



The Effect of *Interval Training* and *Shuttle Run* on Cardiovascular Endurance in Futsal Extracurricular Activities at State Vocational High School 2 Surabaya

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Abstract

This study aims to examine *the bleep test* on cardiovascular endurance at SMK Negri 2 Surabaya. This study uses quantitative research with experimental methods. In this study, a two-group pretest-posttest design was used, with a pretest and a posttest . The sample in this study was 10 students of SMK Negri 2 Surabaya. The implementation and data collection in this study used a test method. Based on a series of research activities that have been carried out, starting with observing existing problems then determining interval training and shuttle runs as suitable exercises for cardiovascular endurance for the futsal extracurricular at SMKN 2 Surabaya after dividing the experimental group 1, experimental group 2 and control groups, an initial cardiovascular endurance test was carried out, namely bleeptest, after being given the initial test, the experimental group 1 was given treatment, namely Interval training and the experimental group 2 was given treatment, namely Shuttle run while the control group was not given treatment. Finally, the final test was carried out the same as the initial test. After obtaining the data and calculating it can be said that Interval training and Shuttle run can increase the cardiovascular endurance of the futsal extracurricular at SMKN 2 Surabaya.

Keywords: *Interval Training, Shuttle Run , Cardiovascular*

Abstract

This study aims to examine the bleep test on cardiovascular endurance at SMK Negri 2 Surabaya. This research uses quantitative research with experimental methods. In this study, a two-group pretest-posttest design was used, where this design contained a pretest and posttest. The sample in this research was 10 students of SMK Negri 2 Surabaya. The implementation and data collection in this research used the test method. Based on a series of research activities that have been carried out, starting by observing existing problems, then determining interval training and shuttle runs as suitable exercises for cardiovascular endurance for extracurricular futsal at SMKN 2 Surabaya. After dividing experimental group 1, experimental group 2 and control, an initial test was carried out. cardiovascular endurance, namely the bleep test, after being given the initial test, experimental group 1 was given treatment, namely interval training, and experimental group 2 was given treatment, namely shuttle run, while the control group was not given treatment. Finally, the final test is carried out the same as the initial test. After getting the data and calculating it can be said that interval training and shuttle run can increase cardiovascular endurance Futsal extracurricular at SMKN 2 Surabaya.

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INTRODUCTION

Futsal in Indonesia is no less popular than soccer. According to Aliza (2014:1), futsal is not only considered a sport for achievement, but also often considered a sport for

recreation and health. Futsal is included in the big ball sport almost the same as soccer, the difference is the rules. The shape of a small futsal field is 38-42 m and a width of 18-25, the number of players is usually 12 people per team but only 10 players on the field play 5 vs 5 with each team and the playing time is 2 x 20 minutes with unlimited substitutions. In the game of futsal, 5 components include endurance, strength, agility, speed and coordination. These 5 components are often used (Lhaksana, 2011:11).

According to Harsono (2018:40), any effort to improve physical condition must develop all of these elements. Cardiovascular endurance, strength endurance, muscle strength (*strength*), *flexibility*, speed, stamina, *agility*, power, and strength *endurance* are all components of physical condition. Mistakes are almost impossible on a small field. Therefore, players must cooperate with each other through accurate passing, not just to get past opponents. This is because in futsal, players always start the game with 100% concentration on the ball. However, opponents can retrieve the ball at the right time and place. By playing like this, 3 in 2 x 20 minutes, players must make rapid movements repeatedly, requiring players to have good endurance.

In addition, in futsal, players learn basic playing techniques, such as passing, control, dribbling, and shooting. These basic techniques are what determine the game of futsal and soccer. To play futsal, each player must have fitness abilities such as speed, explosive power, muscle strength, endurance, flexibility, balance, accuracy, coordination, power, and agility. Speed and agility can be trained together, one method that can be used in *Cardiovascular training* is *Interval Training*. Interval training is training that combines running distance, running speed, and rest time. Interval training also uses the principle of increasing load in each exercise (Suharjana, 2013). Sugiharto (2014) explains that interval training is characterized by 29 variations between work and exercise. Interval training not only allows athletes to work at high intensity but also allows athletes to work during continuous training.

According to Arsil (2008:38), the interval training method is based on alternating between exertion and rest. The pulse rate should be between 120 and 130 beats per minute during the interval, or rest period between exertions. The interval method can provide a higher volume intensity during exercise compared to the duration method. Furthermore, Tanzila and Bustan (2017) explain that interval training consists of periods of high intensity exercise interspersed with rest periods. Sports such as soccer, futsal, basketball, and other sports can be used because interval training improves *cardiovascular endurance* and stamina. All types of sports require *endurance training*, according to physiologists. Athletes can use this exercise to improve their performance or make them able to compete for a long time. Another technique that can be used in training speed and agility is *the Shuttle Run*. *Shuttle Run* is an exercise using the length of the field, running 25% of the distance, then returning to the starting line, then running 50% of the distance, then returning to the starting line, then running 75% of the distance, then returning to the starting line, then running 100%. This exercise can increase a person's endurance, so that a person will be stronger and less tired when doing physical activities. This exercise can train body coordination and increase a person's agility. Improves heart and lung health: Shuttle run is an effective cardiovascular exercise to improve heart and lung health. The movement of running back and forth in a specified time can increase the heart rate and strengthen the lungs.

cardiovascular endurance or heart and lung endurance is one of the components of physical fitness to support muscle performance by taking oxygen and distributing it to all active muscle tissues, so that it is used in the metabolic process. According to Prihatini and Widodo (2019), cardiovascular endurance is a blood circulation system consisting of the heart, blood components and blood vessels that function to channel and provide oxygen and nutrient supplies to all body tissues in the body's metabolic processes. According to Uztavizaki, (2012) if you have good cardiorespiratory fitness it will increase your physical

fitness so you can avoid disease. According to Suharjana, (2013:53) there are 5 benefits of training cardiovascular endurance, including: increasing the strength of the respiratory muscles, increasing the elasticity of blood vessels, increasing the strength and endurance of muscles throughout the body, increasing the strength of the heart muscles, increasing the strength and density of the body's bones. According to Budiwanto (2012), cardiovascular endurance is the ability of the lungs, heart, and blood vessels to deliver oxygen and nutrients to cells to meet long-term physical needs. Cardiovascular endurance, or lung and heart endurance, is a component of physical fitness. Physical fitness is crucial for supporting muscle function by absorbing oxygen and distributing it to all active muscle tissue, thus contributing to metabolic processes (Yulinar and Kurniawan, 2018).

Previous research conducted by Maulana (2022) entitled "The Effect of *Run Stride* and *Interval Sprint Drill Training* to Increase Running Speed at the Tri Lomba Juang Semarang Athletic Club" concluded that there was an effect of *run stride training* on increasing 100-meter running speed at the Tri Lomba Juang Semarang club by 0.98%. By comparing the effect of *interval sprint drill training* on increasing 100-meter running speed at the Tri Lomba Juang Semarang club. By 1.34%. This training is more effective than *run stride training* on increasing 100-meter running speed. Because the average is greater. Research conducted by Muhadi (2021) entitled "The Effect of *Jogging* and *Shuttle Run Training* on Cardiorespiratory Endurance and Agility of Extracurricular Soccer Students", the results of the study showed the effect of *shuttle run training* on cardiorespiratory endurance and agility of extracurricular soccer students, $p < 0.05$. There is a difference in effectiveness between *jogging* and *shuttle run training* on cardiorespiratory endurance and agility of extracurricular soccer students. Where *jogging exercises* have a higher level of effectiveness than *shuttle run exercises*.

METHOD (The Method)

This research is quantitative. It uses a *Two-Group Pretest-Posttest design*. This model is more robust because it uses an initial test (*pretest*), followed by a *posttest* after the treatment is administered to determine the effects of the treatment, thus accurately determining the magnitude of the experimental effect.

Population is a generalization area consisting of objects or subjects that have certain quantities and characteristics which are then determined by researchers to be studied and drawn conclusions (Sugiyono, 2017). The population in this study were students who participated in extracurricular activities at SMKN 2 Surabaya totaling 75 people with the sampling technique in this study using *opportunity random sampling/accidental sampling*. With the sample criteria being students aged 16 years, willing to be research samples, healthy body condition, no history of injury and members of SMKN 2 Surabaya students.

The data collection method was carried out by collecting pre-test data, applying *treatment* and collecting post-test data. To determine whether the data used in this study were normally distributed, data analysis techniques included a normality test using the Kolmogorov-Smirnov Z test. A homogeneity test was conducted to determine whether there were differences between the experimental and control groups. And a hypothesis test, with a T test with a significance level of 0.05, to compare the experimental group with the control group in determining how interval training and shuttle running impacted cardiovascular endurance. If the significance value is > 0.05 then H_0 is accepted or H_a is rejected meaning there is no effect of interval training and shuttle running on cardiovascular endurance. If the significance value is < 0.05 then H_0 is rejected or H_a is accepted meaning there is an effect of *interval training* and *shuttle running* on cardiovascular endurance.

RESULTS AND DISCUSSION (The Results of Study)

This research was conducted at SMKN 2 Surabaya. This research began on October 3, 2023, and ended on November 23, 2023. The time of this research was divided into 4 stages, namely physiological adaptation, *pretest*, *treatment*, *posttest*. The subjects in this study were 15 male futsal extracurricular players at SMKN 2 Surabaya. Data collection techniques in this study used tests and measurements. The purpose of this study is to determine how circuit training impacts cardiovascular endurance in male futsal extracurricular players at SMKN 2 Surabaya. The data to be collected will come from the results of training before and after treatment.

Table 1. Normality Test

Class	Kolmogorov-Smirnov		
	Statistics	df	Sig.
<i>Internal Training Pre-test</i>	0.271	4	0.200
<i>Internal Training Post-test</i>	0.239	4	0.200
<i>Pre-test Shuttle Run</i>	0.253	4	0.200
<i>Post-test Shuttle Run</i>	0.261	4	0.200

Based on Table 1, the asymp. Sig values of all variables have values > 0.05 , so it can be said that based on the population owned by the sample, a normal distribution is accepted.

Table 2. Paired Samples Test

	Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pair 1 <i>pretest – Interval Training posttest- Interval Training</i>	-33.0	6,671	2,983	-41,283	-24,717	-11,062	4	.000
Pair 2 <i>pretest – Shuttle Run posttest- Shuttle Run</i>	-30.4	5,941	2,657	-37,777	-23,023	-11,441	4	.000

Based on table 2, experimental group 1 obtained a sig. (2 tailed) value of $0.000 < 0.05$, so H_a is accepted, which means there is an effect of interval training on cardiovascular endurance in the futsal extracurricular activity of SMKN 2 Surabaya 2. Experimental group 2 obtained a sig. (2 tailed) value of $0.004 < 0.05$, so H_a is accepted, it can be concluded that there is a difference in the average results of the pretest of experiment 2 with the posttest of the experiment, which means there is an effect of shuttle run training on *cardiovascular endurance* in the futsal extracurricular activity of SMKN 2 Surabaya.

Based on these results, there are two groups: experimental group 1 and experimental

group 2, which serve as a comparison. The results above indicate that interval training and shuttle runs are quite effective in improving physical condition. This is due to the combination of *interval training* and *shuttle runs*. With consistent training, your physical condition will improve as your body becomes accustomed to the training load.

cardiovascular endurance results in the SMKN 2 Surabaya futsal extracurricular was due to the interval training and shuttle run training program using intensity zone 4 in the pompa book. In this book, intensity zone 4 uses a short intensity of 1-6 minutes with a heart rate of 85% - 90% of MHR and a 1: 1 interval model. By using intensity zone 4, interval training and shuttle run exercises are at high intensity. The experimental group during physiological adaptation was introduced to each post of *Interval training* and *shuttle run* and looked for settings for the 1: 1 interval model, because each player in carrying out a series of *interval training* and *shuttle runs* had different travel times.

The 1:1 interval model is if you do a series of *interval training* and *shuttle runs* of 17 seconds then rest for 17 seconds, to continue to the next set. Researchers in the first week determined 4 sets with an increase of 2 sets every 2 weeks. On average, players who entered the experimental group got 15-20 seconds in one series of *interval training* and *shuttle runs*. When carrying out the 1:1 training program that had been given by the researcher, the futsal extracurricular players of SMKN 2 Surabaya achieved a heart rate of 85% - 90% of MHR. So that *Interval training* and *shuttle run exercises* have increased *cardiovascular* endurance in the futsal extracurricular of SMKN 2 Surabaya.

CONCLUSION

According to the results of the research analysis of data obtained using data analysis and hypothesis testing, the author can conclude: there is an effect of *interval training* on *cardiovascular* endurance in extracurricular participants at SMKN 2 Surabaya, there is an effect of *shuttle run* on *cardiovascular* endurance in extracurricular participants at SMKN 2 Surabaya, there is a difference in the effect of *interval training* and *shuttle run* on *cardiovascular* endurance in extracurricular participants at SMKN 2 Surabaya. Based on the conclusions of the research above, there are several suggestions, namely for coaches, it can be used as one of the training programs, especially training to increase the *cardiovascular endurance* of futsal players.

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