilcoxon different test showed a sig value of $0.000 < 0.05$, this means that there was a significant difference between the results of the pre-test and post-test. So that it can be said that there is an effect of muscle strength training on the intensity of knee pain in pre-elderly and elderly people in the Pandean Lamper sub-district. The conclusion of this study is that pre-elderly and elderly people who experience knee pain should exercise with weights with special movements to train leg muscle strength which is done at least 2x a week to reduce pressure on the knee joints and can also reduce the intensity of knee pain. Suggestions that can be given are that pre-elderly and elderly people should choose or add to their type of exercise with weight sports or exercise to train leg muscle strength so that the leg muscles strengthen, the pressure on the knee joint is reduced so that the knee pain disappears. Finally able to do activities better in the future.

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1. INTRODUCTION

Aging is a natural process experienced by all humans and is characterized by a decrease in the capacity and function of body tissues. Decrease occurs in all body systems, one of which is the musculoskeletal system. Diseases that often occur in the musculoskeletal system are sarcopenia (muscle wasting) and osteoarthritis (inflammation of the joints). Symptoms of this disease are a person feeling weak, tired quickly, moving slower, even pain which can result in disruption of daily activities to metabolic disorders. These symptoms often occur in the knees, because the knees are where almost our entire body rests.

Health experts say that knee pain is still a health problem, the incidence of which reaches

25 percent of the world's population. The city of Semarang also noted that the top 10 diseases at the puskesmas, including muscle disorders, ranked tenth. The number of residents experiencing muscle disorders in Semarang City reached 64,308. If those who are considered starting to have muscle disorders are residents of Semarang City who are aged 55 years and over, namely as many as 277,956 people, then the percentage is around 23 percent.

Information from the Management of the Pandean Lamper Village Health Forum, namely that out of 18 administrators and members, there were 6 people who experienced knee pain. This figure is quite large, namely 33 percent. Most of the research on knee pain management has been carried out, including in Gorontalo City [1], District Gresik [2], using stretching treatments, physiotherapy in the form of infrared, tens and neuromuscular taping. Several other studies regarding the treatment of knee pain with elderly exercise include in Tangerang District [3], Binjai [4] and in Pakkat [5] which looked at the effectiveness of the effect of elderly exercise on knee pain. The gymnastics that are taught to the elderly are also dominated by stretching movements so they don't focus on strengthening leg muscles. The results of these studies can indeed help reduce pain, improve function and physical activity.

The results of this study have been applied in the general public and the medical community (rest, pharmacology, physiotherapy and/or light exercise such as stretching exercises, walking or swimming) but the number of sufferers of knee pain is still quite high. The results of the pre-test on the community service activity entitled "Training for Older Ages Free of Knee Pain in Pandean Lamper Village" in January 2023 which was carried out by researchers, namely all participants along with FKK management and the Lurah did not know about musculoskeletal diseases properly and how a more effective way to prevent or deal with it so that so far they have only made the same efforts as mentioned above.

How long will the efforts that have been made and the results obtained last if the main cause of knee pain, namely excessive pressure on the knee joint due to muscle weakness, is not treated. Research on leg muscle strength training on knee pain intensity is a topic that continues to develop in the field of sports medicine and rehabilitation. Several studies have shown that leg strengthening exercises can help reduce knee pain in individuals with osteoarthritis of the knee or injuries to the knee. A study published in the journal *Arthritis Care and Research* in 2017 showed that 12 weeks of leg strength training can reduce knee pain in individuals with knee osteoarthritis [6]. Another study published in the journal *Sports Health* in 2019 showed that leg strengthening exercises can help improve knee function and reduce pain in individuals with knee ligament injuries [7]. Although several studies suggest that leg muscle strengthening exercises can help reduce knee pain, such research has not been widely carried out, especially since each individual has unique conditions and different responses to leg muscle strength training. Therefore, research still needs to be done on how the effectiveness of leg muscle strength training to treat knee pain in the long term can even be much better than the condition before knee pain.

2. METHOD

This type of research is quantitative, with the Pre-Experimental method using the One Group Pre-Test Post-Test Design. The intensity of knee pain was measured before and after treatment, namely leg muscle strength training. The population in this study were residents of Pandean Lamper Village aged 45 years and over who had and experienced knee pain, namely around 1,760 people. The number of research samples was 31 people with a purposive sampling technique. The independent variable in this study was leg muscle strength training, the dependent variable was the intensity of knee pain. The location of this research is in Pandean Lamper Village, Gayamsari District, Semarang

Data collection time in this study was carried out for 6 weeks. The instrument used was a Numerical Rating Scale pain scale and an observation sheet with the PQRST mnemonic method, namely Provokes (Causes) and Palliative (Relief), Quality (Quality), Radiates (Spread), Severity (Severity), time (Time). The statistical test used in this study was the paired sample difference test with the Wilcoxon signed ranks test.

3. RESULTS AND DISCUSSION

Result

Respondents numbered 31 people (N) with a minimum age of 45 years and a maximum age of 76 years, while the average age of the respondents was 55 years. The standard deviation is 6.61 which is smaller than the mean, indicating that the age data is close to the mean. The minimum pre-test value is 1, the maximum value is 10, the average pre-test value is 3.93. The standard deviation is 2.08 less than the mean, indicating that the pretest data is close to the mean. The minimum post test score is 0, the maximum value is 8, the average post test score is 2.25. The standard deviation is 1.98 less than the mean value, indicating that the post test data is close to the mean value. The Kolmogorov-Smirnov results show that the pre-test data is not normally distributed with a significance value of $0.004 < 0.05$ and the post-test data is also not normally distributed with a significance value of $0.003 < 0.05$.

For this reason, the difference test in this study used a non-parametric test, namely the Wilcoxon test. Negative rank shows a value of 31, this indicates a decrease (reduction) from the pre-test to the post-test (there is a reduction in the intensity of knee pain). 31 respondents experienced a decrease in knee pain intensity. The average decrease is 16, while the number of negative ranks is 496. Positive rank indicates a value of 0, this indicates that there is no increase (increase) in the value of the pre-test to the post-test (no increase in knee pain intensity). Ties shows a value of 0 which means that there are no equal values from the pre and post tests. The results of the Wilcoxon different test showed a sig value of $0.000 < 0.05$, this means that there was a significant difference between the results of the pre- test and post-test. So that it can be said that there is an effect of muscle strength training on the intensity of knee pain in pre-elderly and elderly people in the Pandean Lamper sub-district.

Discussion

The results of this study indicate that training the strength of the leg muscles 2x a week for 6 weeks has an effect on reducing the intensity of knee pain. The results of the post test showed that all respondents (31 people) experienced a decrease in knee pain intensity between 1-3 levels. Studies published in the journal Sports Health in 2019 suggest that leg strengthening exercises can help improve knee function and reduce pain in individuals with knee ligament injuries. This is supported by the results of research conducted by Chinelo N. Onwunzo, Sylvester E. Igwe, Joseph O. Umunnah, Chigozie I. Uchenwoke, Uchechukwu A. Ezugwu (2021) that at the end of 6 weeks, isometric strengthening exercises show a significant effect on intensity pain, range of motion, and functional abilities among subjects with knee osteoarthritis [8].

The movements to train leg muscle strength used in this study were knee flexion and extension combined with isometric movements to strengthen the quadriceps and hamstring muscles for 8-12 repetitions, 2-4 sets. This is supported by the results of other studies on the effect of exercise on knee osteoarthritis on the quality of life of obese adult patients. It is said that exercise can reduce pain with $p = 0.049$. By doing knee extension flexion can increase muscle strength by 15-16%. Other research says that knee exercises will increase muscle endurance, increase proprioceptive acuity, and reduce quadriceps arthrogenic muscle inhibition. Increasing the strength of the quadriceps muscles is very important for stabilizing the knee, thereby reducing the burden on the knee joint in carrying weight orduring activities.

4. CONCLUSION

People entering the pre-elderly and elderly ages who often take part in heart-healthy gymnastics, walking or swimming, there are still quite a lot of people who complain that their knees hurt because these types of sports are not dominant for training leg muscle strength but instead press on the knee joints constantly except swimming. Swimming is not a sport to strengthen leg muscles. Pre-elderly and elderly people who experience knee pain are not enough to maintain the health of their knees with just the types of sports mentioned above, but must do weight sports with special movements to train leg muscle strength which is done at least 2x a week to reduce pressure on the knee joints and also reduce the intensity of knee pain. Advice

that can be given to pre-elderly and elderly people who experience knee pain, you should choose or add to the type of exercise with weights or exercise to train leg muscle strength so that the leg muscles strengthen, the pressure on the knee joint is reduced so that the knee pain disappears. Finally able to do activities better in the future.

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