Influence of Massage Types on the Badminton Player Fatigue Been Reviewed from Differences of Sex

Julius Agung Saputro
Sport Science, Postgraduate, Sebelas Maret University
Jln. Ir. Sutami No. 36A, Kentingan, Surakarta, Central Java

Abstract

The purpose of this study was to determine (1) the difference of massage and exercise effect on lactic acid recovery after doing maximum activity. (2) sex differences on recovery of lactic acid levels thereafter. (3) the interaction between the massage method (Swedish massage and sports massage) and sex on the recovery of lactic acid levels thereafter. This research uses experimental method with factorial 2x2 factor. The study population is badminton players GOR Klaten. The sampling technique used is purposive random sampling. Samples were prepared based on experimental variables of 11 male players performed at a maximum of 6 x 35 meters, given the manipulation of massage in Sweden. 11 male players do a maximum of 6X35 meters and undergo sports manipulation. 11 female players perform a maximum of 6X35 meters and in the manipulation of Swedish massage massages. 11 female players do a maximum of 6X35 meters and undergo sports manipulation massage. The variables studied were two factor independent variables (manipulative variables and atibutive variables) and one dependent variable. Manipulative variables consist of Swedish massage and sports massage. Attributive variables consist of sample groups with male and female gender. Dependent variable in this research is lactic acid level. Data technique with practice and measurement. Intake of lactic acid content. Measurement of lactic acid content data with pre test is the measurement of lactic acid after maximal and posttest exercise that is measurement of lactic acid after manipulative massage. Data analysis technique used is analysis of variance analysis (anova) two lane at significance level a = 0,05. Conclusions: (1) there was a significant effect difference between Swedish massage and massage on lactic acid levels. Sports massage is better than Swedish massage. (2) There is a significant effect difference between male and female sex in lactic acid recovery. Men are faster at lowering lactic acid levels depending on the female sex. (3) There is a significant interaction between learning methods and sports and gender massage. More appropriate sports massage Dallam lowers lactic acid levels in male gender and Swedish massage is more appropriate in lowering lactic acid levels in women after performing the maximum activity.

Keywords: *Swedish Massage, Sports Massage, Sex, Lactic Acid*

I.PRELIMINARY

Badminton sport is one of the most famous sport of achievement in the world. Along with the development of badminton era became one of the popular sport, so it becomes an activity that can be competed for local level competition such as Regional Sports Week (PORDA) and National Sports Week (PON), as well as international level such as Sea Games, Asian Game and Olympics. Badminton Club Gelarsena is one of badminton clubs in the city of Klaten, having players of all ages both juniors and seniors. Therefore, people from Klaten urban areas who want to improve their skills in playing badminton can learn more, by following a programmed exercise at badminton club GOR Gelarsena Klaten.

Due to the intensity of intense and intense exercise, many players experience fatigue so that during the training program, many players who can not do the program in a maximum. Every physical activity (physical) in exercise always leads to changes, including the anatomical, physiological, biochemical, and psychological condition of the culprit (Sukadiyanto & Muluk, 2011: 25). Failure of the body to adapt to training loads can lead to greater risk of injury, as stated by Calder (2005: 3). High intensity exercise can also cause adverse general conditions, so many athletes experience overtraining, overuse, and burnout.

Based on research conducted Purnomo (2011: 168) there was an increase in lactic acid levels in the blood 5 minutes after maximal exercise. According to Bompa 7 Carrera (2005: 239) anaerobic type activity will increase the production and accumulation of lactic acid, which plays a role in the emergence of muscle fatigue. The accumulation of lactic acid can cause muscle pain that is felt when a cadaver engages in intensive activity (Sherwood, 2012: 300). From the field observation of the condition of players who experience fatigue, the introduction of recovery by observation of masage manipulation is done to

determine the benefits of massage manipulation to the body's recovery process against fatigue.

Massage is now seen as the most successful way of relaxation due to the fatigue or achiness experienced after the activity for most people. Healthy and fit require a lot of services, one of them massage. Massage has involved the sciences of the human body such as body science (anatomy), physiology (science), and the science of motion (kinesiologi) (Bambang Priyonoadi, 2006: 20). From the various massage that there are two kinds of massage that has the same massage purpose, namely sports massage and swedish massage. Swedish Massage is the manipulation of body tissues with special techniques to shorten the recovery time from muscle tension (fatigue), improve blood circulation without increasing the workload of the heart (Ken Gray, 2009: 1). Sport Massage is a type of massage therapy that stimulates blood circulation and lymph nodes. Sport Massage is needed not only by athletes (professionals and amateurs) but also by those who have non-sport activities but many memforsir body work. Both of these massage have the same benefits of massage to relax the body. From the science that has been studied, the location of the differences from both massage is on the massage location of the massage, sport massage starting from the massage of the inferior body of the upper legs, lower legs, legs, back, then continued with a supine position on the upper legs, calves, , Stomach, chest, hands and ends at the head. While swedish massage begins from the supine position of the superior parts of the head, chest, abdomen, arms, hands, legs, ends on the back foot. After that proceed with the position of the stomach that starts from the legs, buttocks and ends on the back. Seen from the sequence of manipulation technique of sport massage starting from effleurage, patrissage, tapotement, shaking and ending with effleurage again. While the technique of swedish massage starts from the manipulation of effleurage, petrissage, tapotement and ends with shaking manipulation.

From the observation of the differences between the two relaxation massage, the researchers wanted to observe and examine the differences in the influence of sex and massage on fatigue (Experimental study of swedish massage and sports massage on male and female players against blood lactate levels in Badminton Club GOR Gelarsena Klaten).

II. METHOD

The research method used in this research is experimental method with 2 x 2 factorial design. According to Ali Maksum (2012: 14) factorial experiments are experiments that almost all factors are combined or crossed with every other factor present in the experiment, the experimental design based on factorial 2 x 2 is where in each independent variable is classified into 2 levels . The determination of the factorial design of the study refers to Ali Maksum (2012: 15). The research design forms are as follows:

Table 1. 2 x 2 factorial design

JENIS KELAMIN (B)	***MASSAGE (A)***	
	***SWEDIA MASSAGE* (A1)**	***SPORT MASSAGE* (A2)**
MALE (B1)	A1B1	A2B1
FEMALE (B2)	A1B2	A2B2

Information:
1. A1B1 : swedia massage, male gender against lactic acid levels
2. A1B2 : swedia massage, female gender to lactic acid levels
3. A2B1 : sport massage, male gender against lactic acid levels
4. A2B2 : sport massage, female gender against lactic acid levels

III. PLACE AND TIME OF RESEARCH

This research was conducted at Gelangang Sport (GOR) GELARSENA Klaten. The reason the researchers chose this place is a place to practice badminton club GOR GELARSENA Klaten. The study was conducted for 3 months, beginning in November 2016 until January 2017.

IV. RESEARCH VARIABLE

This study consists of independent variables, attribute variables and one dependent variable. These variables are: Independent variables are manipulated in this research is the type of massage, namely swedish massage and sports massage. Attribute variables in this study were gender (male and female). The dependent variable in this study was fatigue defined in the lactate acid concentration level.

V. POPULATION AND SAMPLE

According Suharsimi Arikunto (2010: 36), the population is the overall object of research. The population is limited to a portion of the population or individual who has at least one common trait. The

population in this study was badminton club GOR Gelarsena Klaten.

According to Ali Maxum (2012) The sample is a partial or representative of the population under study. If less than 100 sub-subjects are better taken all so the study is a population study. Furthermore, if the number of large populations can be taken 10 - 20% or 20 - 25% or more. The sampling method in this study is the total population of 44 Then from 44 divided into 4 groups / cells (cells in factorial 2 x 2) so that in each cell / group filled by 11 people. From 40 samples grouped into four groups, namely:

A) 11 samples of male sex in swedish massage treatment,

B) 11 samples of male sex in sport massage treatment,

C) 11 samples of female sex in swedish massage treatment,

D) 11 samples of female sex in sport massage treatment,

VI. DATA COLLECTION AND INSTRUMENT TECHNIQUES

Data collection in this research is done by measurement technique. Measurements are used to measure blood lactic acid. Measurement with preliminary test (Pre test) the data studied that is after doing sprint test 6x35 meter, each group of sample calculated laktat acid level. The final test (post-test) is done after the initial test and then given massage treatment is swedia massage and Sport massage according to the classification group then done by measuring the final data of lactic acid levels.

VII. INSTRUMENT DATA COLLECTION

Instrument for measurement of blood lactic acid level using lactotest instrument with Accutrend Plus brand and test strip with mMol / dLiter unit. With the measurement limit of this tool is 1-99 mg / dL. This tool requires only the capillary blood of the study subjects so as not to give discomfort to the subject.

VIII. TEST VALIDITY AND RELIABILITY INSTRUMENTS

Instruments used in this study is an instrument that has a fixed measurement scale that is; Lactotest with the Accutrend Plus brand and a BM-lactate test strip to measure blood lactic acid.

IX. DATA ANALYSIS TECHNIQUE

The data have been collected in the analysis using statistical analysis techniques of lactic acid data in the blood to determine fatigue in each cell or group on the experimental design. The data analysis technique used is a two-lane analysis of variance (anova) analysis at the signification level a = 0.05. Using the help of IBM SPSS Statistics 20. To meet assumptions in manova techniques, a prerequisite test is performed.

X. RESEARCH RESULT

The presentation of the results of the study was based on statistical analysis performed on the initial results of lactic acid after the exercise and the end result of lactic acid after treatment on male and female players. The following sequences are presented on the description of the data, test requirements analysis, hypothesis testing and discussion of research results.

Table 2. Descriptive Data of Lactate Loss

	N	Minimum	Maximum	Mean	Std. Dev
A1B1	11	3.10	4.40	3.4818	.35162
A2B1	11	4.60	5.80	5.2273	.32586
A1B2	11	2.70	3.40	3.0818	.23160
A2B2	11	2.20	3.50	2.8182	.36556

XI. NORMALITY TEST

Test of data normality in this research used Lilliefors method. The results of normality test data performed on each group are as follows:

Table 3. Data Normality Test'

	Kolmogorf-Smirnov			Shapiro- Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
A1B1	.207	11	.200*	.816	11	.015
A2B1	.166	11	.200*	.977	11	.944
A1B2	.168	11	.200*	.936	11	.479

A2B2	.179	11	.200*	.967	11	.859

Liliforce Significance Correction

From result of normality test conducted on A1B1 obtained Statistic value = 0.207 significance value of 0.200> 0.05. The data is said to be normally distributed if the data significance value is greater than the significance value of 0.05, so it can be concluded that the data on A1B1 includes normal distribution because the significance value> 0.05. A2B1 data obtained statistical value = 0.166, significance value of 0. 200> of the significance value 0.05, so it is concluded the data on A2B1 is normally distributed. Data A1B2 B1 obtained statistical value = 0.168 with significance value = 0.200> 0.05. It is concluded that the data in A1B2 is normally distributed. Data A2B2 obtained statistical value = 0.179, significance value = 0.200> 0.05, concluded data A2B2 B2 normal distributed.

XII. HOMOGENEITY TEST

Homogeneity test in this research was done by Levene statistic test. Homogeneity test results are said to be homogeneous if the significance value of data> 0.05.

Table 4. Homogeneous Test Test

Levene Statistic	df1	df2	Sign.
.506	3	40	.680

From the homogeneity test results obtained statistical value of 0.506> 0.05. So it can be concluded that between the groups in this study has a homogeneous variance.

XIII. HYPOTHESIS TESTING

Hypothesis testing research conducted based on the results of data analysis and interpretation of variance analysis. The Newman-Keuls range test is taken as an average test step after Anava. With regard to the results of variance analysis and the Newman-Keuls range test, there are several hypotheses to be tested.

Tabe 5. Descriptive Data

Jenis Kelamin	Jenis Massage	Mean	Std. Deviation	N
MALE	*Swedia Massage*	3.4727	.34667	11
	Sport Massage	5.2273	.32586	11
	Total	4.3500	.95606	22
FEMALE	*Swedia Massage*	3.0818	.23160	11
	Sport Massage	2.8182	.36566	11
	Total	2.9500	.32769	22
Total	*Swedia Massage*	3.2773	.35042	22
	Sport Massage	4.0227	1.27837	22
	Total	3.6500	1.00012	44

Table 6. Dependent Variables of Lactic Acid Recovery

Source	Type III Sum of Square	df	Mean Square	F	Sig.
Corrected Model	38.8748	3	12.958	125.307	.000
Intercept	586.190	1	586.190	5668.651	.000
Sex	21.560	1	21.560	208.492	.000
Massage Type	6.113	1	6.113	59.112	.000
Sex* Massage Type	11.201	1	11.201	108.316	.000
Eror	4.136	40	103		
Total	629.200	44			
Corrected Total	43.010	43			

R Square = .904 (Adjusted R Square = .897)

Based on the results of data analysis above can be done prngujian hypothesis as follows:

1. **Discussion of Hypothesis I**

From the results of the study showed that the decrease of lactic acid with the provision of Swedish massage has a decreasing effect that is different from the result of decreased lactic acid

with the provision of Sport massage. This is evidenced from the value of F arithmetic = 59.112> F table = 4.01 with the significance value 0.000. Thus the null hypothesis (H0) is rejected or the data significance value is 0.00 <0.05. So it can be interpreted the difference in the effect of giving the type of massage to decrease lactic acid, that is the provision of Swedish massage has a decrease in lactic acid is different from the provision of Sport massage acceptable kebenaranya. From further analysis diproleh that proved the Sport massage after exercise is better than the provision of Swedish massage in lowering lactic acid levels .

2. Discussion of Hypothesis II

Testing the second hypothesis is menetetukan whether there is influence of sex differences on the decrease in lactic acid levels. The data is said to have an effect if the significance value of data <0.05. The results showed that male male players had different lactic acid decreases with female sex players. This is evidenced from the value of F arithmetic = 208.492 with a significance value of 0.000 <0.05. Which means players of male sex have a decrease in lactic acid levels are different with the female player is acceptable truth. From further analysis it was found that male sex players had a decrease in lactate acid levels higher than those of female sex.

3. Discussion of Hypothesis III

Testing the third hypothesis is to determine the relationship of interaction between, sex, type of massage and decreased lactic acid. From the results of the study showed that the interaction between the provision of massage methods and sex and male sex is very meaningful. Because F arithmetic = 108,316 with an significance value of 0.000 < 0.05. Thus there is an interaction between the provision of massage methods (Swedish massage and Sport massage) with sex differences between men and women.

D. DISCUSSION OF RESEARCH RESULTS

Discussion of the results of this study provides further interpretation of the results of data analysis has been proposed.

1. Differences influence Swedish massage and Sport massage against lactic acid levels

Based on the first hypothesis testing it turns out there is a difference of influence between the group of players who exercise with the provision of Swedish massage and the group of players who exercise with the provision of Sport massage, In the group of players who get 6x36 meter exercise followed by Sport massage has decreased levels of lactic acid higher than With a group of players who received weight training followed by a Swedish massage.

Based on data analysis results, sport massage is useful to help reduce pain, and helps muscle relaxation so it can cure the fatigue experienced by players. Sport massage has a sequence and manipulation techniques mainstay that is Tapotement and Efflurage are more needed on the target area with the pressure is done must be strong enough, deliberately given directly at the beginning of the massage to cause a shock and stimulate the release of endorphins hormones that function in tahapa lowering lactic acid . (Wara Kushartanti, 2003: 31).

2 Differences Gender affects levels of lactic acid.

Based on the second hypothesis testing there is a difference of influence between the male and female players group on the decrease of lactic acid level. In the male players group had a decrease in lactate acid levels higher than the female players group. In men it is easier to decrease lactic acid, because in men anatomically different from women where the physical dimension in men is 7-100% more than women. And physiologically in men for the same cross-sectional area, so the male muscle power 20-25% higher than in women. This is due to its different histological structure, ie the muscle of the male has less fat, then the density of muscle fibers extending the same cross-section is greater than that of women. In addition, in men have a blood of approximately one liter more than in women, with higher levels of hemoglobin men are also greater than in men, the lung volume is approximately 10% larger than in women.

So in the process of recovery of men more quickly. Because women are influenced by androgen hormones that affect not only their body composition but also have a major impact on the respiratory and cardiovascular systems, women have smaller heart size, including heart volume, and lower diastolic pressure than men, even when controlling body weight . In addition to heart differences, men have red blood cells about 6% higher and 10% to 15% more hemoglobin per 100 ml of blood than in women, in increasing oxygen capacity in men. With the difference in absolute size of the heart and greater total blood volume, the male cardiovascular system can provide more blood per minute for muscle work. In addition to having lower heart output and lower hemoglobin levels, women also have a lower vital capacity. So that in women more rapidly increased lactic acid and longer in decreased levels of lactic acid because women longer to provide blood in the heart so that to eliminate lactic acid takes a lot of time. In addition to women affected by hormones estrogen which in the hormone as a controller of

menstruation, where if in women who menstruate irregularly, have a greater risk of physical stress that can facilitate the occurrence of injury. And the ability of recovery in women is much lower than men

3. Interaction between massage (Swedish and Sport massage) and gender to lactic acid levels

One purpose of research with factorial design is to know the interaction between the main variable A (manipulative variable) with variable factor B (attribute variable). In this study analyzed the interaction of giving massage method (Swedish and Sport massage) and gender on the subject. From the summary table of the two factor variant analysis results, it appears that the main factors of research in the form of two factors show a real interaction.

Conclusion

Based on the results of research and data analysis results that have been done, can be obtained conclusion as follows:

1. There is a significant effect difference between Swedish massage and Sport massage on the decrease of lactic acid.
2. There is a significant effect difference in the decrease in lactic acid levels in terms of sex differences, between male players and female players. Male players are faster in decreasing levels of lactic acid. Giving sports massage is suitable for lowering lactic acid levels in male players. Giving Swedish massage is suitable in lowering lactic acid levels in female players
3. There is a significant interaction of lactic acid levels between the provision of massage method (Swedish massage and Sport massage) with sex (male and female).

BIBLIOGRAPHY

[1] Ali Maksum. (2012). Metode Penelitian Dalam Olahraga. Surabaya: Unesa University Press

[2] Bambang Priyonoadi, (2006). Pencegahan dan Perawatan Cedera. Makalah dalam Proses Pembelajaran Kuliah PPC untuk Mahasiswa FIK. Yogyakarta: FIK UNY.

[3] Bompa, T.O & Carrera, M.C. (2005). Periodization training for sport, (2ended).NewYork: Human Kinetics.

[4] Calder, A. (2005). Recovery training. Australian Coaching Council. Diambil pada tanggal 20 November 2016, dari Htttp://www.trainingsmartonline.com/images/free_Triathlou_Articles/Triathlon_Training_Recovery.pdf.

[5] Ken Gray. (2009). Swedis massage. Amerika: Emperior.

[6] Purnomo, M. (2011). Asam laktat dan aktivitas SOD eritrosit pada masa pemulihan setelah latihan maksima. Jurnal media ilmu keolahragaan Indonesia, VOL 1, 155-170.

[7] Sherwood, L. (2012). Fisiologi manusia dari sel ke sistem (6^{th}Ed). (Terjemahan Brahm. U. Pendit). Singapore Cengage Learning Asia Pte Ltd 5 Shenton Way. (Buku asli diterbitkan tahun 2007).

[8] Suharsimi Arikunto. (2010). Prosedur Penelitian. Edisi Revisi V. Jakarta PT Rineke Cipta.

[9] Sukadiyanto & Muluk, D. (2011). Pengantar teori dan metodologi melatih fisik. Bandung: Lubuk Agung