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The Effect of Giving Tens on Reducing Pain Levels in *Low Back Pain Patients* in Anugerah Sehat Physiotherapy Practice

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ABSTRACT

Physical activity requires energy to do it such as walking, going up and down stairs, lifting things, running. Pain can arise in various parts of the body and can be caused by many things, one of which is the working condition of lifting objects, this condition can cause excessive physical stress on the spinal cord so that it causes muscle spasms and makes the nerves squeezed and causes pain in the lower back. TENS is a physiotherapy modality that aims to reduce pain, by sending signals in the form of low-pressure electrical currents to nerves through the conductivity of electrodes attached to the skin area. The purpose of the study was to determine the effect of giving TENS on the reduction of pain levels in *patients with low back pain* in the practice of Physiotherapy Anugerah Sehat. The type of research used is a quantitative type of research, with the research design used is *Quasi Experimental* with *a pre-test* and *post test one group approach*. This research was carried out at the Anugerah Sehat Physiotherapy Practice in February 2024. The population in this study is *70* Low Back Pain patients.The sampling technique in this study uses a total sampling technique with *the purposive sampling* method, the number of samples in this study is 30 people. Pain scale measurements use the VAS scale. Bivariate analysis was used Paired Sample T Test *analysis*. The pain outcomes of *patients with low back pain* before the administration of the Tens modality were pain scale 4-6 (moderate pain) for 19 people (63.3%), pain scale 7-10 (severe pain) for 11 people (36.7%). The pain of patients *with low back pain* after the administration of the Tens modality was a pain scale of 1-3 (mild pain) as many as 21 people (70%), followed by respondents who felt a pain scale of 0 (mild pain) as many as 4 people (13.3%) and respondents who felt a pain scale of 4-6 (moderate pain) as many as 5 people (16.7%). There was an effect of TENS administration on the reduction of pain levels in *patients with low back pain* in the Anugerah Sehat physiotherapy practice with a significant value (2-tailed) 0.000<0.05.

INTRODUCTION

Humans have needs that must be met, namely carrying out activities or activities. Some activities may cause physiological problems, one of which is musculoskeletal function which can cause pain. The workplace environment is one of the places that has a higher risk of declining health. These risks can cause various diseases in their workers. Sitting too much, standing and lifting weights will cause pain, pain that is unconscious and lasts for a long time, repeatedly, it will cause symptoms of the disease, which often arises is pain in the lower back (Meliala, *et al*, 2017).

Physical activity requires energy to do it such as walking, going up and down stairs, lifting things, running and so on (Ariyanto et al., 2020 in Nugra & Arin, 2021). When the body does continuous standing or sitting activities, it will make the lower back body work excessively (Susanti et al., 2015 in Nugra & Arin, 2021).

Pain can arise in various parts of the body and can be caused by many things, one of which is the working condition of lifting objects, this condition can cause excessive physical stress on the spinal cord so that it causes muscle spasms and makes the nerves squeezed and causes pain in the lower back. Lower back pain occurs under the 12th thoracal bone and above the sacrum bone. Low back pain is often caused by the asymmetry of the vertebral minor columna, especially in the lumbosacral region

(Karundeng, 2019 in Nugra & Arin, 2021). The lower back becomes painful, the surrounding muscles experience spasm, and functional abilities become decreased (Mustagfirin et al., 2020 in Nugra & Arin, 2021).

Low Back Pain is related to frequent lifting, carrying, pulling and pushing heavy objects, frequent or prolonged bending of the body, bending, sitting or standing for a long time or other postures that are not ergonimic. Another opinion says that in a standing position for a long time, the body can only tolerate standing in one position for only 20 minutes. If it exceeds this limit, slowly the elasticity of the muscle tissue will decrease and eventually the muscle pressure will increase and discomfort will arise in the back area (Kusumawati and Wahyono, 2015).

The prevalence *of low back pain* according to data from WHO (2022) states that musculoskeletal disorders in the world amount to 1.71 billion incidences*, low back pain* is the 3rd health problem in the world, including osteoattritis in 2022 amounting to 528 million people, rheumatism in 2020 amounting to 335 million people and *low back pain* in 2022 amounting to 17.3 million people. Meanwhile, the *prevalence of Low Back Pain* (*LBP*) in Indonesia reaches 18% or around 34.4 million people (*Ministry of Health* of the Republic of Indonesia, 2018).

In Indonesia, epidemiological data on LBP does not yet exist, but it is estimated that LBP sufferers in Indonesia vary between 7.6% to 37% of the total population in Indonesia (Rinaldi et al., 2015). It is estimated that as many as 40% of the population in Central Java who are over 65 years old have suffered from LBP complaints, where the prevalence for men is 18.2% and 13.6% for women. The proportion based on patient visits to several hospitals in Indonesia is known to range from 3-17%. In hospitals in Jakarta, Yogyakarta, and Semarang, the incidence of LBP ranges from 5.4 to 5.8%, and the highest frequency is at the age of 45-65 years. Meanwhile, the prevalence of LBP in workers in Indonesia has never been reported as a whole (Purnamasari et al, 2010).

Low back pain is a symptom, not a diagnosis. In some cases, lower back pain can be treated and prevented by knowing what causes it and how it is prevented. To find out, a complete and thorough examination is needed, especially in specific cases the examination will be more than in non-specific cases. In specific cases there will be additional examinations for neurological abnormalities, most of which are caused by *Nucleus Pulposus Hernia* (HNP), spondylosis, and trauma. In patients with *Nucleus Pulposus Hernia* (HNP), there will usually be low back pain that spreads to the lower limb area, some even to the tips of the big toes and is also characterized by severe pain when the patient strains or sneezes. With this pain, muscle spasms around the vertebrae will arise and limitations of movement in the lumbar vertebrae (flexion, extension, latero flexion), lumbar lordosis is less or more horizontal (Wijayanti, 2012).

Pain is a subjective complaint, so direct information from patients is the *gold standard* for assessment. Information obtained from patients should include current condition (onset, pattern, and course of the disease), location (primary location and pattern of pain spread), quality, factors that aggravate or alleviate pain, and severity (usually measured by *a verbal rating scale*, e.g., mild-moderate-severe, or on a numerical scale of 0-10). *The Numeric Pain Rating Scale* (NPRS) is commonly used to assess pain. *The Numeric Pain Rating Scale* (NPRS) is considered simple and easy to understand, sensitive to doses, genders, and ethnic differences. Better than *the Visual Analog Scale* (VAS) primarily for assessing acute pain. *The Numeric Pain Rating Scale* (NPRS) is described as an 11-point scale with a score of 0 to 10 (Yudiyanta, 2015).

From this problem, it will affect daily life activities such as not being able to work in accordance with their field and not being able to enjoy leisure time due to pain during rest (Wijayanti, 2012). Therefore, the role of doctors and medical personnel is needed to help the healing process, one of which is the role of physiotherapy.

Modalities used by physiotherapy for the treatment of Low *Back Pain cases*. Several studies recommend the administration of therapy using *Transcutaneous Electrical Nerve Stimulation* (TENS) to reduce the incidence in patients with myogenic low back pain. TENS is a physiotherapy modality that aims to reduce pain, by sending signals in the form of low-pressure electrical currents to nerves

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through the conductivity of electrodes attached to the skin area (SA Board for People and Practices 2019). TENS is capable of activating small diameter fibers that will relay various sensory information to the central nervous system. TENS is often referred to as a non-invasive analgesic technique to relieve nociceptive pain and neuropathic pain. The electrical stimulation provided in this intervention is far enough away from the injured or damaged tissue, so that the tissue that causes pain remains effective in modulating pain. During the administration of the TENS intervention, a pulsating electric current is generated by a portable pulse generator and delivered to the surface of the skin with pads called electrodes. TENS provides repetitive current stimulation using pulses of 50-250 ms duration and frequency of 1-200 Hz (Zuhri and Rustanti 2017).

Based on the recorded data, the number of patient visits to the Anugerah Sehat Physiotherapy Practice in July - December 2023 is a total of 70 patient visits. Patients who come complaining of lower back pain ranging from mild pain to unbearable pain, the patient does not know the main cause so that the pain appears and interferes with daily activities. Based on this background, the author is interested in carrying out a study entitled The Effect of TENS Administration on Reducing Pain Levels in *Low Back Pain* Patients in the Anugerah Sehat Physiotherapy Practice.

METHOD

The type of research used is a quantitative type of research, with the research design used is *Quasi Experimental* with a *pre-test* and *post test approach of one group*, namely making a comparison before and after being given treatment with *one group*. In this study, respondents were given the management of physiotherapy measures with TENS on the reduction of pain levels in *patients with low back pain* in the Anugerah Sehat physiotherapy practice.

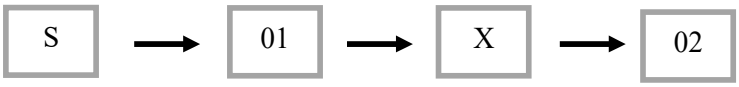

Figure 1. Research Design

Information:
S : Sample
01 : Results of *pre-test* pain intensity before treatment
X : Treatment in the group with TENS during 15x meetings
02 : Results of *post-test* pain intensity after treatment

The population in this study is *70* Low Back Pain patients.The sampling technique in this research uses *a non-probability sampling* technique with a *purposive sampling method* with a determination technique selected through the determination of certain criteria by the researcher (Sugiyono, 2017). The number of research samples was 30 LBP patients. The study was carried out in February 2024, pain measurement using the VAS pain scale. Univariate analysis to see the pain characteristics of LBP patients, bivariate analysis using *the Paired Sample T Test* to determine the Effect of TENS Administration on Reducing Pain Levels in *Low Back Pain Patients* in Anugerah Sehat Physiotherapy.

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RESULTS AND DISCUSSION

Univariate Results

Table 1. Frequency Distribution of Respondent Characteristics

Data	*n*	(%)
Age		
26-35	12	40
36-45	5	16,7
46-55	13	43,3
Total	**30**	**100**
Gender		
Man	9	30
Woman	21	70
Total	**30**	**100**
Education		
SMP	8	26,6
SMA	11	36,7
College	11	36,7
Total	**30**	**100**
Work		
Laborer	3	10
Self employed	18	60
Civil servants	3	10
Other	6	20
Total	**30**	**100**

The results of this study explained that of the 30 research respondents who experienced *low back pain*, the majority of respondents aged 46 years - 55 years were 13 people (43.3%), 26 years - 35 years old as many as 12 people (40%), respondents who had 36 - 45 years old as many as 5 people (16.7%).

The characteristics of respondents based on gender were obtained that the majority of respondents who experienced *low back pain* were female as many as 21 people (70%), followed by male respondents as many as 9 people (30%). The characteristics of respondents based on education were obtained that the majority of respondents who experienced *low back pain* had education in college and high school as many as 11 people (36.7%), followed by respondents with junior high school education as many as 8 people (26.6%). The characteristics of respondents based on occupation were obtained that the majority of respondents who experienced *low back pain* had jobs as self-employed as 18 people (60%), followed by other working respondents as many as 6 people (20%), as civil servants and workers as many as 3 people each (10%).

Table 2. Frequency Distribution of Pain in *Patients with Low Back Pain* Before Administration of Tens Modalities

Pain Scale	*n*	(%)
Pain Scale 0 (No Pain)	-	-
Pain Scale 1-3 (Mild Pain)	-	-
Pain Scale 4-6 (Moderate Pain)	19	63,3
Pain Scale 7-10 (severe pain)	11	36,7
Total	30	100

Based on table 2, the results showed that the frequency of pain in patients *with low back pain* before the administration of the Tens modality was in patients who were assessed as pain using the

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VAS scale, the majority of respondents felt a pain scale of 4-6 (moderate pain) as many as 19 people (63.3%), a pain scale of 7-10 (severe pain) as many as 11 people (36.7%).

Table 3. Frequency Distribution of Pain Frequency in Patients *with Low Back Pain* After Administration of Tens Modality

Pain Scale	*n*	(%)
Pain Scale 0 (No Pain)	4	13,3
Pain Scale 1-3 (Mild Pain)	21	70
Pain Scale 4-6 (Moderate Pain)	5	16,7
Pain Scale 7-10 (severe pain)	-	-
Total	30	100

Based on table 3, the results showed that the frequency of pain in patients *with low back pain* after administration of the Tens modality was in patients who were assessed as pain using the VAS scale, the majority of respondents felt a pain scale of 1-3 (mild pain) as many as 21 people (70%), followed by respondents who felt a pain scale of 0 (mild pain) as many as 4 people (13.3%) and respondents who felt a pain scale of 4-6 (moderate pain) as many as 5 people (16.7%).

Table 4. The Effect of Tens on Reducing *Low Back Pain*

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	5.6364	30	1.02691	.30963
	After	2.0000	30	1.61245	.48617

In table 4, the results of the descriptive summary of the Before and After Tens data are shown that the mean value before Tens is 5.6364, then the result of the mean value after Tens is 2.0000 is obtained.

Tabel 5. Paired Samples Correlations

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Before & After	30	.664	.026

The result of the correlation or relationship between the two before and after data is with a Sig. value of 0.026>0.05, so there is no correlation or relationship between the two data.

Table 6. Paired Samples Test

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Before - After	3.63636	1.20605	.36364	2.82613	4.44660	10.000	10	.000

Based on the data processing carried out using the *Paired Sample Test*, the results were obtained sig. 0.000<0.05, so it was concluded that there was a real difference in *low back pain* of LBP patients before and after Tens.

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Discussion

Age of Respondents

The results of the study that experienced *low back pain* were characterized by age as many as 13 people (43.3%) aged 46 - 55 years, 12 people (40%) aged 26 - 35 years, and 5 respondents (16.7%) aged 36 - 45 years. The results of the research by Nurlaily et al., (2016) obtained results based on the age of the most aged respondents in groups I and II in the age range of 45 years and 50 years. Everyone's age varies because of the difference between a person's birth and death. According to (Azwar, 2007), Age is the level of human life. As an individual ages, they get a higher level of education so that the knowledge they gain continues to increase and develop so that they usually think more realistically.

The results of this study are in accordance with the research conducted by Hartanto, (2016) which states that for age characteristics, in the TENS group, the age with the most age range is >54 years old at 53.3%, then the age range at 35-44 years is 23%, and the least = 34 years at 3.3%. This is in accordance with studies (Evers et al., 2016). which states that one of the physiological risk factors for LBP is the age of 20-50 years, (Benzon et al., 2011). also stated that the risk of LBP increases in patients who age, but once they reach the age of about 65 the risk of stopping increases. the risk is greater for low back pain, while other studies show that women are more likely to experience LBP. Women who have had two or more pregnancies have a higher risk of developing low back pain.

From various epidemiological studies, the incidence of *myogenic low back pain* increases and reaches its peak at about 55 years of age. In general, *skeletal* muscle complaints begin to be felt at the age of 25-65 years. The first complaint is usually felt at the age of 35 and the complaint rate will continue to increase as you age. This happens because at middle age, muscle strength and endurance begin to decrease, so the risk of muscle complaints increases (Ramadhani, 2015).

Gender of Respondents

The results of the research conducted by researchers based on gender obtained the results that the majority of respondents who experienced *low back pain* were female as many as 21 people (70%), followed by male respondents as many as 9 people (30%). The results of the research of Nurlaily et al., (2016) group I female gender amounted to 8 samples and male gender amounted to 2 samples, while in group II female gender amounted to 6 and male samples amounted to 4.

Men and women have the same risk of *myogenic low back pain* until about 60 years of age. Women over 60 years old have a greater risk of *myogenic low back pain* because they tend to osteoporosis. Although there are still differences of opinion from some experts about the influence of gender on the risk of skeletal muscle complaints, some research results significantly show that gender greatly affects the risk level of muscle complaints. This happens because physiologically, women's muscle ability is indeed lower than that of men (Ramadhani, 2015).

Respondent's Job

The results of the research conducted by the researcher based on work obtained the result that the majority of respondents who experienced *low back pain* had jobs as self-employed as many as 18 people (60%), followed by other working respondents as many as 6 people (20%), as civil servants and workers as many as 3 people each (10%).

Heavy physical work, especially those that put considerable pressure on the spine. Work that involves prolonged static positions, such as sitting or standing for long periods of time. The work is done by bending or rotating the body repeatedly (Ramadhani, 2015).

The results of the research of Nurlaily et al., (2016) Based on the work activities of respondents in groups I and II, all workers work in a static state. The time is more than 1 hour. *Myogenic Low Back Pain* is related to the frequent lifting, carrying, pulling and pushing of heavy objects, frequent or prolonged bending of the body, bending over, sitting or standing for long periods of time or other unnatural postures. Standing for a long time, the body can only tolerate standing in one position for

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only 20 minutes. If it exceeds this limit, the elasticity of the tissue will slowly decrease and eventually the muscle pressure will increase and discomfort will arise in the back area. Ergonomic work position is a determining factor in the occurrence of *Low Back Pain* (Irwan, 2014).

Pain of *Myogenic Low Back Pain* Patients Before Giving Tens in Anugerah Sehat Physiotherapy Practice

Based on the results of the study, the value was obtained that the frequency of pain in patients *with low back pain* before the administration of the Tens modality was in patients who were assessed as pain using the VAS scale, the majority of respondents felt a pain scale of 4-6 (moderate pain) as many as 19 people (63.3%), a pain scale of 7-10 (severe pain) as many as 11 people (36.7%). On the severe pain scale, respondents experienced pain on the pain scale of 7.

The results of the research of Pramita & Wahyudi, (2018) Based on the analysis of ODI score data before training using the Wilcoxon match pair test, the median score before training was obtained ± 4212.34.

Pain of Low *Back Pain Patients* After Giving Tens Modalities in Anugerah Sehat Physiotherapy Practice

Based on the results of the study, the value that the frequency of pain in patients *with low back pain* after the administration of the Tens modality was in patients who were assessed for pain using the VAS scale, the majority of respondents felt a pain scale of 1-3 (mild pain) as many as 21 people (70%), followed by respondents who felt a pain scale of 0 (mild pain) as many as 4 people (13.3%) and respondents who felt a pain scale of 4-6 (moderate pain) as many as 5 people (16.7%).

The results of the research of Pramita & Wahyudi (2018) Based on the analysis of ODI score data after training 8±12.26 with p=0.00 (p<0.05) so that there was a decrease in ODI scores. With the above results, it can be concluded that the administration of Tens can improve functional activity in LBP patients.

The Effect of Tens Administration on Reducing Pain Levels in *Low Back Pain Patients* in Anugerah Sehat Physiotherapy Practice

This study was carried out at the Anugerah Sehat Physiotherapy Practice, the number of respondents who became a research sample was 30 people who were assessed *for low back pain* before being given Tens modality therapy for 5 weeks (in 1 week the respondents came 3x physiotherapy visits on Monday, Wednesday and Friday) and then reassessed the *low back pain scale* after being given Tens, The results of the *Tets Sample Paired* Test were considered significant < 0.05 so that the results of this study were the effect of giving Tens on the reduction of *low back pain* levels with a significant value (2-tailed) of 0.000<0.05.

The implementation of therapy is carried out fifteen times (15x) there is a reduction in pain by Tens, Tens therapy is used to overcome nerve problems. The electrical current delivered from the TENS unit will flow through the central nervous system. This can reduce the ability of the nerves to send pain signals to the brain and spinal cord so that the pain slowly decreases.

Transcutaneous Electrical Nerve Stimulation (TENS) is beneficial in some patients with LBP (Adams & Zaniewski, 2012) in the Program for *Control of Rheumatic Disease* 1318% with peak incidence occurring between the ages of 45-60 years. LBP should receive important attention because it affects the patient's work, 80% of working adults will experience low back pain and 1 in 3 of them are unable to work due to low back pain. LBP is also associated with significant comorbidities and health service costs due to increased health service utilization (Evers et al., 2016). TENS is a generic name for a method of stimulation of afferent nerve fibers designed to control pain. TENS activates complex adendence and desendence neural networks, neurochemical transmitters, and opioid/non-opioid receptors that will reduce the conduction of pain impulses and pain perception (Hayes & Hall,

2015). TENS is a nonpharmacological treatment method to reduce pain. TENS can be used to reduce acute pain as well as chronic pain (Dowswell et al, 2011).

CONCLUSION

There is an Effect of Tens Administration on Reducing Pain Levels in *Low Back Pain Patients* in Anugerah Sehat Physiotherapy Practice with a significant value (2-tailed) 0.000<0.05.

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