The Influence of Short Interval Training on Anaerobic Resistance Power in U-14 Arema Academy Players

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ABSTRACT
Anaerobic endurance called stamina is a higher endurance level than endurance, stamina work is at an anaerobic level, where oxygen supply or insufficiency does not adequately serve the work needs of the muscles. Short interval training is needed to support anaerobic endurance capability. The purpose of this study was to find out whether there was any effect of short-interval training on anaerobic endurance on the U-14 Arema Academy player. The research design used in this research is the design of a quasi-experimental design that is Nonequivalent Control Group Design. Based on the results of the SPSS analysis Anova test obtained control group = 0,000 <0.05 which means there is an influence (significant) and experiments = 0,000 <0.05 (significant). From calculation result of Anova using One-Way Anova got p difference of experiment group and control group = 0,000 <0,05. The result showed a p-value <0,05 which means Ho refused. There is a difference between the two groups. The experiment has a larger average. It was concluded that there was an effect on short interval training on increasing anaerobic endurance in the U-14 Arema Academy player.

Keywords:.*Short intervals, Anaerobic endurance, Exercise.*

1. INTRODUCTION

Endurance is very important when defending or attacking within a time period of 2 x 45 minutes in playing football. Anaerobic power is the ability to repeat anaerobic work activities repeatedly [1]. Anaerobic endurance or so-called stamina is a higher endurance level than endurance, stamina is working at anaerobic level, where oxygen supply or intake is not enough to meet the needs of work performed by muscles [2]. One of the factors that can influence the success of a football team is the ability of individuals, both physical and technical abilities.

Short interval training is needed to support the ability of anaerobic endurance. Short interval training plays a role in increasing anaerobic endurance. The method of interval running training is a form or form of running training where the determined distance is traveled repeatedly and interspersed with stoppages or periods of rest which do not result in full recovery and implementation. done at high speed or the load is close to maximum [3]. This interval running exercise occurs gradually from the synchronization of the training work, where the distance that has been determined is not covered in constant speed, but the distance is divided into several short distances and traveled by sprinting (sprint) and interspersed with periods of passivity-resting (walking in place) which are limited in time and controlled.

In physical abilities per-toy football is influenced by the ability of stamina or anaerobic endurance in a player. However, in fact there are many football players at the Arema U-14 Academy who have less anaerobic stamina or strength. Based on interviews with trainers at the Arema U-14 Academy, the player has a level of physical ability that is still lacking, this is obtained from the results of a trial run by the Arema U-14 Academy. From these results the players still have difficulty in both defending and attacking patterns, so that players cannot display their best game. With the conditions possessed by players today there is a need for special training to improve their anaerobic stamina and endurance in football games. Training that focuses on stamina and endurance of an-aerobics can be in the form of short interval training [1]. Because training like this

is a fundamental training needed by a soccer player to achieve maximum performance.

Exercise is a physical movement or activity carried out systematically and regularly with the aim of improving physical and physical condition skills so that at the time of doing sports activities can achieve maximum performance. Training is the process by which an athlete is prepared for the highest performance, through the development of a systematic plan of training that utilizes extensive knowledge gathered from various disciplines [4]. Training for perfecting the ability to exercise always uses theoretical material and uses methods so that the training objectives can be achieved on time. “Training is a physical movement and / or mental activity that is carried out systematically and repeatedly over a long period of time, with burdens increasing progressively and individually. , which aims to improve the system and physiological and psychological functions of the body so that at the time of physical activity can achieve optimal performance " [5]. Training is based on the movements that have been taught and the intensity is adjusted to the goals, needs of the team or individual [6].

Programmed and structured training is done in an effort to achieve the training objectives. "The main purpose of training is to help athletes improve their sports skills and achievements to the maximum extent possible" [7]. Broadly speaking, the goals and objectives of the training are as follows: 1) improving general physical quality in general and overall, 2) developing and enhancing specific physical potential, 3) adding and perfecting techniques, 4) developing and perfecting strategies, tactics, and play patterns, 5) improving the quality and psychic abilities of athletes in competition [8].

The interval training method is the most appropriate method to improve the physical quality of an athlete. In the in terrain training method, the emphasis is on giving rest time between sets, with activities that can be in the form of jogging or walking. Interval training is defined as an activity carried out repeatedly and each time interspersed with lighter activities [9]. From the interval method that is often used many difficulties in understanding the interval method itself.

This interval training is the same as other interval training exercises which always use sets, repetitions, and duration of training time. "Short interval training is a form of interval training with a training distance of 55 yards to 440 yards or if it is changed to meters it is 50.3 meters to 402.3 meters" [1]. The following is about short inter-val training with the form of training activities, namely running 50 meters with repetition 5 times and resting 23 seconds in the form of road breaks, running 40 meters with 5 times deletion and rest 19 seconds with a form of jogging rest, run 30 meters with repetition 5 times and rest 15 seconds in the form of is-rest jogging [8].

Endurance is one of the main basic biomotor components in every sport. Components of endurance biomotor are generally used as a benchmark to determine the level of physical fitness (physical fitness) of athletes. "Endurance is a condition or condition of the body that is able to work for a long time, without experiencing excessive fatigue after doing the work" [10]. Endurance is always associated with the length of work (duration) and intensity of work, the longer the duration of the exercise and the higher the intensity of work that can be done by an athlete, the athlete has good endurance.

Every sport activity always uses maximum intensity in a short time, and always uses anaerobik energy source. Without having a good an-aerobic endurance, sportsmen will not be able to work with maximum intensity and short duration or work that is explosive. "Anaerobic endurance is an exercise that uses energy from the anaerobic system, both from the ATP-PC system and anaerobic glycolysis” [11]. Furthermore anaerobic endurance is grouped into two, which states that anaerobic endurance is divided into two, namely: lactic anaerobic endurance is the ability of a person to overcome the training load with a maximum intensity in the period between 10-120 seconds, alactic anaerobic endurance is a person's ability to overcome the training load with maximum intensity in a period of less than 10 seconds [1].

During activity the body always needs energy to do various kinds of movements. “Energy is the power to carry out activities or work". Each activity that takes place within a few seconds anaerobic energy required depends on ATP (Adenosine Triphosphate) and PC (Phospho Creatin), which are only able to sustain the work for 15-20 seconds [12]. The ATP PC system is included in anaerobic because its metabolism is caused by a series of chemical reactions that occur in the muscles as a process of ATP resintesis that does not require oxygen [13]. If work still has to be direct, then the energy used to continue working is a lactic acid energy system that is able to last for between 1:30-2 minutes.

Energy needed for muscle work is obtained from food consumed daily, which consists of carbohydrates, fats and proteins. In a state of resting muscles get about 2/3 of the energy from fatty acid aerobic metabolism, and only about 1/3 sum of energy derived from carbohydrates [8]. In this state the muscles always receive energy in accordance with the needs of the activities required, both in a state of rest and in the presence of muscle contraction. To produce energy there are two systems, namely anaerobic energy systems and aerobic energy systems.

2. METHOD

The research method used in this study is a quasi experimental method that is nonequivalent control group design. Subjects in the study were 38 Arema U-14 Academy players, who were divided into two groups, namely, the 19 player experimental group and the 19 player control group. In the nonequivalent control group design the first thing the researcher does is to do a pretest to find out the initial state in the initial difference between the experimental group and the control group. Then the experimental group was given treatment (X) with short interval training while the control group was not given treatment. After the experimental group was given treatment for a certain period of time, both groups will be given a posttest to find out the final results of the two groups.

Provision of treatment for 6 weeks, as many as 18 meetings with the number of meetings 3 times in one week, namely Monday, Wednesday, and Saturday in the afternoon at 15:00 to 17:00 WIB. Static-tick analysis used in this research is by using the Anova Test. Analysis of variance can be used if the variants of the two data groups are homogeneous. Therefore, before analysis of variance is used for hypothesis testing, homogeneity testing is necessary. After that the data were tested using the Anova test to find out whether the training given had a significant effect, with a significant level of 5% using the program (SPSS) 22.0. Data obtained from the initial test (pretest) and final test (posttest) from the two groups will be tested in the T Score and then analyzed the data and presented in the form of (1) normality test results, (2) homogeneity test results, (3) hypothesis test results, and (4) Anova test results.

3. RESULTS

The results from the normality test data are obtained as follows.

Table 1. Normality Test

Variable	Test	Experiment group	Control group	Status
Anaerobic endurance	Pre	0.200	0.200	Normal
	Post	0.200	0.200	Normal

Table 1 shows that the acquisition of data from the dependent variable is normally distributed. This is because the significance (p) from each group shows (p) or sig> 0.05 which results in Ho being accepted, so it can be concluded that the data is taken from a normally distributed population.

Table 2. Homogeneous Test

Variable	Test	Sig. (P)	Status
Short interval	Experiment group	0.366	Homogeneous
	Control group	0.146	Homogeneous

Table 2 shows that the significance value of the dependent variable (anaerobic endurance), indicates a significance level or (p)> 0.05. The conclusion is that the variance in each group is equal or homogeneous.

Table 3. Anova test

Group		df	F	Sig.
Experiment	Between	1	17.598	0.000
	Within	36		
Control	Between	1	73.772	0.00
	Within	36		

Based on Table 3, the calculation of Anova results using One Way Anova obtained p-control group, 000 <0.05 which means that there is an influence (significant) and p experiment =, 000 <0.05 which means there is an influence (significant) . It can be concluded (1) that there is no difference between the effect of the control group and the increase in anaerobic endurance, (2) short interval training has an effect on the increase in an-aerobic endurance in the experimental group (significant).

Table 4. Anova results

	df	F	Sig.
Between group	1	59.235	0.000
Within group	36		

Based on Table 4, the calculation of the Anova results using One Way Anova obtained the difference between the experimental group and the control group = 0,000 <0.05. From these results it shows a difference of p <0.05 which means that Ho is rejected. So it can be concluded, there is no difference between the effect of the control group with anaerobic endurance increase and there is an effect of giving short interval training to anaerobic endurance increase in the ex-experimental group.

4. DISCUSSION

Based on the results of short interval exercises conducted in the experimental exercise group, it was found that this exercise had a significant effect on increasing anaerobic endurance at the U-14 arema academy. Anaerobic plays a very important role in the

success of the competition with a performance of 30 seconds to 10 minutes [14]. Anaerobic exercise stimulates muscle activity in high intensity thereby increasing muscle strength and endurance. Anaerobic exercise makes the body unable to supply enough oxygen to the muscles needed in energy synthesis. In that condition, muscles must depend on the body's ability to produce energy without oxygen.

Based on the results of the Anova calculation using One Way Anova, p-experiment = 0,000 <0.05 and control group 0,000 <0.05. Difference from pretest T score and posttest T score of the experimental group and the control group was obtained, p difference = 0.000 <0.05. From these results it shows p <0.05 which means Ho is rejected. It can be concluded that there is influence in the control and experimental groups. There are also differences in the effect of anaerobic endurance between the control and experimental groups. Between the control group and the experiments had an average of 41.79 control groups and 58.18 experimental groups. Furthermore, the researcher recommends the experimental group to be the choice for the training program because the training in the experimental group has a better average score than the control group.

Exercise is a systematic process of physical adaptation by gradually increasing the body's physiological capacity to the work of muscles. Anaerobic capacity is the short-term ability to produce energy by tabulating organism phosphate and by glycolysis, without the use of oxygen, where lactate accumulates [15]. When there is an exchange of energy in body tissues without using oxygen, this is an anaerobic process. Proper training with maximum results must be based on the energy system involved in muscle activity according to the type of exercise. This means that anaerobic exercise causes anaerobic processes in the body and this will explain why this exercise is carried out for a short period of time. In anaerobic exercises using short interval training is a short exercise to increase the anaerobic capacity used for energy.

Training programs to increase endurance must be able to be carried out carefully, systematically, regularly and always improve, following the principles and methods of training that are accurate in order to achieve the expected goals. The alternative training used in this study is short interval training. High-intensity interval training (HIIT) training is defined as an exercise consisting of several cycles of short or moderate duration and high intensity and each cycle is interspersed with rest periodsin the form of light intensity training [16].

In a previous study, there was an effect of short interval training on increasing an-aerobic endurance [1]. The link in research conducted by researchers that in anaerobic endurance carried out by the Arema U-14 academy players there is energy to obtain maximum endurance that must be created when the player wants to move or accelerate an object and provide momentum. In short interval training, it influences the arema U-14 academy players. "with endurance training, endurance training is associated with high intensity, low repetition, high load of exercise increases muscle strength, power and anaerobic capacity, with little change in aerobics" [17].

The increase in an-aerobic endurance in the Arema U-14 Academy players, especially in the experimental group increased from before, it was because the experimental group players did an endurance exercise using short interval exercises in it which contained an element of muscular endurance, anaerobic capacity, and ae-tear capacity that can improve muscle performance and have effective, efficient and maximum resistance.

5. CONCLUSION

It can be concluded that there is an influence on the provision of short- term intervals training treatment to anaerobic endurance improvement for the Arema U-14 Academy players. If they want to maximize their ability in terms of anaerobic endurance, they can use short interval training. Facilities and infrastructure must also be considered because without adequate facilities and infrastructure, training is not optimal.

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