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Effectiveness massage effleurage with warm oil for doms decrease (Delayed onset muscle soreness) on the arms

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Abstract
This research is to find out the effectiveness of effleurage massage with warm oil on reducing DOMS (Delayed Onset Muscle Soreness) of the students in Special Region of Yogyakarta. This research was conducted at 5-19 February 2021 at HSC, 2nd floor, Faculty of Sport Science, Yogyakarta State University. This research was a descriptive quantitative study. The research design used experiment with two groups pretest-postest design. The research samples were for about 30 people, the sampling was based on the incidental sampling. The right arm was treated for 15 minutes while the left arm was used as the control. Pain research instrument used VAS and the function used DASH. Data analysis used the Wilcoxon Signed Rank Test to determine the significance of differences before and after treatment from the control group and the treatment group. The results of the VAS score of the pretest and posttest treatment is at 3.13±1.20 to 1.71±1.14 with a value (p< 0.000). The pretest and posttest VAS control is at 3.30±1.00 to 3.00±1, 70 points (p<0.000). While the pretest and posttest treatment function values are at 16.0±2.35 to 17.5±2.04 values (p <0.008), the pretest and posttest control groups are at 16.1±2.03 to 5.00±4.08. with value (p<0.000). So that the VAS in the treatment group get a decrease with an effectiveness of 32% and the function treatment group get an increase of 9%.

Keywords: Effleurage massage, warm oil, doms

Introduction
Physical activity is activity related to muscles, joints, whether it's doing sports or work Rahmah Laksmi Ambardini, (2016) [16]. Suharjana, (2013) [20] states that physical activity is the movement of limbs that involves muscles to achieve goals. Meanwhile, according to Elmagd, (2016) [6] physical activity is body movement that requires energy to do a job. Sport is a form of physical activity that uses large muscles such as doingphus up, shit up, squat jump, dan harvard step test. If exercise is done beyond the limit then someone will be more at risk of injury. Injury according to Vanin *et al*., (2016) [23] is a disorder caused by sports activities that cause heat, pain, swelling, redness, muscles, tendons, ligaments, and joints and bones do not function properly because injuries can occur due to accidents. or excess motion. Excessive motion, especially in the form of excessive eccentric contractions, is associated with impaired DOMS injury (delayed onset of muscle soreness) DOMS is usually marked by tension in the muscles, stiffness in the joints, pain, swelling, redness, and decreased function of movement. According to Lu *et al*., (2019). DOMS is often a problem for novice players and the general public who engage in sports activities. DOMS usually occurs 24-48 hours after exercise
Meanwhile, the opinion of Mcgrath *et al*., (2014) [13] DOMS is pain that will arise some time after doing physical activity. The opinion of Heiss *et al*., (2018) [9] that DOMS is fatigue from physical activity due to poor physical condition. According to Nosaka *et al*., (2002) [15] DOMS can be interpreted as fatigue in the muscles or injuries to the muscles that cause pain so that many people are unable to carry out activities and interfere with their work. DOMS can recover by itself around 5-7 days from the initial appearance of DOMS. During the recovery period, movement activities are disrupted and special treatment is needed to reduce DOMS pain. Therefore there is a need for special treatment to reduce pain in DOMS. Judging from previous research, there are several ways to reduce DOMS, such asice massase, massase, streaching, pre exercise, etc. One way to reduce pain is techniquemassase. Massase aims to reduce pain and accelerate the opening of blood flow.

Whereasmassase according to Farber & Wieland, (2016) [8] massase is a hand movement and aims to massage parts of the body to relieve pain. Many kinds of techniquesmassase can withice massase, sirkulo massase, effleurage, etc. As for the methodmassase according to (Wikstrom *et al*., (2017) [24] therapeutic method massase that we can givetreatment like warm therapyice therapy, andexercise. While we use the techniquemassase effleurage to deal with DOMS, According to Darmareja *et al*., (2020) [5] effleurageis a pressing movement with the palms used entirely to improve blood circulation. Effleuragefelt capable of accelerating blood flow to parts of the body and reducing DOMS pain Budak, (2020) [2]. While the opinion of Syamrotul *et al*., (2016) techniqueeffleurageis a safe, inexpensive and can be done alone technique to relieve pain, aches and fatigue. BesideseffleurageThere are several ways to improve blood circulation and reduce pain. One of them is using warm therapy, there are lots of alternatives for warm therapy such as irradiation, warm compresses, ultrasound rays and many more Farahmand *et al*., (2020) [7]. Meanwhile, warm therapy according to Chinnappan *et al*., (2021) [4] warm therapy provides a feeling of comfort and reduces pain in the joints. Opinion of Sarli & Sari, (2018) [18] warm therapy can reduce pain in injuries and increase ROM in the joints. Meanwhile, according to Shehata & Fareed, (2013) [19] warm therapy can use tools where this therapy can reduce aches and pains. Syahwal & Aluddin, (2021) [21] Warm therapy binds cell activity with a conductive energy flow method. So the authors combinemassase effleurage with warm therapy intended to reduce DOMS more quickly. Whereasmassase effleurage who usually useloction as a lubricant. The author changesloction with warm oil as a lubricant and get a warm effect. So, once the treatment is done by two methods namelymassase effleurage and warm therapy. Warm oil as a substitute for lubricant for the ingredientsmassase hopefully can improve DOMS. Therefore, this study aims to accelerate the healing of DOMS in order to determine its effectivenessmassase effleurage with warm oil to decrease DOMS (Delayed Onset Muscle Soreness) on the arm.

Method

This research is a quantitative descriptive, qualitative descriptive research using designexperiment with a planTwo grup pretest – posttest design. In this study, an initial test was carried out before being giventreatment patients to obtain datapretest and re-measurement after 24 hours giventreatment to get dataposttest. This study aims to see the effectivenessmassase effleurage with warm oil against DOMS on the arm. This study used two sample groups using a control group and a control grouptreatment, where the treatment group used the right arm and the control group used the left arm. The sample group will be measured as the initial DOMSpretest then givenmassase effleurage with warm oil which DOMS is then measured again to obtain data posttest.

R	01	X	02
P	01	C	02

R/X: Subjects/Experimental Group
P/C : Subject/ Control Group
01 : Pretest
02 : Posttest

Gambar 1: Kelompok Kontrol dan Eksperimen

Where R and P as research subjects, 01 as initial test orpretest, X as a combination of massage therapy treatmentseffleuragewith warm oil, C as the untreated group and 02 as the final test orposttest.In this study, the subjects were divided into 2 groups, namely the treatment and control groups. Both groups were given initial tests, which included measurements of pain and arm function. After doing the initial test, the grouptreatment will be given treatment, namely massage therapyeffleuragewith warm oil. And the control group was not given any treatment. Both groups were then given a final test to reassess arm pain and function.

This research was conducted in the lab. Exercise therapy Ofhealth and sport center, and floor FIK UNY. The time of this research was conducted from 5 February to 19 February 2021. The samples in this study totaled 30 samples. The determination of sample grouping is carried out sequentially insendental sampling. Insendental sampling is a sample determination technique based on criteria that happen to match. The criteria consist of inclusion and exclusion criteria. The following are the inclusion criteria: 1) Students who are active in DIY, 2) Male, 3) Age 18-40 years, 4) Non-athletes and exclusion criteria: 1) have a degenerative disease, 2) have an injury, 3) are sick. Visual Analog Scale (VAS) is a tool used to measure pain in DOMS sufferers. the functional ability instrument in this case uses the DASH (Disabilities Of Arm, Shoulder & Hand) Score). in the normality test of normally distributed data, parametric calculations can be used. If it is not normally distributed then the calculation can be done by calculationnonparametric. Then test the difference using SPSS 25.

Discussion

A. Uji Beda Wilcoxon Signed Rank Test Different test Wilcoxon Signed Rank Test used to process the data of the significance of the difference between the 2 groups of data paired between the data retest and data post-test control and treatment groups.

Table 1: Comparison of pain before and after treatment control group and treatment group

Treatment data	Positive	Negative	Ties	Asymp. Sig. (-2 tailed)	Conclusion
Painful Eksperimen Pretest - Posttest	0	23	7	0,000	Different
Pain Control Pretest and Post test	7	17	6	0,625	No different
Pain Control Pretest – Experimental Pretest	6	9	15	0,727	No different
Pain Control Post-test–Pain Post-test experiment	20	0	10	0,000	Different

Showed experimental pain before and after treatment on the arms had positive ranks of 0, negative ranks of 23, ties ranks

of 7, andAsymp. Sig. (-2 tailed) of 0.000 which is a significant difference. Then for pain control before and after treatment on the arm it has a positive rank of 7, negative ranks of 17, ties ranks of 6, and asymp. Sig. (-2 tailed) of 0.625 where there is no significant difference. then on pain controlpretest and treatmentpretest negative arm 6, positive 9, ties ranks by 15, andAsymp. Sig. (-2 tailed) of 0.727 where there is no significant difference. Then for post control pain and post experimental pain on the arm it has a positive rank of 20, negative ranks of 0, ties ranks of 10, and asymp. Sig. (-2 tailed) of 0.000 which indicates a significant difference. markAsymp Sig 2 tailed in the treatment group of 0.00 is less than 0.05 which means there is a difference betweenpretest andposttest. While the control group was 0.625 and 0.727 which was greater than 0.05, which meant that in the control group there was no difference betweenpretest andposttest. It can be concluded that only the treatment group has a good effect on painpretest norposttest in students with DOMS.

Table 2: Comparison of limb movement function before and after treatment of the control group and the treatment group

Treatment data	Positive	Negative	Ties	asymp. Sig.	Conclusion
Post Experiment Function –Pre Experiment Function	9	2	9	0,008	Different
Control Post Control Function –Pre Control Function	9	12	9	0,084	No different
Pre Control Function–Pre Experiment Function	4	9	17	0,373	No different
Post Control Function–Post Experiment Function	0	16	14	0,000	Different

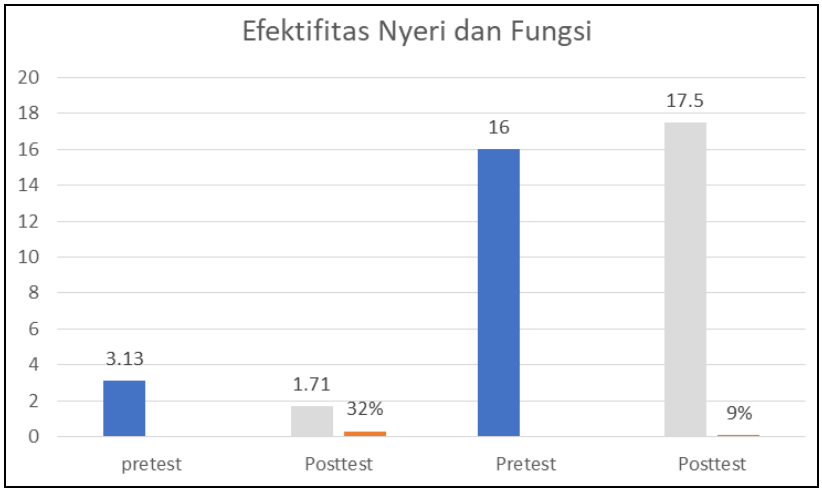
Shows the experimental function post-test and pre-test the arm group has positive ranks of 9, negative ranks of 2, ties ranks of 9, and Asymp. Sig. (-2 tailed) of 0.008 which is a significant difference. Then the control group function post-test and retest on the arm has positive ranks of 9, negative ranks of 12, ties ranks of 9, and Asymp. Sig. (-2 tailed) of 0.084 which is not significantly different, then the function of the control group retest and pre-test on the arm has positive ranks of 4, negative ranks of 9, ties ranks of 17, and Asymp. Sig. (-2 tailed) of 0.373 which has no significant difference. Then the control group functions post and experiments retest on the arm has positive ranks of 0, negative ranks of 16, ties ranks of 14, and Asymp. Sig. (-2 tailed) of 0.000 there is a significant difference. Mark Asymp Sig 2 tailed in the treatment group of 0.008 and 0.000 less than 0.05, which means there is a difference between retest and posttest. While the control group was 0.084 and 0.373 which was greater than 0.05, which means that in the control group there was no difference between retest and posttest. It can be concluded that only the treatment group has an effect on good function retest nor post-test in students suffering from DOMS.

Effectiveness Calculation

Based on the table above shows that the results of the effectiveness of pain treatment before and after massage decreased with an effectiveness of 32%, as well as the function of the treatment or experiments before and after massage increased with an effectiveness of 9%.

Table 3: Data Analysis of pain effectiveness and function pre-test and post-test

Variable	Time	Experiment Mean	Effectiveness
Painful	Pretest	3,13	32%
	Posttest	1,71	
Function	Pretest	16,0	9%
	Posttest	17,5	



Picture 2: Graph of Pain Effectiveness and FunctionPretest and Posttest

It can be seen that massage effleurage combined with warm oil can significantly reduce pain and improve movement function in the arm. The decrease in pain can be seen from the pretest graph number 3.13 and posttest 1.71 with an effective percentage of 32%. While the increase in function can be seen from the pretest score of 16 and posttest of 17.5 with an effectiveness percentage of 9%. So it was concluded that massage effleurage therapy with warm oil was effective in reducing pain and increasing movement function in patients with DOMS of the upper extremities, namely the arms.

Discussion

This research was conducted aiming to determine the existence of a longitudinal effect massage effleurage with warm oil on symptoms of pain and impaired function in cases of DOMS (Delayet Onset Muscle Soreness)upper extremity non-athlete student DIY and the effect of VAS on pain and function pre-test post-test control and treatment arms. The sample used in this study was 30 people and included a 2-group different test experiment with Two Group Pretest-Post-test Design. On VAS pain outcome (Visual Anale Scale) pre-

test and post-test both the control arm and the treatment arm have an effect on arm pain in non-athletic DIY students using calculations Wilcoxon Signed Rank Test. After that for the difference pre-test and post-test there is an influence if after being given treatment massage effleurage with warm oil there is a decrease in DOMS when post-test, but when pre-test the control arm has no effect because of the effect after exercise and has not been given treatment massage effleurage.

Then on arm function using the DASH questionnaire, only the treatment group had an effect on good arm function retest and post-test on non-athletic students in DIY because of the effect of treatment massage effleurage with warm oil. This situation shows the treatment massage effleurage with warm oil on decreasing pain and arm function in cases Delayed Onset Muscle Soreness (DOMS) has a significant contribution to improve the function of injured organs. Nandar, (2015) [14] Reducing pain after exercise massage effleurage with warm oil occurs because blood circulation is getting smoother thus increasing the transport of O2 and CO2 in the blood which then reduces pain which is a symptom of DOMS. In accordance with the study entitled "Effectiveness Massase Effleurage with Warm Oil to Decreasing Doms (Delayed Onset Muscle Soreness) In the Arms". Strengthened by the research of Abbasi *et al*., (2021) [1] where a decrease in pain and function is used Massage can affect the body during sports or excessive exercise.

An increase in the scale of function in the organ that is given treatment must go hand in hand with a decrease in the pain scale. A decrease in pain is an early sign that there is an increase in the scale of function in the arm. Unaccustomed to physical activity that may exceed the habits carried out by the subject can have the effect of pain in the muscles after carrying out excessive physical activity from the initial load. The muscle disorder that is often felt by the subject is a natural thing where the subject has physical activity that is getting heavier day by day. This can really happen because the arm is the organ that is most often used for activities such as exercising. This situation is usually of particular concern to provide treatment or provide special therapy to be able to reduce the disturbances obtained in the arm.

Exercise that is not properly controlled can cause muscle damage, inflammation, and pain as well as decreased joint range of motion Elmagd, (2016) [6]. In line with this opinion, the training program must be adapted to the conditions of non-athletes and must have a load that is getting better day by day. However, the possible state of the subject is not conditioned for the given exercise to trigger negative effects felt by the subject such as DOMS. The training program provided by the subject basically has a size that is adjusted to the ability and physical condition of the subject. The effects of muscle disturbance and pain and decreased function are felt by the subject. Giving massage treatment effleurage with warm oil, of course, helps the subject to reduce the disturbances that arise as a result of the exercises carried out. Elmagd, (2016) [6] Giving treatment massage Proper training can have a positive effect on restoring the condition of the affected muscles. Arm strength is composed of arm muscles so that the strength needed for the basic arm abilities is even greater Hesti F *et al*., (2020) [10]. Disorders that are felt in that part of the arm must be able to be minimized with therapy and treatment according to needs. DOMS is often experienced by all individuals who engage in physical activity regardless of their fitness level and this is a normal physiological response to increase energy use and as an introduction to previously unknown physical activity Kim *et al*., (2017) [11]. In line with this opinion, it shows that the disorder experienced by a person occurs regardless of the person's fitness level before exercising or doing physical activity. This means that the disturbance can be felt by everyone after doing exercise or physical activity. Rustiasari, (2017) [17] Proper therapeutic massage can help the muscles to get back in shape and get rid of the pain and improve function so that they can carry out activities optimally. The recovery process by taking complete rest can be done in severe injuries. However, for injuries that can still make certain movements, massage can be done. This of course stimulates and helps strengthen the injured part again. Strengthening the injured part aims to be able to keep the injured part from being easily injured again. Chen *et al*., (2022) [3]. Giving the right load and portion of exercise therapy can help the subject to get back in shape and get rid of the trauma optimally Suharjana, (2013) [20]. The trauma experienced by the subject becomes something that must be removed through the exercise therapy carried out.

Conclusion

Based on the results of the study it was concluded that the combination massage effleurage with warm oil the effect of reducing arm pain using VAS and arm function as measured by DASH. Pain perception and arm function as measured by the DASH questionnaire experienced significant improvements in the massage-treated group effleurage with warm oil, but this did not occur in the control group which did not receive treatment. Massage effleurage with warm oil the effectiveness of reducing pain with a percentage of 32% for pain and function increases function 9%.

Suggestion

Based on the results of the analysis and conclusions of the research results, it is necessary for the authors to submit suggestions, as follows:

1. Non-athlete students in Yogyakarta who have DOMS injuries are advised to receive massage therapy effleurage with warm therapy for pain relief and arm function.
2. For health practitioners, it is recommended that this therapy be applied and studied so that it can assist first aid for Yogyakarta non-athlete students who are injured in DOMS during practice.
3. For future researchers, it is necessary to carry out ongoing research to determine the success rate of recovery from moderate or severe DOMS injuries. In future research, it is also necessary to examine the effectiveness of massage therapy effleurage with warm therapy for other types of injuries which can be done in combination or separately to determine the effectiveness of each technique.

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