



The Effect of Thai Massage and Sport Massage on Decreasing Low Acids and Blood Glucose

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Abstract

The purpose of this research was to analyze the difference between the effectiveness of Thai and Sports massage against the decrease of lactic acid and blood glucose. The research was experimental laboratoris. The results showed the initial data retrieval on lactic acid level in treatment and control group ranged between between 1.30-3.40 mmol/l of lactate. Then on lactic acid level after activities on Sport massage group was 6.01 mmol/l, whereas the thai massage group was 5.72 mmol/l, and control group was 5.18 mmol/l. whereas in lactic acid levels after 5 minutes of physical activity on a group of sport massage namely 8.36 mmol/l, a group of thai massage 7.26 mmol/l, and the control group 5.83 mmol/l. lactic acid levels and then 10 minutes of physical activity on the group after group of sport massage namely 3.81 mmol/l, a group of thai massage 4.11 mmol/l, and the control group 4.62 mmol/l. While on initial data retrieval on the blood glucose levels between 75 – 91 mg/dL. then in blood glucose levels after activities on a group of sport massage namely 93.50 mg/dL, while the Group of thai massage 96.12 mg/dL, and the control group 88.75 mg/dL. While in blood glucose levels after 5 minutes of physical activity on a group of sport massage i.e. namely 89.75 mg/dL, a group of thai massage 88.25 mg/dL and a control group of 88 mg/dL. Then blood glucose after 10 minutes of physical activity on the group the Group of sport massage i.e. namely 81.12 mg/dL, a group of thai massage 83.12 mg/dL, and the control group 85.00 mg/dL. Based on the above analysis, it can be concluded that there is a decrease in the levels of blood glucose and lactic acid for each experimental and control groups group after being given the treatment of Thai Massage and Sports Massage..

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INTRODUCTION

Exercise is a necessity for human beings because humans are moving beings. Humans in doing their activities are never separated from the process of motion, because there is no life without any movement. In practice, sport is universal because sports can be done by all levels of society. Exercise can be a way to get good benefits, both in terms of health or physical appearance. In exercising, supported by various organs of the body, one of them is muscle. Exercising can lead increasing of lactic acid in muscle and blood. The increase of lactic acid depends on the physical intensity performed. When performing light physical activity, the lactic acid product is in small amount. But if the physical intensity increases, the production of the lactic acid also increases resulting in fatigue.

Fatigue is common to everyone. Fatigue is not only experienced by the elderly but also by the adults or even by children. Fatigue is thought occurring due to build up in muscle and blood. Besides being produced in muscle, lactic acid is also produced by the liver, heart muscle, and tissues in the body. The higher of the ability to reach the lactate threshold, the better the person's endurance level. At the time of someone experiencing fatigue, it is likely to occur hyperglycemia when the physical activity is very heavy, because the use of glucose first decreased before the glucose is formed (Marliss, 2002). Hyperglycemia is a condition where blood glucose levels are above normal limits. Normal glucose levels range from 70 - 100 mg / dL.

Recovery can be done with both active and passive. Active recovery is an actively restored recovery and decreases activity becomes lighter until the body's energy metabolism becomes normal. Passive recovery is a recovery done passively and stops the activity until the energy metabolism in the body returns to normal. One way of passive recovery is massage. Massage is expected to increase blood circulation so as to speed up the discharge of lactate. Passive recovery can be done by manipulating sport massage. Giving sports massage has the purpose of fostering physical conditions, and avoid things that can harm and alleviate suffering as little as possible due to sports injuries. According to Sutaji (in Sulistyorini, 2013: 35) the effect of massage on the physiology that affects all the tissues without exception although located deeper in the body, such as skin, muscles, peripheral nerves, central nervous, as well as circulation and also blood circulation

and lymph, and it can more significantly affect the activity of the heart, helps food assimilation and the effect on metabolism extensively. Sport massage has the effect of relieving stress, improving tissue elasticity, and eliminating the buildup of lactic acid. In Indonesia generally, sport massage is considered the most powerful in stimulating the decrease in lactic acid in muscle because sport massage stimulates active soft tissue and dynamic in the body's metabolism that can speed up muscle metabolism and clean up the remnants of the body's metabolic processes (Roepadjadi, et al 2014).

Along with the development of modern times, a variety of massage in the world of sports is also developing, one of those is thai massage. As the name implies, thai massage was developed in Thailand. Massage techniques in thai massage is stretching and body parts emphasis to be massaged and massage technique is not using oil or lotions like massage in general. Thai massage centers massage to stretch the muscles of the body and nerves like yoga movements. Thai massage has the effect of relieving stress, the body feels more flexible, the muscles feel supple, and the body becomes fitter. Based on research conducted by Buttogat, et al (2010: 16) showed that thai massage also improves blood circulation, lower heart rate, reduce pain, and increase relaxation.

Sport massage and thai massage are some examples of variations of massage movements that existed before. Some interesting things from sports massage and thai massage that is the difference of massage manipulation movement. According to Salguero, Pierce, et al (2011: 52), thai massage combines many movements that are similar to yoga practices (Thai self-sport stretches). However, unlike in traditions, this stretch is made passive as the therapist moves the body to relax the client to the right position. Meanwhile, according Sulistyorini, et al (2013: 55) manipulation techniques in sport massage refers from the Swedish system that is effleurage, petrissage, shaking, tapotement, friction, vibration, stroking, and skin rolling. Despite having different manipulation movements, the purpose of giving thai massage and sport massage should be achieved in accordance with the manipulation provided, ie to lower lactic acid and blood glucose after doing submaximal ergocycle activity.

Therefore, this study was conducted to test the effectiveness of the technique of knowing the difference sport massage and thai massage against decrease in lactic acid and blood glucose.

METHOD

This study was using Experimental Quasi Research Design with Time-Series model (Sugiyono, 2009: 114).

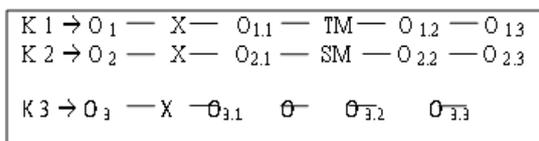


Figure 1. Treatment Design (Sugiyono, 2009: 115)

Which are :

- O1 : Lactic acid and blood glucose levels of Thai Massage group pretest
- O2 : Lactic acid and blood glucose levels of Sport Massage group pretest
- O3 : Lactic acid and blood glucose levels of control group pretest
- X : Ergocycle physical activity
- O1.1 : Lactic acid and blood glucose levels of Thai Massage group pretest 1
- O2.1 : Lactic acid and blood glucose levels of Sport Massage group pretest 1
- O3.1 : Lactic acid and blood glucose levels of control group pretest 1
- TM : Thai Massage treatment Giving
- SM : Sport Massage treatment Giving
- O : Without any massage treatment
- O1.2 : Lactic acid and blood glucose levels of Thai Massage group pretest 2
- O2.2 : Lactic acid and blood glucose levels of Sport Massage group pretest 2
- O3.2 : Lactic acid and blood glucose levels of control group pretest 2
- O1.3 : Pretest 3 kadar asam laktat dan glukosa

darah kelompok Thai Massage

O2.3 : Lactic acid and blood glucose levels of Sport Massage group pretest 3

O3.3 : Lactic acid and blood glucose levels of control group pretest 3

The population in this study was the sophomore students in Faculty of Science Sporting Education Training Program of Universitas Negeri Surabaya (UNESA) in the age range of 21 to 25 year old. The number of the sample was 24 students of male gender. These 24 male students were divided into 3 groups using ordinal pairing which were consisting of 8 people in each group people. First group was Sport Massage treatment group, second group was Thai Massage treatment group, and the last group was control group that was not treated by any massage treatment.

This research was carried out at SSFC UNESA for 3 weeks. This research was conducted in May-June 2016. Research instrument in this study was using Accutrend Lactate, and Optium Xceed.

In accordance with the hypothesis and type of research used in this study, the statistical analysis used was pretest of normality and homogeneity data, then it was continued with the paired sample t-test and Analysis of Variance (Anova) with a significance level of 5%. The above process was implemented using Statistical Product and Service Solution (SPSS) 20.0 program.

RESULT AND DISCUSSION

Normality Data Test

Calculation results with SPSS 20.0 to see normal whether data can be seen in Table 1.

Based on the table above showed that the

Table 1. Normality Data of dependent Variable Test Result

Group	Variable	Lactic Acid Level		Blood Glucose Level	
		Sig.	Status	Sig.	Status
Sport Massage	Pretest	0,963	Normal	0,831	Normal
	Posttest 1	0,975	Normal	0,160	Normal
	Posttest 2	0,977	Normal	0,825	Normal
	Posttest 3	0,773	Normal	0,467	Normal
Thai Massage	Pretest	0,993	Normal	0,889	Normal
	Posttest 1	0,682	Normal	0,484	Normal
	Posttest 2	0,926	Normal	0,588	Normal
	Posttest 3	0,760	Normal	0,591	Normal
Control		0,933	Normal	0,963	Normal
	Pretest				

Posttest 1	0,775	Normal	0,661	Normal
Posttest 2	0,940	Normal	0,988	Normal
Posttest 3	0,988	Normal	0,634	Normal

Table 3. Paired t-Test Result of Lactic Acid Level in Sport Massage Group

Variable	Pair	T-count	Sig. (2 tailed)	Status
Lactic Acid	posttest 1 – pretest	7,362	0,000	Different
	posttest 2 – pretest	15,659	0,000	Different
	posttest 3 – pretest	8,809	0,000	Different
	posttest 2 – posttest 1	6,618	0,000	Different
	posttest 3 – posttest 2	-12,707	0,000	Different

*Note : significant value $p < 0,05$

Table 4. Paired t-Test Result of Lactic Acid Level In Thai Massage Group

Variable	Pair	T-count	Sig. (2 tailed)	Status
Lactic Acid	posttest 1 – pretest	9,293	0,000	Different
	posttest 2 – pretest	15,860	0,000	Different
	posttest 3 – pretest	8,016	0,000	Different
	posttest 2 – posttest 1	4,674	0,002	Different
	posttest 3 – posttest 2	-9,482	0,000	Different

*Note : significant value $p < 0,05$

acquisition of data from the dependent variable that was the balance had the meaning that the data was normally distributed. This could be seen from the sig (p) value of each group was greater than 0.05. Therefore it could be concluded that the data was taken from a normally distributed population.

Homogeneity Test

SPSS 20.0 Calculation Results for the the homogeneity of data as in Table 2.

Table 2. Homogeneity Test Results of Variance

Group	Variable	Lactic Acid Level	
		Sig.	Status
Sport massage, Thai massage, dan kelompok Control	Pretest combination	0,913	Homogeneous
	Posttest 1 combination	0,895	Homogeneous
	Posttest 2 combination	0,234	Homogeneous
	Posttest 3 combination	0,176	Homogeneous

Based on the table above showed that the acquisition of the dependent variable data is the balance had a homogeneous data variance. It could be seen from the significance value of each data was greater than the level of significance ($p >$

0.05). So it could be concluded that the variance in each group was the same or homogeneous.

Paired t-Test

To answer the proposed hypothesis, the analysis test used in this study was the mean difference test by using paired t-test. The value used in paired t-test was pretest and posttest value of each group.

Based on the results of the study, $p < 0.05$, it could be seen that the results of paired t-test sports massage group on lactic acid (posttest 1 - pretest, posttest 2 - pretest lactic acid, posttest 3 - pretest, posttest 2 - posttest 1, and Posttest 3 - posttest 2) there was a significant difference.

Based on the result of research with $p < 0,05$ it could be seen that the paired t-test result in Thai massage group at lactic acid level (posttest 1 - pretest, posttest 2 - pretest, posttest 3 - pretest, posttest 2 - posttest 1, and posttest 3 -posttest 2) there was a significant difference.

Based on the result of research with p value $< 0,05$ it could be seen that the result of paired t-test of sport massage group on blood glucose level (posttest 1 - pretest, posttest 2 - pretest) there was a significant difference, whereas at posttest 3 - pretest, posttest 2 - posttest 1, and posttest 3 - posttest 2 there was no significant difference with $p > 0.05$.

Table 5. Paired t-Test Result of Blood Glucose Level in Sport Massage Group

Variable	Pair	T- _{count}	Sig. (2 tailed)	Status
Blood Glucose	posttest 1 – pretest	5,635	0,001	Berbeda
	posttest 2 – pretest	10,362	0,000	Berbeda
	posttest 3 – pretest	-0,252	0,808	Tidak Berbeda
	posttest 2 – posttest 1	-1, 464	0,187	Tidak Berbeda
	posttest 3 – posttest 1	-3,644	0,008	Tidak Berbeda

* Note : significant value $p < 0,05$

Table 6. Paired t-Test Result of Blood Glucose Level in Thai Massage Group

Variable	Pair	T- _{count}	Sig. (2 tailed)	Status
Blood Glucose	Posttest 1–pretest	3,548	0,009	No difference
	posttest 2 – pretest	1,764	0,121	No difference
	posttest 3 – pretest	0,351	0,736	No difference
	Posttest 2 – posttest 1	-3,895	0,006	No difference
	posttest 3–posttest 1	-4,556	0,003	Different

* Note : significant value $p < 0,05$

Table 7. Paired t-Test Result of Blood Glucose Levels in Control Group

Variabel	Pair	T- _{count}	Sig. (2 tailed)	Status
Blood Glucose	posttest 1 – pretest	4,277	0,004	Different
	posttest 2 – pretest	3,850	0,006	No Dirrence
	posttest 3 – pretest	2,223	0,062	No Dirrence
	posttest 2 – posttest 1	-0,683	0,516	No Dirrence
	posttest 3 – posttest 1	-4, 356	0,003	Different

* Note : significant value $p < 0,005$

Based on the result of research with p value $< 0,005$ it could be seen that the result of paired pair t-test of Thai massage group on blood glucose level (posttest 1 - pretest, posttest 2 - pretest, posttest 3 - pretest, posttest 2 - posttest 1) there was no significant difference . While on posttest 3 - posttest 2 there was a significant difference.

Based on the result of the research with $p < 0,05$ it could be seen that the result of paired pair t-test in blood glucose level (posttest 2 - pretest, posttest 3 - pretest, and posttest 2 - posttest 1) there was no significant difference. While in posttest 1 - pretest and posttest 3 - posttest 1 there was a significant difference.

ANOVA Test Result

Analysis of variance (ANOVA) was used to know the difference of dependent variables between groups. To analyze the data using ANOVA, the control group data were tested together with the experimental group. ANOVA was used to test the difference in outcome of the dependent variable in the group based on the independent variable.

Table 8. ANOVA Test Result of Lactic Acid Level

Variable	F-count	Sig. (2 tailed)	Status
Pretest – posttest 1,2,3	10,948	0,000	Different

Based on the research results, it could be seen that the sig value was 0.000, in other words $p < 0,05$. So it could be concluded that there were significant differences between the group of Sport massage and Thai massage against lactic acid levels.

Table 9. ANOVA Test Result of Blood Glucose Level

Variable	F-count	Sig. (2 tailed)	Status
Pretest – posttest 1,2,3	19,687	0,000	Different

From the table above, sig value was 0,000, so $p < 0,05$. So it could be concluded that there

Table 10. LSD Test Result of Blood Glucose Level

Method		Mean Defference	Sig.
Sport Massage	Thai Massage	0,804	0,064
	Control	1,987*	0,000
Thai Massage	Sport Massage	-0,804	0,064
	Control	1,183*	0,007
Control	Sport Massage	-1,987*	0,000
	Thai Massage	-1,183*	0,007

were significant differences between groups of sports massage and thai massage against blood glucose levels. Based on the results of the study showed that there were significant differences. The difference could be seen from the mean difference, so it could be said that there were differences in the effect on blood glucose levels between experimental groups. From the data mean difference was seen that sport massage was more optimal in lowering blood glucose levels than thai massage group. Thus sport massage can reduce blood glucose levels optimally.

Based on the results of the study, showed that there were significant differences in blood glucose levels. These differences could be seen from the mean difference, so it could be said that Sports massage is better in reducing blood glucose levels than thai massage. Thus sport massage can lower blood glucose levels optimally.

RESULT AND DISCUSSION

Initial Lactic Acid Level

The result of independent t-test of lactic acid before physical activity showed that there was no significant difference ($p > 0,05$) at initial lactic acid level in Sport massage group, Thai massage group and control group. Thus it could be concluded that the lactic acid levels between groups before the activity had a balanced value. Thus if there was a difference in lactic acid levels after the activity, it was not because of the difference in initial lactic acid levels, but because of the influence of treatment given to each group.

Lactate Acid Level 5 Minutes After Doing Physical Activity

The highest increase in lactic acid levels 5 minutes after the activity occurred in sport massage group. In addition, the movement of sports massage techniques was also more about on muscles used during the move and the movement of sports massage that directed blood flow to the heart so it increased lactic acid metabolism and accelerated the recovery process (Giriwijoyo,

2006). The reaction of lactic acid after physical activity was estimated reaching peak between 3-5 minutes. However, physical activity that relied on endurance such as cycling, long-distance runners, swimmers, lactic acid levels tend to decline faster when compared to physical activity that relied on speed (Guyton, 1996).

Lactate Acid Level 10 Minutes After Doing Physical Activity

Significant decrease of blood lactic acid levels occurred better in Sports massage group when compared to Thai massage group and control group. According to Badriah (2011), during the resting phase from anaerobic physical exercise occur energy reserves recovery. ATP-PC resource occurs recovery through anaerobic metabolism in both muscle types, as well as lactic acid which was accumulated during the exercise. Most of the lactic acid will be converted to pyruvic acid and will join Co-enzyme A (CoA) to form acetyl-CoA. Then acetyl-CoA and oxaloacetate will form citric acid which subsequently undergoes chemical process in mitochondria.

Initial Blood Glucose Level

The results of the independent t-test and ANOVA of blood glucose levels before the physical activity showed no significant difference ($p > 0.05$) in Sport massage, Thai massage and control group. It could be concluded that blood glucose levels between groups before the activity had a balanced value. Thus if there was a difference to blood glucose levels after activity, it was not because of the difference in blood glucose levels in the initial, but because of the influence of treatment given to each group.

Blood Glucose Level After Doing Physical Activity

During exercise, the need for glucose increases so that occurs glycogen breakdown in liver into glucose, this is called glycogenolysis. Then glucose is released from liver and enters the bloodstream until reaches the muscle. There are four

hormones that work in increasing glucose levels, those are glucagon, epinephrine, norepinephrine, and cortisol (Kusnanik, et al, 2011). In physical activity or high intensity exercise, blood glucose levels are enhanced by glucagon, epinephrine, norepinephrine, and cortisol.

Blood Glucose Level After Doing Physical Activity in 5 Minutes

Blood glucose levels after activity in 5 minutes decreased in Sport and Thai massage group, but it increased in the control group. It occurred because the massage groups were undergoing treatment so that it could stimulate the muscles that have worked during submaximal activity to release the enzymes so that glucose levels decreased. Blood glucose would also decrease because of the stimulation of the adrenaline hormone decreased 30 minutes after doing physical activity. Glycogen reserves in liver were limited, so that blood glucose levels would decrease when demand exceeded the supply (Kusnanik, et al 2011).

Blood Glucose Level After Doing Physical Activity in 10 Minutes

After physical activity, in the recovery period would cause the decrease of blood glucose because it required oxygen in the metabolism of energy. The resource energy of the body (carbohydrates) like blood glucose, muscle glycogen and stored fat would contribute to produce energy aerobically with oxygen so that energy could be processed optimally. However, these energy deposits depend on the intensity of exercise performed so that the amount of energy released was also not the same. The glycogen reserves in liver were limited, so the blood glucose level would decrease when the demand exceeds the supply. The depletion of glycogen had no direct effect on fatigue, but it was the first stage of the chain reaction and caused fatigue (Kusnanik, et. al 2011).

CONCLUSIONS

Based on the results of the result and discussion that have been described in the previous chapter, could be summarized as follows: 1. Thai massage treatment could lower lactic acid and blood glucose levels; 2. Sports massage treatment could lower lactic acid and blood glucose level; 3. There was a difference in the effect of Thai and Sports massage treatment on decrease of lactic acid and blood glucose level where Sports massage decreased lactic acid and blood glucose levels faster than Thai massage.

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