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The effect of sport massage therapy using virgin coconut oil on the physical fitness of athletes in Bali Province

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ABSTRACT

The aim of this study was to determine the effect of massage therapy using Virgin Coconut Oil (VCO) on improving the fitness of Bali athletes. The research method employed was a quasi-experiment involving a sample of 32 male Bali athletes (aged between 16 and 18 years), divided into 16 participants in the experimental group and 16 participants in the control group. The experimental group received massage therapy using VCO, while the control group used body lotion for massage. Data were collected through fitness tests using the Multi-Stage Fitness Test (MFT) and involved pre-test and post-test measurements. Based on the results of the study, the massage therapy using VCO had a statistically significant effect on the physical fitness of Bali athletes (p=0.001). In contrast, massage therapy using body lotion did not show a statistically significant effect on physical fitness (p=0.064). Furthermore, a significant difference was found between the two treatments (p=0.036), indicating that VCO was more effective than body lotion in improving athletes' physical fitness. The results of this research are expected to contribute to improving athlete performance through massage interventions using VCO and to provide a broader understanding for coaches in enhancing athlete performance based on the principles of training and recovery.

KEYWORDS

Sport Massage; Virgin Coconut Oil (VCO); Body Lotion; Athlete

1. INTRODUCTION

Physical fitness is a critical factor influencing an athlete's performance across various sports disciplines. Optimal fitness not only enhances an athlete's physical capabilities but also helps prevent injuries and accelerates recovery after training or competitions. One commonly used method to improve fitness and speed up recovery is massage. Massage is recognized as a form of manual therapy that can improve blood circulation, reduce muscle tension, and enhance sleep quality (Field, 2016). The use of additional mediums during massage, such as Virgin Coconut Oil (VCO) and body lotion, is believed to offer distinct benefits. Virgin Coconut Oil contains medium-chain fatty acids with antioxidant and anti-inflammatory properties, which can improve blood circulation and accelerate tissue regeneration (Debmandal & Mandal, 2011). Meanwhile, body lotion generally contains moisturizing agents that help maintain skin hydration, although its therapeutic effects on muscle fitness require further investigation.

Studies on the effectiveness of VCO compared to body lotion in massage therapy for athletes remain limited. Therefore, this study aims to explore the impact of these two mediums on athletes' fitness. Athletic fitness can be measured through parameters such as heart rate, fatigue levels, and improved flexibility after receiving a massage. This research is expected to contribute to the development of more effective recovery and care methods for athletes. Additionally, massage has long been recognized as an integral part of rehabilitation and injury prevention. According to Gupta et al. (2018), massage can improve local blood flow, enhance muscle flexibility, and reduce stress levels. By integrating massage techniques with natural ingredients such as VCO, athletes are expected to gain more significant benefits compared to using body lotion, which generally lacks specific therapeutic properties.

This study aims to determine the effect of massage therapy using Virgin Coconut Oil (VCO) on the physical fitness of Porprov Bali athletes, to assess the effect of massage therapy using body lotion on their physical fitness, and to examine the differences in the effects of massage therapy using VCO and body lotion on the physical fitness of Porprov Bali athletes. Based on the background described above, the research questions addressed in this study are as follows:

1. Is there an effect of massage therapy using Virgin Coconut Oil (VCO) on the physical fitness of Porprov Bali athletes?
2. Is there an effect of massage therapy using body lotion on the physical fitness of Porprov Bali athletes?

3. Are there differences in the effects of massage therapy using VCO and body lotion on the physical fitness of Porprov Bali athletes?

2. METHODS

2.1. Design and Participants

This study was a quasi-experimental study using a pretest–posttest design with both an experimental group and a control group. The participants were students from the Faculty of Sports and Health (FOK) who also served as athletes representing their institutions in the Bali Provincial Sports Week (*Pekan Olahraga Provinsi* or PORPROV Bali). The participants were drawn from first, third, and fifth-semester students. A total of 32 athletes were included in the study. The participants were male, aged between 16 and 18 years. These athletes were then divided into two groups; 1) Experimental Group: Consisting of 16 athletes who received massage treatments using Virgin Coconut Oil (VCO), 2); Control Group: Consisting of 16 athletes who received massage treatments using body lotion.

2.2. Massage Procedure

The massage procedure carried out consists of massage techniques in the form of *effleurage*, *friction*, *petrissage*, *tapotement* and *vibration*. The body parts that are massaged are the arms, back and legs. each is done for 10 minutes, so the total time needed for the massage is 30 minutes. The level of massage pressure is in the medium category, and depends on the athlete's condition. The experimental group underwent massage therapy with VCO, administered six times over two weeks. The control group underwent massage therapy with body lotion, also administered six times over two weeks. This division and treatment approach were designed to examine and compare the effects of the two mediums VCO and body lotion on the athletes' physical fitness levels.

2.3. Instrument

The instrument used to assess physical fitness in this study is the Multi-Stage Fitness Test (MFT), also known as the beep test or shuttle run test. This test is commonly used to measure maximal aerobic capacity (VO_2 max) or aerobic endurance. It evaluates an individual's cardiorespiratory fitness and physical ability. In the MFT, participants are required to run back and forth between two lines spaced 20 meters apart. The speed of running is controlled by a series of beeps, played through an audio recording or digital app. As the test progresses, the frequency of the beeps increases, requiring participants to run faster to keep up with the pace. Steps of the Test: 1) The participant starts by standing behind the starting line and begins running towards the opposite line when the first beep sounds, 2) The participant must reach the opposite line before the next beep

sounds, 3) After reaching the line, the participant turns around and waits for the beep before running back to the starting line, 4) The pace increases each time the test level advances, making it progressively harder.

The test ends when the participant is unable to reach the line twice in a row before the beep or when they stop due to fatigue. The final score is recorded based on the last level achieved before the participant fails to meet the required pace. This score is calculated using the level reached and follows the guidelines provided in the MFT manual. This test is a reliable way to measure cardiovascular endurance and is often used in sports science to gauge an athlete's fitness level.

2.4. Statistical Analyses

Data were analyzed using IBM SPSS Statistics. The normality of the data was assessed using the Kolmogorov–Smirnov test, while homogeneity of variance was tested using Levene's test. Descriptive statistics (mean, standard deviation, and standard error) were used to summarize the data. A paired sample t-test was applied to examine within-group differences between pre-test and post-test measurements, while a one-way ANOVA test was used to compare differences between the experimental and control groups. A significance level of $p < 0.05$ was used for all statistical tests.

3. RESULTS

Based on the results of the experimental test, prior to analysis, the data were tested using the Kolmogorov–Smirnov normality test and Levene's test for homogeneity. The results showed that the data were normally distributed, with a significance value (p) of $0.280 > 0.05$, and homogeneous, with a significance value (p) of $0.437 > 0.05$.

The description of the data on the results of static balance in the experimental group treated massage with VCO is shown in Table 1.

Table 1. Data description of the experimental group treated with massage using VCO

Variable	Experimental Group of Massage With VCO	
	Pre-Test	**Post-Test**
Number of Samples (N)	16	16
Mean (M)	43,600	45,019
Standard Deviation (SD)	8,180	7,177
Std Error Mean	2,045	1,794

In Table 1, the descriptive statistics show an increase in the mean (M) score from the pre-test (M = 43.600) to the post-test (M = 45.019) in the experimental group treated with massage using VCO. Furthermore, to examine the difference in the effect within the experimental group (the group receiving massage with VCO) between the pre-test and post-test, a paired sample t-test was conducted. The results of the test are presented in Table 2.

Table 2. Results of the paired sample t-test for the experimental group receiving massage with VCO (N = 16)

	Mean	SD	Std. Error Mean	95% Confidence Interval of Difference		t	df	p value
				Lower	Upper			
Pre-test Post-test	-1, 418	1,260	0,315	-2,090	-0,747	-4,503	15	0,001

The paired sample t-test results showed a statistically significant difference between the pre-test and post-test scores in the experimental group receiving massage with VCO, with a p-value of 0.001 ($p < 0.05$). This indicates that the improvement in physical fitness after the intervention was statistically significant.

The descriptive data for the physical fitness results in the control group treated with massage using body lotion are shown in Table 3.

Table 3. Data description of the control group treated with massage using body lotion

Variable	Control Group Massage with Body Lotion	
	Pre-Test	Post-Test
Number of Samples (N)	16	16
Mean (M)	41,188	40,519
Standard Deviation (SD)	6,269	5,564
Std Error Mean	1,567	1,391

Table 3 shows a slight decrease in the mean score from the pre-test (M = 41.188) to the post-test (M = 40.519) in the control group receiving massage with body lotion. Furthermore, to determine the difference in effect within the control group (the group receiving massage with body lotion) between the pre-test and post-test, a paired sample t-test was conducted. The results are presented in Table 4.

Table 4. Paired sample t-test results for the control group receiving massage with body lotion (N = 16)

	Mean	*SD*	Std. Error Mean	95% Confidence Interval of Difference		t	df	p value
				Lower	Upper			
Conventional Pre Test-Conventional Post Test	0,668	1,337	0,334	-0,044	1,381	2,00	15	0.064

Table 4 shows that the t-value (t = 2.000) was lower than the t-table value (2.131), and the significance value was p = 0.064 (> 0.05). Therefore, there was no statistically significant difference between the pre-test and post-test in the control group, indicating that massage with body lotion did not produce a significant effect on physical fitness.

To investigate the difference in the effects of the two treatments (massage with VCO and massage with body lotion), a one-way ANOVA test was conducted. The results are presented in Table 5.

Table 5. One-way ANOVA results for physical fitness (N = 32)

Source	Type III Sum of Squares	df	Mean Square	F	p value
Between Group	191,590	1	191,590	4,841	0.036
Within Group	1187,354	30	39,578		
Total	1378,945	31			

A p value of 0.036 between the experimental group and the control group indicates that massage therapy using VCO was more effective than body lotion in improving physical fitness.

4. DISCUSSION

The research results on the effect of massage therapy using Virgin Coconut Oil (VCO) compared to body lotion on athletes' fitness show significant differences in several aspects. Massage with VCO produced better effects than body lotion in improving physical fitness parameters such as heart rate recovery, reduced fatigue, and increased muscle flexibility. VCO contains medium-chain fatty acids, such as lauric acid, which can accelerate muscle tissue regeneration and improve blood circulation (DebMandal & Mandal, 2011). The study found that athletes who received massage with VCO experienced faster heart rate recovery after intense physical activity compared to those who

used body lotion. This indicates an improvement in circulatory efficiency, which aids in the recovery process and massage has the potential to elevate athletic performance while concurrently mitigating the risk of injuries (Tahiraj & Hakaj, 2024). Even the massage treatment led to a decrease in depression, stress, anxiety, and the perception of fatigue and an increase in mood, relaxation, and the perception of recovery (Dakic et al., 2023).

Massage is known to reduce cortisol levels in the body, which are associated with stress and fatigue (Field, 2016). According to Gasibat et al. (2024) massage can significantly impact muscle healing, performance, physiological, and psychological. The mechanism of massage, including its effects on blood circulation, muscle relaxation, and athlete recovery, has been well-documented (Weerapong et al., 2005). Sports massage in reducing pain in doms (Ramdhan et al., 2024) and also sports massage can use these findings as a guide to develop more effective recovery strategies for athletes (Karadavut & Acar, 2024). Massage also impacts the musculoskeletal system and aids in recovery processes in athletes (Best & Crawford, 2020). In this study, the use of VCO provided better results in reducing fatigue compared to body lotion. The antioxidant content in VCO plays a role in reducing oxidative stress, which often occurs in athletes after intense training. On the other hand, while body lotion helps maintain skin moisture, it lacks therapeutic properties that directly affect muscle recovery. Muscle flexibility is an important fitness indicator for athletes, especially in sports requiring high mobility. The use of VCO massage significantly increased muscle flexibility compared to body lotion. VCO has a positive effect on accelerating tissue healing and reducing inflammation (Nevin & Rajamohan, 2010). This effect is likely due to VCO’s ability to penetrate the skin layers more effectively, providing better lubrication benefits during massage, which influences muscle relaxation (Gupta et al., 2018).

VCO has natural anti-inflammatory properties that can help reduce microscopic inflammation in muscles after intensive training (Intahphuak et al., 2010). Bioactive components in VCO, such as lauric acid and polyphenols, possess antioxidant and anti-inflammatory effects (Marina et al., 2009). In this study, athletes who received massage with VCO reported less muscle soreness compared to the group that used body lotion. Furthermore, VCO's benefits as a natural anti-inflammatory and analgesic are relevant in reducing muscle pain in athletes (Intahphuak et al., 2010). While body lotion is superior in maintaining skin moisture, it does not have a significant impact on physical fitness. The benefits of moisturizers in maintaining skin integrity, although important, do not directly affect muscles or overall fitness (Draelos, 2010). However, some participants reported higher

comfort levels during massage with body lotion. This may be due to the lighter texture of body lotion compared to VCO, which made the massage feel more comfortable for some individuals.

5. CONLCUSIONS

Based on the research findings, it can be concluded that massage therapy using Virgin Coconut Oil (VCO) has an effect on the physical fitness of athletes participating in the Bali Provincial Sports Week (PORPROV Bali), while massage therapy using body lotion does not show a significant effect on physical fitness. In addition, there is a significant difference between the effects of the two treatments, with VCO demonstrating a greater improvement in physical fitness compared to body lotion. This study contributes to improving athlete performance through massage interventions using VCO and provides valuable insight for coaches in enhancing athlete performance based on the principles of training and recovery.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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