

Conference Paper

The Effectiveness of Infrared and Retrowalking Exercise on Pain Reduction in Patients With Knee Osteoarthritis

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Abstract.

Knee osteoarthritis is a condition that causes weak bone strength and poor bone formation. The main cause is musculoskeletal pain. Treatment of pain in knee osteoarthritis patients is usually through infrared and retrowalking. The mechanism of infrared in reducing pain is through mild heating which gives a sedative effect on sensory nerve endings, while retrowalking decreases pain through rehabilitation exercise techniques for the lower extremities. This research aimed to compare the effectiveness of infrared and retrowalking on pain reduction in knee osteoarthritis patients at Puskesmas Kendal Kerep. This was a quasi-experimental study with 30 participants from Puskesmas Kendalkerep, divided into 2 groups: Group I (with infrared, n = 15) and Group II (with retrowalking, n = 15). Participants in both groups were given their interventions for 5 weeks. The level of pain was measured using the VAS scale at baseline and after the intervention. The paired t-test analysis showed that there was an improvement in pain in both groups after being given the interventions, while the independent t-test showed that there was no significant difference between the groups in the level of pain reduction.

Keywords: knee osteoarthritis, knee pain, infrared, retrowalking

1. Introduction

Aging is considered a physiological event that must be experienced by living things. Until now, it is not known with certainty the occurrence of the aging process. Experts suspect due to the presence of free radical compounds, arteriosclerosis, and lack of physical activity. The aging process is a challenge that must be overcome because it is defined as a process of decline in work performance and a decrease in one's physical capacity. As a result, the elderly become less productive, susceptible to disease and depend a lot on others [1].

In 2000, the number of elderly people in Indonesia is projected to be 7.28% and in 2020 it will be 11.43% [2]. According to [3], almost 8% of people aged 50 years and

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over have complaints in their joints, especially rheumatic pain, aches and pains. Some abnormalities due to joint changes that occur in the elderly include; gout, rheumatoid arthritis, and osteoarthritis [4].

Osteoarthritis is a condition that is described by weakness of bone strength and poor bone structure [5]. Meanwhile, [6] said that osteoarthritis is known as a degenerative disease associated with excessive bone growth. This disease is more common in the knee, the main cause of which is chronic musculoskeletal pain and inability to move in old age, or it can also be caused by carrying a load that is too heavy to exceed the requirements [7].

Most knee osteoarthritis patients use a combination of pharmacological and non-pharmacological in their treatment. Recommendations from the American College of Rheumatology (ACR) in knee osteoarthritis, non-pharmacological therapies include aerobic exercise, strength exercise, hydrotherapy, and weight loss [8].

Aerobic exercise that is safe and recommended by sports experts is to maintain stamina, for example, walking and swimming. The most important benefit is to maintain the condition of the heart, lungs, blood circulation and muscles [1]. Aerobic exercise used to treat pain in patients with osteoarthritis in the knee joint is retrowalking [9].

According to [10] the application of infrared is considered more effective when compared to the use of hot water in reducing pain levels in knee osteoarthritis patients. On sensory nerves, light heating has a sedative effect on sensory nerve endings so that pain in patients can be reduced [11].

2. Method

This study uses a quasi-experimental design with pre and post tests involving 30 respondents using quota sampling. The sample was divided into 2 intervention groups, namely infrared therapy group (n=15) and retrowalking group (n=15). The data obtained were analyzed using paired t test and independent t test.

3. Results

Table 3.1 shows the results of the independent t test for the effectiveness of infrared and retrowalking on reducing pain in knee osteoarthritis patients at Kendal Kerep Health Center.

TABLE 1: *Independent T Test Results on Pain Reduction after giving the intervention in both groups*

	Sig (2-tailed)
Pain Reduction	0,007

The results of the independent t test analysis after infrared and retrowalking with the SPSS program, obtained a significance value of 0.007 ($p < 0.05$), the value of Sig. (2-tailed) < significant level (α) so it can be concluded that H_0 is rejected, thus it can be concluded that there is a significant difference in the effectiveness of infrared and retrowalking on reducing pain in knee osteoarthritis patients at Kendal Kerep Health Center. And according to the results of the comparison of the difference between infrared and retrowalking, there are quite different comparisons of results, the results of the pre-post difference in the infrared group are greater than the results of the pre-post difference in the retrowalking group, so it can be concluded that there is a difference in effectiveness between infrared and retrowalking, where infrared more effective than retrowalking in reducing pain in knee osteoarthritis patients at Kendal Kerep Public Health Center.

4. Discussion

Giving infrared therapy at a distance of 45 cm has an effect on increasing the pain threshold. The increase in pain threshold is due to the sedative effect of infrared, which stimulates heat to the subcutaneous tissue which results in vasodilation of blood vessels so that blood vessel flow increases and substance P participates in the blood flow, as well as increased metabolism resulting in an increase in the supply of nutrients, O_2 to the tissue so that pain is reduced [12].

Infrared therapy is more effective in reducing pain than retrowalking therapy because the heat stimulation generated by the infrared will stimulate peripheral nerve endings, if this stimulation continues it will activate small fiber nociceptors (A- δ nerve fibers and C nerve fibers) and large fibers (A- β nerve fibers). Activation of these nociceptors will stimulate sensory nerve impulses that travel via axons from primary afferent neurons to the dorsal horn (DH). Activation of C nerve fibers will activate primary afferent neurons that reproduce nerve impulses to DH with excitatory amino acids such as glutamate, aspartate and neuropeptides such as P substance so that activated DH will activate nociceptive impulses to the brain. While the activation of A- α and A- δ nerve fibers will activate inhibitory neurons such as inhibitory amino acids, namely -amino butyrate (GABA) and neuropeptides, these substances bind to primary afferent receptors and

DH neurons and will inhibit nociceptive transmission by pre-mediated mechanisms. - synaptic and post-synaptic so that nociceptor transmission decreases, so nociceptive traffic in DH is not sent directly to the brain but is more modulated which results in pain reduction [12].

5. Conclusion

Giving infrared therapy has a sedative effect so that the patient's pain can be reduced. The warmth caused by infrared can increase superficial tissue vasodilation so that it can accelerate metabolism and cause a relaxing effect on sensory nerve endings.

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