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Sports Massage Combination of Lemongrass Oil to Reduce Fatigue and Improve Sleep Quality of Futsal Athletes

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Abstract*:* Fatigue is a natural response of the body that serves to prevent further damage, especially in post-intensive exercise conditions. Sleep quality is a combination of several important aspects that include individual satisfaction with the sleep process, both in terms of duration, and ease of falling asleep. The purpose of this study was to determine the effect of a combination of sports massage with lemongrass oil on fatigue and sleep quality of futsal athletes at Fafage Banua Bekasi. This study used a *quasi experimental design* method with a *one group pretest-posttest* design. The research was conducted at Saka Futsal Camp from January 6 to 20, 2025. The population in this study were Fafage Banua futsal athletes, with a sample of 13 people selected using purposive sampling technique. The instruments used in this study include *Fatigue Assessment Scale (FAS) and Pittsburgh Sleep Quality Index (PSQI)*. Data analysis techniques used normality test, homogeneity test, and hypothesis testing (paired t-test). The results showed that the level of fatigue decreased significantly from 26.85 before treatment to 21.23 after treatment (a decrease of 5.62 or 20.94%; p = 0.001). Meanwhile, sleep quality improved with the score decreasing from 7.38 to 4.38 (a decrease of 3.00 or 40.65%; p = 0.001). Therefore, this study concludes that the combination of sports massage and lemongrass oil has a significant effect in reducing fatigue levels and improving sleep quality in Fafage Banua Bekasi futsal athletes.

Keywords: Athlete, Fatigue, Sport Massage, Lemongrass Oil, Sleep Quality.

INTRODUCTION

Futsal is an intermittent team sport under the auspices of FIFA, the governing body of international football. The sport has grown rapidly and attracted players from all over the world and is widely popular. More than 12 million players actively participate in futsal, making it one of the most popular sports globally, the sport is played at various levels, ranging from amateur to professional (Ruiz-Pérez et al., 2023). The development of futsal sports in Indonesia is very rapid, as seen from the many competitions held starting from school, university, to general competitions. Based on the Indonesian Futsal Federation (FFI) the highest futsal competitions in Indonesia include; *3S Futsal Super Cup, Futsal Nation Cup, Professional Futsal League.* The intense competition motivates players to train intensively to improve individual skills, tactics, and physical endurance. However, this intensive training often leads to fatigue, tension and muscle pain, especially after strenuous training (Amar *et al.*,2023)

Fatigue is a common thing that occurs due to excessive physical activity, especially in futsal athletes who undergo high-intensity training. Fatigue can affect an athlete's performance, which has the effect of reducing ability during training and matches (Amar *et al.*, 2023). Factors causing fatigue in futsal athletes include lactic acid accumulation, high energy use, and dehydration due to excessive sweating during activity. Fatigue in futsal athletes is not only physical but also mental. Sleep is one of the effective ways to reduce fatigue by restoring body stamina, so that a person can return to optimal activity (Nugraha *et al*., 2019). Sleep quality is a measure that describes how well a person sleeps, including aspects such as adequate sleep duration, speed of falling asleep, calm sleep without many disturbances, and a sense of freshness or recovery felt after waking up. Good sleep quality means sleep that is long and deep enough to allow the body and mind to recover optimally, supporting physical, mental health and daily performance.

Given the importance of quality sleep to athlete recovery and performance, various methods have been developed to address this issue. One approach that has been proven effective and influential in addressing fatigue and sleep quality is *massage*. Through proper massage, *massage* can improve blood circulation, help eliminate toxins formed due to physical activity, and accelerate energy recovery. There are various types of therapies used to date, one of which is *sports massage*. *Sports massage* is widely used to help overcome fatigue and sleep quality, especially for athletes. One type of *massage* therapy known as sports massage is designed specifically for athletes or individuals who are active in *sports*. This technique aims to maintain body fitness, reduce the risk of injury, and accelerate the recovery process after injury (Kurniawan & Sifaq, 2018). Based on research conducted by Siregar (2022), that *massage* has been proven effective in improving sleep quality by 49.21% to 62.64%.

The use of essential oils, such as lemongrass oil in *massage* practice also provides additional benefits. Lemongrass oil is known to have relaxing properties that can help with muscle fatigue and provide a calming effect that has benefits for improving sleep. Lemongrass oil is proven to have anti-inflammatory, analgesic or pain-relieving effects, and helps relax muscles effectively (Widiawati & Mulyati, 2021). The benefits of *sports massage* and lemongrass oil are known, but until now, there has been no detailed or focused research to examine the effect of the combination of both in overcoming fatigue and improving sleep quality in futsal athletes. Therefore, the focus of this study aims to analyze the effect of a combination of *massage* with lemongrass oil on fatigue and sleep quality in futsal athletes.

Based on observations made through communication with Fafage Banua staff, important information was obtained about the training and competition schedules of the club's futsal athletes. Fafage Banua athletes undergo an intensive training routine, with a frequency of at least twice a week. In addition, they also actively participate in a professional futsal league, with matches scheduled twice per week. This shows the high intensity of physical activity that the athletes have to undergo. Furthermore, in the coming months, the Fafage Banua team will also face additional challenges with competitions. This busy schedule indicates that Fafage Banua Bekasi futsal athletes need effective recovery strategies to avoid fatigue and maintain optimal performance amidst the high physical demands of competitions. In addition to fatigue, sleep quality is also something that needs to be considered.

METHODS

This research is a *quasi experimental* with *one group pretest-posttest design*. This design uses *one group pretest posttest.* The population in this study were Fafage Banua athletes with samples determined by purposive sampling who were healthy, willing to be research subjects, and did not have allergies to oil totaling 13 samples. This research was conducted in January 2025. Before the implementation of the research following *ethical clearance* procedures issued by Yogyakarta State University, the following guidelines for the implementation of sports massage using lemongrass oil.

Table 1. Implementation guidelines

No.	Component	Description
1.	Frequency	3x 2 weeks.
2.	Intensity	Medium
3.	Time	45 Minutes
4.	Type	*Sports Massage* (Using Lemongrass Oil)

The exercise program has gone through the validation stage with a total of 2 experts in the field of massage. The research instrument used the Likert scale *Fatigue Assessment Scale (FAS)* questionnaire to measure the level of fatigue and *the Pittsburgh Sleep Quality Index (PSQI*) to measure sleep quality. Data analysis using t-test with the help of SPSS 27 software.

RESULT AND DISCUSSION

Data collection was carried out by filling out a questionnaire starting with questions related to characteristics including name, age, and playing position. Then filling out the fatigue measurement questionnaire in the form of a *Fatigue Assessment Scale* (FAS) consisting of 10 questions and measuring

sleep quality *Pittsburgh Sleep Quality Index (PSQI)* which is divided into 4 open questions and 11 closed questions.

Table 2. Descriptive Fatigue Statistics

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Pretest	13	20	40	26,85	5,669
Posttest	13	17	29	21,23	3,940

Based on table 2, the *pretest* data shows the minimum or smallest value of 20 and the maximum or largest of 40. The *pretest* average is 26.85 with a *standard deviation* of 5.669. Meanwhile, in the *posttest* data, the minimum value obtained was 17 and the maximum value was 29. The *posttest* average decreased to 21.23 with a *standard deviation* of 3.940. Based on the *pretest* and *posttest* data in the table above, that before the treatment, the average fatigue level was 26.85. After the intervention, the average fatigue level decreased to 21.23, indicating a decrease of 5.62.

Table 3. Descriptive Statistics of Sleep Quality

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Pretest	13	4	10	7,38	1,938
Posttest	13	3	6	4,38	0,870

Based on table 3, the minimum value of *pretest* data is 4 and the maximum value is 10. The average *pretest* data is 7.38 with a standard deviation of 1.938. Meanwhile, in the *posttest* data, the minimum value remains 3, but the maximum value decreases to 6. The average *posttest* data is 4.38 with a standard deviation of 0.870. From the *pretest* and *posttest* data above, it can be concluded that before being given the treatment, the average *pretest* score was 7.38. After being given the treatment, the average *posttest* score dropped to 4.38, which means there was a decrease of 3.00. In addition, the smaller *standard deviation* in the *posttest* shows that the results after treatment are more consistent than before treatment.

Table 4. Test Results

	Shapiro-Wilk	
	Sig.	Description
1Fatigue *pretest*	0,171	Normal
Fatigue *Posttest*	0,142	Normal
Sleep Quality *Pretest*	0,353	Normal
Sleep Quality *Posttest*	0,111	Normal

Based on table 4, the normality test data above using *Shapiro-Wilk* shows the significance value of the *pretest-posttest* fatigue and sleep quality measurements is more than 0.05, so it can be concluded that the data is normally distributed. So, after that a homogeneity test is carried out then if homogeneous, a parametric test is carried out using the *paired sample t-test*.

Table 5. Test Results

	Levene Statistic	**Sig.**	**Description**
Fatigue	1,404	0,248	Homogeneous
Sleep Quality	1,911	0,180	Homogeneous

Based on table 5, the results of the homogeneity test above indicate the results of the *pretest-posttest* fatigue and sleep quality significance measurements are more than 0.05, so it can be concluded that the data is considered homogeneous. Then the *paired sample t-test* was continued.

Table 6. Test Results

	Paired Results			
Indicator	**Pretest**	**Posttest**	**Significance**	**Description**
Fatigue	26,85	21,23	0,001	Significant
Sleep Quality	7,38	4,38	0,001	Significant

Based on the results of the Paired T-test, the p value = 0.001 for sleep quality and p = 0.001 for fatigue, both of which are smaller than the 0.05 significance level. This indicates that the null hypothesis (H_0), which means that there is no effect of a combination of *sports massage* with lemongrass oil on fatigue and sleep quality of Fafage Banua Bekasi futsal athletes, is rejected. Conversely, the alternative hypothesis (H_1) is accepted, which means that there is a significant effect of the combination of *sports massage* with lemongrass oil in reducing fatigue levels and improving sleep quality of futsal athletes. These results indicate that the intervention provided has an influence in helping athletes obtain better quality sleep while accelerating fatigue recovery after undergoing intensive physical activity.

1. Effect of *Sports Massage* with Lemongrass Oil on Fatigue

Fatigue is one of the things that is often felt by athletes. Exercise patterns that vary in intensity, frequency, and duration cause fatigue (Mulya *et al*., 2021) . Based on the analysis of fatigue data in this study, the average or *mean* in the *pretest* data is 26.85 and the fatigue data in the *posttest* data is 21.23 with the significance value of the difference in data before the *pretest* and *posttest* treatment is p = 0.001. Based on these data, it can be said that *sports massage* with lemongrass oil has a significant effect on fatigue.

The results of this study are in accordance with previous research conducted by Hidayatulloh (2021), entitled, "The Effectiveness of Sports Massage in Reducing Fatigue and Increasing the Concentration Power of Factory Workers in Kalasan", sports massage proved effective in reducing fatigue with an effectiveness of 63.7125%. Research conducted by Karadavut & Acar (2024), has similar results, namely, sports massage is effective in reducing post-exercise fatigue symptoms and accelerating athlete recovery. This study shows that sports massage can reduce muscle pain, improve muscle function, and minimize inflammatory responses. The results of this study further strengthen the evidence that sports massage plays an important role in post-exercise recovery, as has been found in various previous studies.

Sports massage is done to help improve blood circulation. This technique can accelerate the process of breaking down and removing lactic acid from the body, so that recovery after physical activity becomes more optimal. Sports massage helps reduce fatigue through various physiological mechanisms that support the body's recovery. One of the main mechanisms is improving blood circulation, which plays a role in accelerating the transportation of oxygen and nutrients to tired muscle tissues. This increased blood flow also helps eliminate waste metabolites, such as lactic acid, which can cause muscle fatigue. In addition, sports massage stimulates the lymphatic system to speed up the removal of metabolic waste substances, thereby reducing muscle swelling and soreness. The relaxing effect of massage also contributes to lowering muscle tension, increasing flexibility, and reducing the risk of injury due to stiff muscles. Furthermore, nerve stimulation during massage can reduce pain by activating the gate control theory mechanism, which inhibits pain signals before they reach the brain. The combination of these physiological effects makes sports massage a method that can accelerate recovery.

2. Effect of *Sports Massage* with Lemongrass Oil on Sleep Quality

Various aspects of sleep patterns, such as sleep duration, depth, ease of falling asleep without medication, and how often one wakes up, determine the quality of one's sleep. The process of rest that takes place passively is carried out by a person when he falls asleep to get energy and freshness when he wakes up (Shafi, 2023). Based on data analysis of sleep quality in this study, the average or mean on pretest data is 7.38 and the quality data on posttest data is 4.38 with a significance value of the difference in data before pretest and posttest treatment is p=0.001. Based on these results, it can be said that sports massage with lemongrass oil has an effect on sleep quality.

The results of this study are in line with the findings of previous research conducted by Sifah (2023), that foot massage and aromatherapy have an effect on improving sleep quality in 100% of respondents with a marked decrease in PSQI scores. Massage itself has the aim of increasing the hormone endorpin and increasing feelings of calm and comfort so as to improve sleep quality, while lemongrass oil has content or effects in the form of sedative effects that can cause a sense of calm and sleepiness so that it can help in improving sleep quality. Lemongrass oil can help improve sleep quality through the mechanisms of nervous system relaxation, stress reduction, and natural sedative effects. The active compounds in lemongrass oil, such as citral and geraniol, have anxiolytic (anti-anxiety) and mild sedative properties, which can help calm the mind and body before bed.

When used in aromatherapy or oil in sports massage, lemongrass oil works by stimulating the limbic system in the brain, the part that regulates emotions and stress response (Sitorus, 2023) . The fresh scent and warmth of lemongrass oil can reduce cortisol (stress hormone) levels, which is often the main cause of sleep difficulties. A person more easily enters a deeper, quality sleep phase with decreased stress and anxiety.

In addition, lemongrass oil has a muscle relaxant effect that helps relieve physical tension due to daily activities or exercise. When applied through massage, lemongrass oil can improve blood circulation, reduce muscle tension, and provide a comfortable sensation, which supports the body's transition to a deeper state of sleep. Some studies have also shown that lemongrass oil has antimicrobial and anti-inflammatory properties, which can help improve breathing and reduce sleep disturbances due to nasal congestion or mild inflammation in the respiratory tract. Therefore, lemongrass oil is a natural way to improve sleep.

CONCLUSION

Based on the results of the research and data analysis that has been carried out, it can be concluded that there is a significant effect between the combination of *sports massage* with the use of lemongrass oil on the level of fatigue and sleep quality in futsal athletes Fafage Banua Bekasi. This combination of therapies is proven effective in helping fatigue recovery and improving sleep quality. Further research is needed to explore the long-term effects as well as the mechanisms underlying the benefits of this therapy. The application of *sports massage* combined with lemongrass oil may be a useful strategy in athletes' recovery management to support their optimal performance.

REFERENCES

Amar, A. J., Guntoro, T. S., Wanena, T., Wandik, Y., & Fariz, M. (2023). Sports recovery to support achievements that are often forgotten Sports recovery to support achievements that are often forgotten athlete performance and even achievements make coaches confused looking for intensive that can trigger fatigue. *Journal of Physical Education and Sport,22* (4), 19-25. https://ppjp.ulm.ac.id/journal/index.php/multilateralpjkr/article/view/16469/9258

Indonesian Futsal Federation. (n.d.). *Indonesian Futsal Competition*. Https://Futsalindonesia.Org/.

Hidayatulloh, A. N. (2021). *THE EFFECTIVENESS OF SPORTS MASSAGE IN REDUCING FATIGUE AND INCREASING THE CONCENTRATION OF FACTORY WORKERS IN KALASAN.*. 6.

Karadavut, Ö., & Acar, G. (2024). Effects of Sports Massage on Post-Workout Fatigue. *Uluslararası Türk Spor ve Egzersiz Psikolojisi Dergisi,4* (1), 15-29. https://doi.org/10.55376/ijtsep.1486062

Kurniawan, M. T. A., & Sifaq, A. (2018). Comparison of Hydrotherapy Cold Water Immersion (Cryotherapy) Method with Sport Massage to Reduce Lactic Acid Levels after Circuit Training. *Journal of Sports Achievement*, *1*(4), 1–11.

Mulya, D. Y., Suwondo, A., & Setyaningsih, Y. (2021). Literature Review of Giving Sport Massage and Stretching to Muscle Fatigue Recovery and Lactic Acid Levels in Athletes. *Journal of Public Health,9* (1), 79-86. http://ejournal3.undip.ac.id/index.php/jkm

Nugraha, A., Sartono, A., & Handarsari, E. (2019). Fast food consumption and sleep quantity as risk factors for obesity in high school students of Institut Indonesia Semarang. *Journal of Nutrition,8* (1), 10-17. http://jurnal.unimus.ac.id

Ruiz-Pérez, I., Raya-González, J., López-Valenciano, A., Robles-Palazón, F. J., & Ayala, F. (2023). Physical Differences between Injured and Non-Injured Elite Male and Female Futsal Players. *Applied Sciences (Switzerland),13* (11). https://doi.org/10.3390/app13116503

Shafi. (2023). The Effectiveness of Traditional Massage and Swedish Massage in Reducing Fatigue Levels and Improving Sleep Quality in Post Covid-19 Workers. *State University of Yogyakarta*.

Sifah, L. A. (2023). *THE PROVISION OF FOOT MASSAGE AND LEMONGRASS OIL AROMATHERAPY ON SLEEP QUALITY IN MENOPAUSAL WOMEN IN THE PMB LUSI SUMARTINI, S.ST. AREA.*

Siregar. (2022). *Comparison of the Effectiveness of Circulo Massage and Thai Massage on Fatigue Recovery and Sleep Quality of Field Workers*. *33*(8.5.2017), 2003–2005.

Sitorus, R. A. (2023). *The Effect of Back Massage Technique with Lemongrass Oil on the Decrease of Asnidawani Period I Labor Pain in Kisaran.*. 1–10.

Widiawati, I., & Mulyati, S. (2021). EFFLEURAGE MASSAGE USING SERAI (CYMBOPOGON Sp) ESSENTIAL OIL AND TEH SEREH IS EFFECTIVE FOR REDUCING PAIN IN POST PARTUM MOTHERS. *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*,*13* (1), 230-238. https://doi.org/10.34011/juriskesbdg.v13i1.1915