

## **Effective Treatment in Reducing Pain in Patients With Musculoskeletal Pain Complaints**

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Diterima : 15 Agustus 2017  
Layak Terbit : 19 Desember 2017

### **Abstract**

Musculoskeletal problems are complaints on the parts of the skeletal muscles felt by someone start complaints very mild to very sick. When the muscle receives static load repeatedly and for a long time will may cause complaints of damage to the joints, ligaments and tendons. Complaints to the damage this is what is usually termed the complaint musculoskeletal disorders (MSDs) or injury to the musculoskeletal system (Grandjean, 1993; Lemasters, 1996). This study aims to know a more effective treatment of electrotherapy and deep massage with massage than picking up, in reducing pain in patients with musculoskeletal pain complaints. This study used a quasi-experimental design (quasi experimental) double blind with a value of 5% negligent. This research was conducted at the Rumah Fisio Clinic and Patient's home. These samples included 25 patients, with medical diagnosis of musculoskeletal pain who underwent physiotherapy program from May to July 2016, was taken by randomization techniques. Pain was measured by using Visual Analogue Scale (VAS). The results of the analysis of the t test showed that electrotherapy and deep massage (mean = 3.18) more effective than Picking up (mean = 2) in reducing the patient's pain..

**Keywords:** Musculoskeletal pain, electrotheraphy, deep massage, picking up.

### **Abstrak**

*Pengobatan yang Efektif dalam Mengurangi Rasa Sakit pada Pasien dengan Keluhan Nyeri Muskuloskeletal. Masalah muskuloskeletal adalah keluhan pada bagian-bagian otot rangka yang dirasakan oleh seseorang mulai keluhan yang sangat ringan hingga sangat sakit. Ketika otot menerima beban statis berulang-ulang dalam waktu yang lama dapat menyebabkan keluhan kerusakan sendi, ligamen dan tendon. Keluhan terhadap kerusakan inilah yang biasanya disebut keluhan gangguan muskuloskeletal (MSDs) atau luka pada sistem muskuloskeletal (Grandjean, 1993; Lemasters, 1996). Penelitian ini bertujuan untuk mengetahui pengobatan yang lebih efektif terhadap elektroterapi dan pijat dalam dengan pemijatan daripada picking up, dalam mengurangi rasa sakit pada pasien dengan keluhan nyeri muskuloskeletal. Penelitian ini menggunakan desain kuasi eksperimental (kuasi eksperimental) double blind dengan nilai kelalaian 5%. Penelitian ini dilakukan di Rumah Klinik Rumah Fisio dan Rumah Pasien. Sampel ini termasuk 25 pasien, dengan diagnosis medis nyeri muskuloskeletal yang menjalani program fisioterapi dari bulan Mei sampai Juli 2016, diambil dengan teknik pengacakan. Nyeri diukur dengan menggunakan Visual Analogue Scale (VAS). Hasil analisis uji t menunjukkan bahwa elektroterapi dan pijatan dalam (mean = 3,18) lebih efektif daripada Picking up (mean = 2) dalam mengurangi nyeri pasien.*

**Kata Kunci:** Nyeri otot, elektroterapi, pijat dalam, mengangkat.

### **INTRODUCTION**

Musculoskeletal Problems are complaints on the parts of the skeletal muscles felt by someone start complaints very mild to very sick. When the muscle receives static load repeatedly and for a long time, Will may cause complaints of damage to the joints, ligaments and tendon. Complaints to the damage this is what is usually termed the complaint musculoskeletal disorders (MSDs) or injury to the musculoskeletal system (Grandjean, 1993; Lemasters, 1996). Broadly

speaking muscle complaints can be grouped into two, namely: Complaints temporary (reversible), namely muscle complaints that occur when the muscles receiving a static load, however, the complaint will be lost if loading is stopped, and Complaints persist (persistent), namely muscle complaints that are settled. Although the imposition of work has been stopped, but the pain in the muscles still continues. The study of MSDs in a variety of industries have been carried out and the results showed that part of the muscle that is often complained is the skeletal muscle (skeletal) muscle that covers the neck, shoulders, arms, hands,

fingers, back, waist and bottom muscles. Among the skeletal muscle complaints, experienced by many workers. The report from the Bureau of Labor Statistics (LBS) US Department of Labor published in 1982 showed that nearly 20% of all cases of occupational illness and 25% of compensation costs incurred in connection with the complaint. The amount of compensation costs to be incurred by the company is not known. Nevertheless, the results published by NIOSH estimates indicate that the cost of compensation for skeletal muscle complaints had reached 13 billion US dollars every year. Such costs were the highest when compared to the cost of compensation for the complaint / pain due to other work. (NIOSH, 1996). Meanwhile the National Safety Council reports that the occupational ill highest frequency of occurrence is backache, which is 22% of the 1.7 million cases (Waters, et al, 1996a).

While in Indonesia itself there has been no adequate data on the musculoskeletal pain. Muscle weakness, limitation of motion and impaired motor function of the body must be analyzed to determine the causes of the relationship. Pain in musculoskeletal can cause weakness and loss of control of the movement that was realized, as a form of muscle weakness, directly or indirectly, in the form of trauma / damage to the soft tissue so that physiotherapy is required to make the problem formulation and enforcement of diagnosis will lead to clinical decision making and appropriate treatment, determining factors that cause will also determine the type of treatment that can be given to reduce the patient's pain. (O'Sullivan, 2014).

Physiotherapy has an influence on the control and management of pain patients feel due to involve local network peripheral, neurophysiological and psychophysiological mechanisms, as well as the placebo effect. (Dor, 2012). In this study, the author tries to formulate the issue in question: How effectiveness of electrotherapy modalities and deep massage versus picking up, in order to reduce musculoskeletal pain".

## LITERATURE REVIEW

Diathermi Microwave is an electromagnetic wave having a frequency of 300 MHz - 300 GHz (Goats, 1990), especially in 2450 MHz with a wavelength of 122 m (Joyner, 1967). Are hot and capable of treating soft tissue trauma, degeneration, atrophy and acute infections. (Goats, 1990). Ultra Sound is a heating modality in which intensity is low and very high frequencies. The use of Ultra Sound aims to improve collagen fibers in the tendon and joint capsule, reducing spasms and pain. Ultra Sound has a positive effect on musculoskeletal pain management. Charrin research on 32 patients showed improvement in the quality of pain of 36.6% after 12 weeks and 55.1% after 24 weeks. Transcutaneous Electrical Nerve Stimulation is a

treatment modality that should be integrated with a sensitivity of sensory nerves, the patient's psychological and Visual Analog Scale parameter by observing the pulse, time of administration, electrode placement and intensity changes periodically. TENS was given in order to enable the peripheral A $\beta$  fibers using electric current that would inhibit the activation of pain pathways. Activation of pain pathways in the brain-derived and down into the spinal cord through the brain stem (extrasegmental circuit) so that the path "pain gate" will be closed. (Miller, 1980) Physiotherapy requires experience and knowledge based on scientific evidence in the provision of treatment that aims to reduce the patient's pain. The use of modalities and giving a good massage therapy can help patients deal with the pain experienced in the long run may even reach one year after the implementation of the physiotherapy. (Rakel, 2003). Massage therapy was born thousands of years are found in countries such as China, Japan, India, Egypt, Greece and Rome. But in its development Sweden managed to make massage therapy protocol are arranged in a systematic and measurable.

Massage into one of the modalities of physiotherapy can help the healing process and recovery of muscle tissue caused by excessive contraction and repetitive (Paolini, 2008). Several research studies can be used as a scientific basis giving massage in physiotherapy practice that should be developed and investigated further to establish the diagnosis and physiotherapy practitioner competence (Moyer, 2004). Massage is a management to overcome anxiety, psychological stress (which will affect blood pressure and pulse), and helps relaxation (Lafferty, 2006). Positive results were obtained in the form of reduction of pain, improve quality of life and sleep and reduces anxiety levels. (Richards, 2000) Massage helps physical recovery, improve blood circulation and lymph and joint flexibility mempernaiki (Chung et al, 1993 and Moraska, 2013). Massage has a positive effect because it can increase the supply of oxygen and nutrients needed to remove metabolic waste and lactic acid (Oh et al, 2003).

Deep massage and picking up an adaptation of Swedish massage. Deep massage focusing to the point of pain, which is pain when pressed and can cause symptoms of pain elsewhere. Both of these techniques is believed to provide stimulation to block pain signals that are sent to the brain. Additionally, it will stimulate the release of hormones that is beneficial to the body, namely serotonin or endorphine that will help the recovery of soft tissue. (Sluka, 2001) so that the massage becomes a precautionary measure and the recovery of excessive muscle injury (Oh et al, 2003).

Giving deep massage can help improve patients' perceptions that will determine the long healing and

tissue regeneration. (Hemmings, 2000). This is in line with Aboodarda study that tested 150 patients that deep massage can help perlepasan attachment of muscles that give effect to the central system modulators of pain that alter the effects of the patient's pain perception. Deep massage also has a relationship with the parasympathetic system of the autonomic nervous system. Stimulation of the parasympathetic nervous system can reduce the stress hormone, anxiety, depression and pain that make the body become fitter. Deep therapeutic massage done in the form of a transverse pressure to the target muscles that are tailored to patient tolerance. (Brummit, 2008). In addition, the deep therapeutic massage are well defined muscle tissue manipulation undertaken for the purpose of healing. Deep massage therapy is able to improve blood pressure (Cambron, 2006) but does not stimulate pain points (trigger points), lower levels of anxiety and improve mood. (Leviadi, 1999). Deep massage therapy done in 30-60 minutes duration with a repetition 2x / week for 5 weeks.

Deep massage can help reduce chronic pain and muscle weakness caused neoplasm, infection, fractures, arthritis, osteoporosis and inflammatory process. (Kumar, 2013). Furlan examined 1266 patients with nonspecific back pain get the result that the deep massage can significantly reduce pain. Van Middelkoop also investigate pain reduction by -0.93 [95% CI -8.51] on 163 patients.

Lewis and Johnson's research examines the effect of deep massage with other medical treatments. Deep massage is done 3 times a week for 3 weeks with a duration of 30 minutes can provide mental relaxation. Deep massage is done 2x a week for 5 weeks with a duration of 30 minutes can reduce pain comparable to standard medical care (pharmacological and chronic pain management). However, if viewed in terms of cost and effectiveness, giving physiotherapy and deep massage have costly and less effective compared to other health professionals. This is evidenced by Lin that tested 579 patients with a division of 4 groups: acupuncture, physiotherapy, education, reflexology. Picking up massage therapy is more effective in reducing pain and stress. Hernandez research that provides massage therapy 2x a week with a duration of 30 minutes showed satisfactory results for reducing pain, depression, anxiety and improve sleep quality. In addition they show an improvement of motion of the spine and have high levels of serotonin and dopamine higher.

Picking up massage therapy is believed to reduce pain and improve the microcirculation of the blood vessels. Plasma concentrations of beta-endorphin tested 12 volunteers after administration of massage picking up an increase of 16% from 20.0 to 23.2 pg / 0.1 ml (P = 0.025). The increasing of endorphin is associated with reduced pain and give a sense heal better in treatment.

(Kaada, 1989). However, this therapy would not work if it is done to patients who did not experience any pain due to the absence of an increase in plasma beta endorphin hormones and beta lipotropin. (Day, 1987).

Deep massage and picking up tested on fibromyalgia cases showed that picking up more to have a positive effect on reducing pain cases characterized by reduced fatigue and muscle spasms compared with deep massage. (Yuan, 2015). Along with picking up the research that improve the elasticity of soft tissue and reduce muscle spasm will affect the perceived muscle soreness. This involves the parasympathetic and hormonal processes such as serotonin that blockade of pain in the brain. This technique is very well applied by the muscles that were damaged in the fibers causing inflammation and lead to tense muscles. (Paolini, 2008). However, research Tozzi to 60 correspondents, found that the deep massage therapy is better at releasing adhesions facia and improve the perception of pain than picking up but has a short-term effect. This is in line with research LeBauer are on picking up massage twice a week for 6 weeks to get a positive result which is improvements to posture, reduce pain, improve quality of life and lung function in conditions of scoliosis.

Physiotherapists have an important role after the administration of treatment is monitoring the quality of pain that can be done through the phone. Buhrman Research 2004, shows the pain evaluation can be done a week after the administration of treatment by combining components of education, cognitive skills, training, and maintenance therapy. Results showed significantly patients showed improvement on behavior to reduce even be able to control pain after 3 months since discontinuation of treatment.

VAS (Visual Analogue Scale): a method used to measure pain. This method uses a line along the 10 cm that describes a state of pain until the pain is very great. Patients mark the numbers on the line that represents the intensity of the pain. The advantage of using this method is more sensitive to assess changes in pain intensity, easy to understand and work with, and can be used in a variety of clinical conditions. The disadvantage is that can not be used in children under 8 years and it may be difficult to implement if the patient is in...?

## MATERIALS AND METHODS

The research method is a systematic work steps and done scientifically ranging from the preparation stage, collect data, process the data and drawing conclusions from the research results. The method used in this study is a quasi-experimental method (quasi experimental). In essence, this method is an experimental design with human research subjects. The purpose of this quasi-experimental research method with meihat causal relationship by imposing a treatment modality

electrotherapy and deep massage in one group of patients and compared the results with a comparison group of patients picking up massage to reduce musculoskeletal pain.

In this case the observation is used to observe the treatment undertaken to musculoskeletal pain is reduced. It aims to determine changes in the treatment of pain each made up of patients recover from pain. Comparison between two groups of patients will usher in a second conclusion how effective the treatment, and how they affect changes in pain. Data processing is done in two stages: stage logical and empirical. On stage empiris data collected were processed with statistical method possible. Data processing is performed using descriptive statistics and inferential statistics. The collected data exploration with descriptive statistical methods. Then do the inference method for making conclusions. As well as see the logic between the calculation results with existing theories.

The first step in analyzing the data is to study the characteristics of the data. Exploration data used by the graphical method. By using line graph to present data obtained by observation from time to time in sequence. The X-axis shows the times of observation, while the Y axis shows the value daa observation for a certain time. With data exploration is expected to catch pattern data.

The data obtained is a ratio scale measurement data. By looking at the characteristics of the data, it is assumed that the data were normally distributed and homogeneous. To see the difference between the two groups of patients, then tested the difference. Besides using regression analysis to catch the trend pattern data. With this method is expected to answer the hypotheses.

Wavelength radiation has 4 cm in subcutaneous penetration, which stimulates blood vessel when done effectively for 5-10 minutes with the electrically polarized atoms and molecules in muscle tissue, causing the displacement or release electrons and ion in the muscle tissue. (Joyner, 1967 ).

## RESULT AND DISCUSSION

Prior to further analysis, this study see the profile of patients at Home with Picking Up with the aim to describe the data obtained. Here are profiles of patients at Home with Picking Up. The research looked at the old treatment Effect against the patient's recovery. The data were processed using Microsoft Excel and obtaine regression graph as follows.

### Cost incurred

Costs incurred for once treatment is Rp 60,000.00. If the patient's pain level 5, then the patient's treatment needs to be done 10 times, with the cost of Rp 600.000,00.

Here Profile Patients in clinics with electrotherapy and deep massage is shown in the graph below.

### Cost incurred

Costs incurred for once treatment is Rp 200,000.00. If the patient's pain level 5, the patient needs to do treatment for 4 times, with the cost of Rp 800.000,00. Effectiveness of treatment in the House and in the Clinic Difference in levels of pain treatment with the first day of the second day

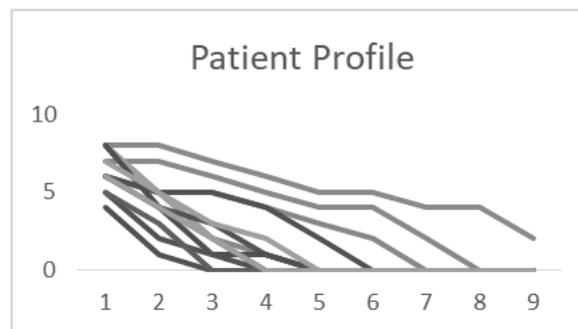


Fig. 1. Profile of Patients at Home with Picking Up

The relationship between treatments and morbidity

$$Y = 6.9359 - 1.431X$$

Y = level of pain

X = the number of treatment

Each patient's arrival for a treatment at home will reduce the average pain level of 1,431.

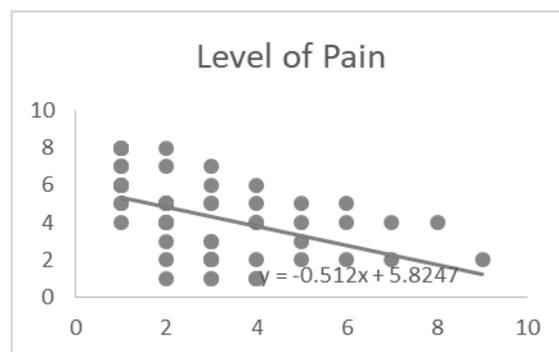


Fig. 2. The regression line between old Effect treatment to cure patients at Home with Picking Up

The relationship between treatments and morbidity

$$Y = 5.825 - 0.512X$$

Y = level of pain

X = the number of treatment

Each patient's arrival for a treatment at home will reduce the average pain level of 0,512.

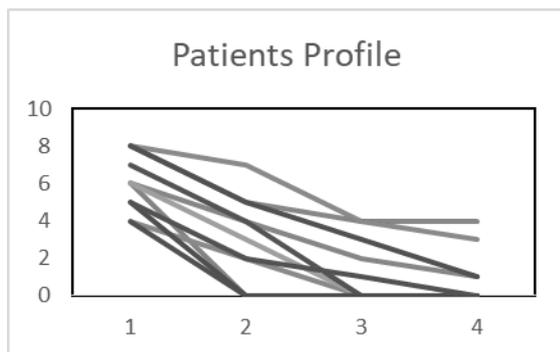


Fig. 3. Profile Patients in clinics with electrotherapy and deep massage. Effect of long treatment against the patient's recovery.

Because the value of  $t$  Critical two-tail = 0.02 < 5%,  $H_0$  rejected so that it can be concluded that the average level of pain of patients when therapy at home is not the same as the level of pain in patients when therapy clinic. There is a significant difference in the cure rate of the first treatment when therapy at home and in the clinic. The average value decreases in pain level at the beginning of the first to come and the treatment at home, a decrease in pain levels of 2 and treatment in the clinic at 3:18. In the clinic decrease in pain level greater compared to at home.

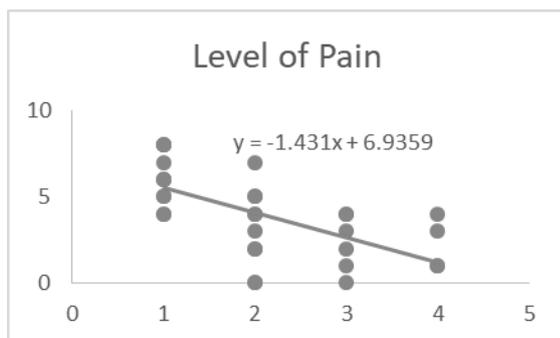


Fig. 5. Effect of long regression line between treatment to cure patients at the Clinic with electrotherapy and deep massage.

The difference in total costs spent

Because the value of  $t$  Critical two-tail = 0.003 < 2.5% then  $H_0$  rejected so that it can be concluded that the average total cost of a patient when the therapy at home is not the same as the total cost of the patient when treatment at the clinic. There is a significant difference between the total cost of treatment in clinics and treatment at home. The average total cost of treatment at home is Rp 252,857.00 and US \$ 509,090.00 at the clinic.

## CONCLUSION

The research concludes that there is a significant change treatment is performed in a clinic using MWD, TENS, US and deep massage compared with treatment that is done at home using only the modalities of picking up, but in terms of cost effectiveness, then the home is much cheaper in comparison at the clinic. There needs to be large-scale study with a larger sample and further research regarding the cost burden of treatment in the clinic and at home in terms of decreasing musculoskeletal pain.

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