Survey Neutrofil Level in Futsal and Swimming Housers at Malang City

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ABSTRACT
The purpose of this study was to determine neutrophil levels in futsal and swimming hobbyists in Malang City. The data analysis technique used in this study is the survey method. The subjects in this study used futsal sports hobbyists and swimming with a range of ages 22-23 years as many as 20 samples, 10 from futsal hobbyists and 10 from swimming hobbyists. The data obtained were analyzed using the Shapiro Wilk normality test because the data analyzed were less than 30 samples using the ANOVA test. The results of the study were based on data analysis using the ANOVA test that Between the differences between the two groups there was no significant difference, namely Sig. > α or 0.564> 0.005. The conclusion of this study is that there is no significant difference in neutrophil levels in futsal hobbyists and swimming hobbyists. Because sports performed by each futsal and swimming hobbyist have no effect on neutrophil levels.

Keywords: *Neutrophil, Futsal Sport, Swimming Sport.*

1. INTRODUCTION

Sports dose consists of intensity, frequency, duration. Therefore, exercise will be very useful functional if it is done with a measured dose of exercise and is sufficient to provide body stimulation, systematic, carried out regularly, and continuously.

In essence, every movement in sports requires energy. The energy used in every movement in exercising comes from the breakdown of ATP available in muscle cells. There are two kinds of energy systems, namely anaerobic and aerobic. The use of the two energy systems is different depending on how much energy is used and the duration needed to exercise or do physical activities [1]. Aerobic exercise is a sport that requires oxygen and plays a role in improving the ability of the heart and lungs and lasts for more than 120 seconds with glucose and fat as a source of energy, whereas anaerobic exercise is usually carried out at high intensity and taken in a short time, namely the duration less than 120 seconds with energy sourced from ATP-PC (Adenotriphospat-phosphocreatin) and glucose [2]. Meanwhile according to Wiarto (2013:156), the term aerobics is used by bacteria to describe how bacteria live. Bacteria that need energy to survive are called aerobic bacteria and bacteria that don't need oxygen are called anaerobic bacteria [3].

Aerobic exercise is an activity that depends on the availability of oxygen to help the process of burning energy sources, so that it will also depend on the optimal work of the body's organs such as the heart of the lungs and blood vessels to be able to transport oxygen so that the process of burning the energy source can run perfectly. Aerobic exercise is a sport with low to moderate intensity that can be carried out continuously for a long time [4]. What is meant by low intensity is, it only requires a little energy and usually does not cause changes in breathing or endurance. Whereas moderate intensity requires intense or continuous energy, rhythmic muscle movements or flexibility [5]. Aerobic exercise that involves a lot of muscle for activity causes an increase in pulse and energy expenditure. Protein, fat, and carbohydrates are a source of fuel for muscle contraction. The use of each fuel depends on the intensity and duration of training [6].

Futsal is a popular sport that is loved by all levels of society, especially men, ranging from children,

adolescents and adults. This is evident from the fact that there is in the community that most prefer futsal games compared to other sports, both in urban and rural communities [7]. Futsal is a branch of soccer that has been modified to both the size of the field and the number of players. Futsal is a team sport that is fast and dynamic with accurate passing that allows for a lot of goals [8]. In professional-level futsal sports there are characteristics of movements that require anaerobic energy, such as repetitive sprints, dynamic movements, fast passes. But with the length of time playing futsal, surely an aerobic energy system is needed to support the implementation of these activities. Unlike the professional level, amateur level futsal sports certainly have different characteristics, at this level having slower movements, passing, jogging, without any sprints that are done many times. This certainly requires a better aerobic energy system to support these activities [9].

Swimming is a sport that uses limbs, especially the hands and feet to move in water. Specifically swimming is an activity carried out in water, both in swimming pools, rivers, lakes and oceans, by trying to lift his body to float so that he can breathe and move both forward and backward [10]. Swimming is a healthy sport, because almost all the muscles of the body move so that all muscles develop properly. In swimming, sports is very much influenced by the ability to take as much oxygen as possible, namely the ability of VO_2 Max. Swimming requires an aerobic endurance energy system, in which sports that require quite a long time, a span of time that takes 2 minutes and above. Strengthened by Salman's opinion (2018: 24) "Swimming sports are in the category of medium / medium endurance (2 to 8 minutes) this ability is called anaerobic capacity or can also be said to be aerobic. There are so many physical condition factors that affect, one of which is the ability of VO_2 Max and the heart that is able to pump blood throughout the body [11]. The energy system contained in swimming consists of aerobic glycolysis from krebs and electron transport systems that occur in the mitochondria. If oxygen is sufficient, the pyruvic acid that occurs due to the breakdown of glycogen or glycosine is only very little that turns into lactic acid. The bulk of pyruvic acid entering the mitochondria involves a complex enzyme system.

Aerobic exercise such as futsal and swimming will stimulate muscle damage caused by local inflammation so that the muscles degenerate and regenerate around the connective tissue. Neutrophils will be moved into circulation after physical activity, and immediately infiltrate the damaged tissue. Neutrophils are in the muscles one day after physical exercise, and after neutrophil infiltration, macrophages will replace and be in the muscles 1-14 days after physical activity [5]. In futsal and swimming alone, of course also have the risk of injury. The injury is usually treated with therapy or other medical treatment. Wound healing starts with the process of inflammation. Then cleansing occurs in the injured area of cell debris, organisms, dead tissue, blood clots and a little by neutrophil cells, so granulation tissue is formed. When tissue damage occurs, neutrophils first arrive at the site of injury or inflammation. Chemical compounds released by injured tissue are factors that trigger activated neutrophils [12].

Neutrophils help protect the body against bacterial, fungal infections and digestion of foreign matter remnants of inflammation [13]. Neutrophils are present in blood leukocytes as much as 50-60% of the total blood in the body that functions as the body's immunity after undergoing intensive training for a long time [14]. According to Setiawan et al (2016: 137) neutrophils are one component of white blood cells which is the body's first-line defense against infection and plays an important role in the immune response to tissue injury. Neutrophils play an active role in the process of bacterial phagocytosis, microorganisms and clean the remnants of damaged tissue caused by injury [12].

So it can be concluded that exercise can trigger injury. Thus triggering the arrival of neutrophils into damaged tissue. Neutrophils that come will be in the muscles 1-14 days after exercising. This is one of the physiological responses to the body's defense.

2. METHOD

This research is a quantitative descriptive study with a survey method. Descriptive research is research that solely aims to find out an intention to draw conclusions that generally apply. The method used in this study is a survey method, while the data collection uses laboratory tests. The research conducted aims to determine differences in neutrophil levels in futsal athletes and swimming athletes.

In this study the subjects used were futsal athletes and swimming athletes in Malang with a range of ages 22-23 years as many as 20 subjects, 10 subjects from futsal athletes and 10 subjects from swimming athletes. Both of these sports were chosen because of the different ways of training, and also the researchers wanted to know the difference in neutrophil levels in futsal and swimming athletes in Malang.

According to Sugiyono (2014: 102), a research instrument is a tool used to measure natural and social phenomena observed [15]. Specifically all of these phenomena are called research variables.

- Tools
  - Weight scales
  - Height measuring instrument
  - Spuit 3 Cc
  - 3 ml EDTA bottle
- Material

- 3 ml blood
- Hypocritical Plaster
- Alcohol
- Cotton

Data collection techniques used in this study were blood samples taken from athletes from both types of sports. And data collection in this study was divided into three stages, namely: The preparation phase, the implementation phase, the results reporting stage.

2.1. Preparation Stage

(a). Selection of problems. (b). Make initial observations. (c). Literature study (d). Determination of research subjects. (e). Preparation of research instruments. (f). Consult the research instrument problem to the nursery lecturer. (g). Taking care of permission letters at the Faculty of Sports Science.

2.2. Implementation Stage

(a). Conduct breefing or explain the purpose and objectives to the subject before conducting research (b). Take measurements of the subject's weight and height. (c). Take a blood sample.

2.3. Result Reporting Phase

(a). The results of collecting blood samples. (b). Processing data (ANOVA). (c). Analyzing data that has been processed. Data analysis in this study was conducted after the data collection stage of the results of the collection of blood samples collected. Analysis of the data used by researchers as follows:

- Homogeneity testing is intended to provide confidence that the groups studied come from populations that are not much different in diversity.
- The normality test is used to see the results of whether the data obtained in the study are normally distributed. The normality test used is Shapiro-Wilk because the analyzed data is less than 30 samples.
- The results of the study were analyzed using the one-way ANOVA method. This method is believed to be the most accurate method using statistical analysis, which is used to analyze the average difference between groups and related procedures.

3. RESULTS

To find out the results of this study, an examination of 20 samples of hobbyists has been carried out, the data obtained from the measurement of variables in each group of futsal hobbyists and pool hobbyists. Each group consisted of 10 futsal hobbyists and 10 pool hobbyists, descriptive analysis, homogeneity test, normality test, and Analysis Of Variance (ANOVA) statistical methods with a significance level of error of 5% or 0.05.

Table 1. Results of neutrophil level measurement in futsal hobbies

Neutrophil Level		
No	Name	Level (%)
1	HDU	64,7
2	MFB	47,9
3	MF	49,5
4	IN	53,5
5	ARS	41,1
6	AP	56,7
7	VS	54,2
8	IHK	53,8
9	BS	60,9
10	YM	68,7
Rate		55,1

Table 2. Results of neutrophil level measurement in pool hobbies

Netrophil Level		
No	Name	Level (%)
1	YP	68,4
2	MJ	69,9
3	DRT	40,2
4	FW	50,7
5	IW	71,2
6	ARP	57,1
7	AP	53,8
8	RC	46,3
9	S	67,4
10	DK	51,4
Rate		57,64

Based on the results of data analysis, the average neutrophil level can be seen in Figure 1.

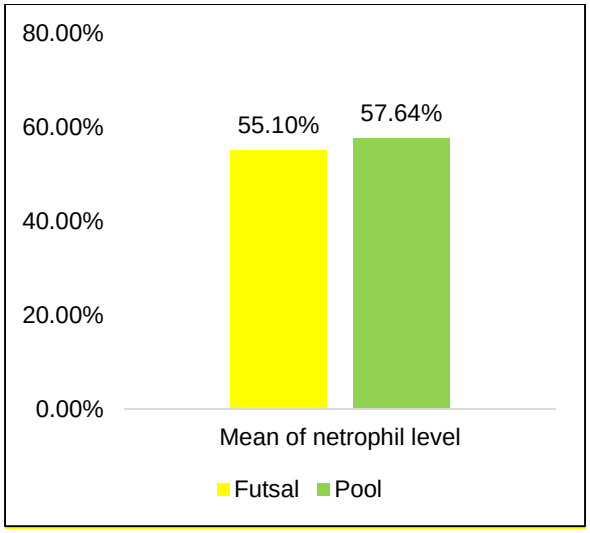

Figure 1. Netrophil level measurements

Based on the Figure shows that the average neutrophil level, in the pool hobbyist group is higher than the futsal hobbyist group. Therefore to see whether or not the comparison of neutrophil levels is significant in the pool hobbyist group and in the futsal hobby group, a different ANOVA test is needed, but before the ANOVA difference test is performed, the prerequisite test is carried out in the following stages:

Before conducting the ANOVA difference test, the normality test and homogeneity test as a prerequisite for conducting the ANOVA test are different, with the following steps:

3.1.1. Normality Test for Neutrophil

Data on the results of the Normality Test for neutrophil levels are presented in the following Table 3:

Table 3. Normality test for neutrophil levels in swimming and futsal hobbies

Groups	Kolmogorov-Smirnov[a]		
	Statistik	Df	Sig.
	0.981	10	0.971[a]
	0.915	10	0.318[a]

Information:
Sign (*): Indicates normal data or (p> 0.05)

3.1.2. Homogeneity Test for Neutrophil Level Data

The next requirement after the data is stated to be normally distributed is that the data must be homogeneous. Homogeneity test results for Neutrophil content data are presented in the following table 4:

Table 4. Homogeneity test for neutrophil levels of groups in the pool hobby group and the futsal hobby group

Levene Statistic	Statistik	Df	Sig.
2.008	1	18	0.174

Based on table 4, the homogeneity test shows that the distribution of Neutrophil content data is homogeneous (p> 0.05), then it is continued with the ANOVA difference test.

After the normality and homogeneity tests, the ANOVA test is then performed as follows:

Table 5. Test results for anova differences in neutrophil levels

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	32.258	1	32.258	0.00	0.564
Within Groups	1677.684	18	93.205		
Total	1709.942	19			

Based on table 5 ANOVA different test, showed that there were no significant differences in neutrophil levels (p> 0.05) or sig. 0.564.

4. DISCUSSION

In the results of the calculation of the number of samples is a total of 20 people taken from futsal and swimming hobbyists. After being tested it proved that the sample used was homogeneous.

After getting a research sample, then prepare counseling about the stages of blood sampling. Athletes before blood drawn are required to fast for 6 hours so that at the time of collection, the blood is not contaminated by substances contained in food and obtain valid blood sample data.

Before the blood draw was prepared tools such as weight scales, height measurement devices, 3 cc syringes and 3 ml EDTA bottles. Blood sampling is performed directly after the hobbyist is declared healthy and has a blood sample taken by laboratory staff. The hobbyist is not given treatment and is quite required to fast for 6 hours. The response is a change in the function of the body's organs to the burden of sport that is temporary which disappears some time after the sport is stopped or ends [16].

Blood drawn through a vein in the arm using a syringe. The steps used in blood sampling are after the process of checking health and blood pressure. Then a blood sample is taken through a vein in the arm.

Syringes that have been connected with syringes are injected into the veins of the hands to meet 3 cc. Then the blood is transferred from the syringe to the EDTA tube so that blood clots do not occur.

After that the blood sample is inserted into the temperature incubator (binder). Next, a centrifuge is carried out to separate blood plasma from blood serum. After separate leukocyte (Neutrophil) levels were tested.

Based on the ANOVA test results stated there were no significant differences in the neutrophil levels of the futsal hobbyist and swimming. (P> 0.05) seen from the differences in sports hobbyists are different, but it does not affect that each hobby neutrophil levels can be higher or lower, even though the graph (Figure 4.3.2) shows the pool hobbyist group is higher than futsal hobbyist groups because of food intake and training patterns of each person or futsal and swimming hobbyists must be very different.

According to Akbar (2010: 22) the difference occurs because if humans do physical activity on an irregular basis then it will make the body's condition decline. Physical activity is the movement of the body due to muscle contraction which results in increased energy expenditure [17]. Exercise triggers greater O_2 consumption to produce energy with the negative impact of producing ROS [18]. Increased aerobic metabolism during exercise is a potential source of oxidative stress [19].

5. CONCLUSION

Based on the results and discussion, a statement can be obtained that between the groups of futsal and swimming hobbyists did not experience significant changes. Futsal sports performed on fusal sports hobbyists do not significantly influence neutrophil levels in the hobby's blood. Swimming sports carried out on swimming hobbyists do not significantly influence the neutrophil levels in the hobby's blood. There was no significant difference between the hobbyists of futsal and swimming, there was no significant effect. Based on the conclusion, it can be suggested that in the next research it is expected to use the treatment in order to find out neutrophil levels between the futsal hobbyist and swimming. It is expected to use the non-hobbyist athlete variable so that the research results are more effective in increasing the neutrophil level. In future studies it is necessary to pay attention to the intake of food eaten by the research sample and also their health condition.

REFERENCES

[1] Wahono, E. 2013. Analisis Kapasitas Aerobik Maksimal Dan Anaerobik Pada Atlet Remaja Sepatu Roda Menjelang Persiapan Kejurnas Jabar 2012. Jurnal IPTEK Olahraga, 1 (1):1-5.

[2] Rahayu, R., Purba, A. & Setiawan. 2013. Perbedaan Pengaruh Latihan Aerobik Intensitas Ringan Pada Sore Dengan Pagi Hari Terhadap Kadar Adiponektin, Trigliserida, Dan Glukosa Darah Pada Tikus Galur Wistar Model Obesitas. Jurnal Bhakti Kencana Medika, 3(7) 306-311.

[3] Wiarto, Giri. 201. Fisiologi dan Olahraga. Yogyakarta: Graha Ilmu.

[4] Hernawati. 2007. Produksi Asam Laktat Pada Exercise Aerobik Dan Anaerobik. Jurnal Pendidikan Biologi. 1(1):1-22. Huldani. 2016. Pengaruh Latihan Aerobik Ringan dan Sedang terhadap Kadar Interleukin 8 dan Jumlah Netrofil pada Remaja. Jurnal Berkala Kedokteran, 12 (1):61-67.

[5] Purwanto. 2011. Dampak Senam Aerobik terhadap Daya Tahan Tubuh dan Penyakit. Jurnal Medis Ilmu Keolahragaan Indonesia, 1 (1):1-9.

[6] Penggalih. 2015. Perbedaan Perubahan Lemak Tubuh Dan Berat Badan Atlet Balap Sepeda Pada Berbagai Intensitas Latihan. Jurnal Gizi Kesehatan, 16 (2):1-14.

[7] Novianda,. Kanca, I. & Darmawan, G. Metode Pelatihan Taktis Passing Berpasangan Statis Dan Passing Sambil Bergerak Terhadap Keterampilan Teknik Dasar Passing Control Bola Futsal. Jurnal PKO Universitas Pendidikan Ganesha, 1(1):1-13.

[8] Affrianty, F., Marzuki. & Chiar, R. 2012. Studi Keterampilan Teknik Dasar Menggiring Bola Dengan Kecakapan Bermain Futsal Club Wanita Starlight. Jurnal Pendidikan Jasmani Kesehatan dan Rekreasi, 1(2):1-10.

[9] Wicaksono, S. 2015. Perbedaan Olahraga Futsal di Sore dan di Malam Hari Terhadap Tingkat Insomnia Pada Anggota Klub Futsal Mahasiswa di Universitas Muhamadiya Surakarta.

[10] Badruzaman. 2007. Modul Teori Renang. Bandung: Universitas Pendidikan Indonesia.

[11] Salman, E. 2018. Kontribusi Vo2max Teradap Kemampuan Renang Gaya Dada 200 Meter. Jurnal Gelanggang Olahraga. 22-31.

[12] Setiawan, G., Pangemanan, D. & Polii, H. 2016. Pengaruh Pemberian Vitamin C terhadap Kadar Neutrofil Setelah Latihan Fisik. Jurnal e-Biomedik (eBm), 4 (1):136-140.

[13] Safrida. 2010. Gambaran Diferensiasi Sel Darah Putih Tikus (Ratitus norvegicus) Betina pada Starvasi (The Description of Differential

Leukocyte Count of Female Rat (rattus norvegicus) in Starvation). Jurnal Kedokteran, 1 (2):1-5.

[14] Li, T., Lin, C., Hung, C. & Tseng, K. 2011. The Effect of Repeated Intensive Pulls of Tug-of War on Immunoendocrine Responses. international Journal of Sport and Exercise Science, 3(1): 17-26. Nader, N.D., Farid., Besa, E.C. 2013. Neutropilia.

[15] Sugiyono. 2014. Metode Penelitian Pendekatan Kuantitatif, Kualitatif Perhitungan Manual dan SPSS. Jakarta:Kencana.

[16] Sugiharto. 2014. Fisiologi Olahraga Teori dan Aplikasi Pembinaan Olahraga. Malang:Universitas Negeri Malang.

[17] Candrawati. S., 2013. Pengaruh Aktivitas Fisik Terhadap Stres Oksidatif. Jurnal Physical Activity, Stress Oxidative. (454-461).

[18] Escribano, B.M., et al. 2010. Effects of an Aerobic Training Program on Oxidative Stress Biomarkers in Bulls. Veterinarni Medicina, 55, 2010 (9): 422-428Alvarez, B., & Subiela. Aerobic Fitness And Performance In Elite Female Futsal Players. Jurnal Biology of Sport, 32 (4):339-344.

[19] Stankovic S. 2012. Biological Analysis of the Water Quality of Moravica Spring in the Sokobanjska Moravica Drainage Basin, Serbia, Journal Arch. Biol.Sci. Belgarde; 64 (1): 59-64.