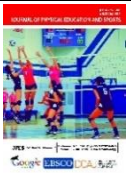
Journal of Physical Education and Sports

11 (4) (2022) : 499-503

https://journal.unnes.ac.id/sju/index.php/jpes



The Effect of Interval Training on Lung Vital Capacity of Futsal Athletes State High School 1 Toili Banggai Regency

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Article Info

History Articles
Received:
17 September 2022
Accepted:
18 October 2022
Published:
30 December 2022

Keywords:
Interval training, endurance, lung vital capacity

Abstract

This study aims to observe, analyze, and increase the vital capacity of futsal athletes using the interval training method, a quantitative type of research with pretest and posttest approach models. The sample in this study was 12 futsal athletes from Senior High School 1 Toili Banggai Regency. The study was conducted by giving the model interval training for 16 training meetings and then measuring it using a spirometry type SP70B with a unit of measurement in liters (L). The training is carried out with a training program with a 20-meter trajectory with repetitions and improvements given in stages. The data were analyzed using the normality test followed by the T-test to see the increase and significance that occurred using SPSS version 26.00. The results showed an increase in the vital capacity of the athletes' lungs after carrying out the exercise. Pretest results were 3.0600 ± 0.2340 and posttest results were 3.3617 ± 0.2744. Athletes experienced an average increase of 0.3016 while for a significance result of 0.000 <0.05, there is an increase in effect. Interval training can increase lung vital capacity for futsal athletes at Senior High School 1 Toili Banggai Regency.

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p-ISSN 2252-648X
e-ISSN 2502-4477

INTRODUCTION

Futsal is a sport that is very popular to play, especially among high school students. The simple and practical way of playing is the reason why futsal is so popular to play. Futsal is played by 2 groups of teams which include five players, the field which is smaller than a football makes futsal more flexible to be played anywhere including the school field. Futsal is also currently part of the extracurricular sport development in schools to develop the interests and talents of students who are fond of the sport of futsal (FIFA, 2022).

Playing futsal generally requires good physical fitness. Where physical fitness is the basis for starting to carry out physical activities starting from work activities and sports. A good physical condition of the body is very much needed for futsal players to be able to play futsal with the available time without feeling significant fatigue (Barcelos et al., 2017). This will have an impact on the quality of futsal when played on the field. Physical fitness covers all of the parts of the human body itself (Naser et al., 2017).

Physical fitness is a physical condition that describes the physical potential and ability to perform certain tasks with optimal results without showing significant fatigue. The need for physical fitness for school-age children, among others, can improve the ability of the organs, social-emotional, sportsmanship, and the spirit of competition (Syahda et al., 2016). From the point of view of educational development efforts to increase physical fitness have objectives including: formation of movement, formation of achievement, social formation, and body growth. Physical fitness can be divided into several components of physical fitness and divided into two aspects of physical fitness, namely: (1) health-related fitness and (2) skill-related fitness (Ian Respati, Said Junaidi, 2012).

The sport aims to improve physical potential, reduce drug administration, improve emotions, and maintain fitness, is also an active behavior that involves the cardiovascular and respiratory systems. An increase in cardiorespiratory endurance can be seen by measuring VO2Max, besides that an increase in cardiorespiratory endurance can also be seen by measuring the value of the respiratory vital capacity of the lungs (Ramadhanus, 2020). Because during exercise there is a cooperation between the various muscles of the body which is characterized by changes in muscle strength, muscle flexibility, reaction speed, agility, movement coordination, and endurance.

Exercise can provide physiological changes, including the working system of the heart and lungs (cardiorespiratory). The average person can achieve heart and lung fitness if they do aerobic exercise within 20-30 minutes, with a frequency of three times a week, so that the oxygen consumed by the body increases, especially in the lungs. The lungs are one of the organs that have an important role in human life. The function of the lungs is to exchange oxygen with carbon dioxide through the process of breathing (Astuti et al., 2020). It was stated that the purpose of breathing is to provide oxygen to the tissues and remove carbon dioxide and that the ultimate goal of breathing is to maintain the concentration of oxygen, carbon dioxide, and hydrogen ions in body fluids. Respiratory activity is very responsive to each particular concentration (Khasan et al., 2013).

The ability of the lungs to accommodate oxygen is called the vital capacity of the lungs. Lung vital capacity is an anatomical measurement that is affected by exercise and disease. A productive person requires a lot of energy to carry out various physical and cognitive activities for a long time. The process of providing energy requires oxygen consumption, the more activity a person has, the more oxygen intake is needed. The volume of oxygen that enters the body is determined by the vital capacity of the lungs. The higher the lung vital capacity that a person has, the more oxygen that can be used to carry out sports activities and exercises (Basuki et al., 2013; García et al., 2021).

Exercise is a process that must be carried out by individuals repeatedly for a long time to improve physical abilities. This process must be guided by the principle of training to achieve the specified target. In increasing cardio-pulmonary endurance many kinds of exercises can be done, one of which is interval training. Interval training

is a model of a type of exercise that can increase the endurance of an individual's heart and lungs as well as changes in human lung physiology (Lutfi, 2017).

Based on the results of direct observations on the field of SMA N 1 Toili's futsal athletes in participating in 4 tournaments, the SMA N 1 Toili futsal team went the furthest once in the knockout round of the top 12 and the other 3 only reached the group phase. This futsal team experienced a problem, namely limited endurance, in this case, the athlete did not have good endurance, which was good for athletes in the game, where the tempo of the game began to slow down and was unable to last long on the playing field.

Fatigue in the game can affect other parts such as decreased concentration, decreased tempo for attacking, the accuracy of shooting the ball at goal, passing the ball, and a weakened defense so that in the game they often make mistakes when attacking and defending. This caused the SMA N 1 Toili futsal team to be unable to score goals, to be ineffective in defense, and ultimately to lose the game. After further investigation by conducting random interviews with athletes, it turned out that there were things that caused athletes' performance to not be optimal due to exercises that were not carried out in a directed and measurable manner and training processes that were not carried out with appropriate training procedures. This was also confirmed by the coach of the futsal athlete at SMA N 1 Toili and the teacher who doubled as a team coach where preparation for the athletes had not been carried out optimally due to limited infrastructure, programs, and training management which had not been owned so that the training was not optimal.

Seeing the problems described above and from the results of observations in the field, the researchers wanted to conduct further research to improve cardiovascular endurance, as well as increase changes in lung vital capacity for the athletes on the futsal team of SMA N 1 Toili. So the authors are very interested in taking up research with the research topic "The Influence of the Interval Training Method on the Lung Vital Capacity of Futsal Athletes at State Senior High School 1 Toili Banggai Regency".

METHODS

This research is a type of quantitative research using experimental methods with the research design used in this study the pre-test and post-test. The experimental method is used to test whether there is an effect from the research results from interval training. The sample used in this study was 12 futsal athletes from SMA N 1 Toili, Banggai Regency.

This research was started by collecting the initial data and then providing 16 training meetings. The final training meeting of this study was to return to the final data collection. The instrument used in this research was to measure lung vital capacity using a digital spirometry model SP70B with a unit of measurement in liters (L).

The technique used to analyze data from this study uses the T-test. As for the normality test, this study used the one-sample Kolmogorov-Smirnov method with a significance level of 0.05. By using the help of the SPSS application version 26.00.

RESULTS AND DISCUSSION

The normality test is carried out to see whether the data is normally distributed or not before proceeding to the next stage.

Table 1. Normality test results

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual for Lung vital capacity	0.172	12	0.200*	0.906	12	0.188

The results of the data normality test obtained a significance value of the Shapiro-Wilk test of 0.188. These results indicate that the data is normally distributed because it is greater than p = 0.05, (0.188> 0.05).

Table 2. Descriptive pre-test and post-test statistics

Variable	N	Pretest	Posttest
Lung Vital Capacity	12	3.0600±0.2340	3.3617±0.2744

The results of the descriptive pre-test and post-test showed that from the results of the interval training carried out, it could be seen that the results of the pretest showed a result of 3.0600 ± 0.2340 whereas after undergoing interval training for 16 training meetings, the vital capacity volume of the lung decreased. increase in volume by an average of 0.3017L, so the results of the posttest obtained 3.3617 ± 0.2744.

Table 3. Descriptive data on the results of the T-test

	Mean	SD	95% confidence interval of the difference				
			Lower	Upper	t	df	Sig. (2-tailed)
Lung vital capacity	0.3016	0.1435	0.2104	0.3928	7.278	11	0.000

The results of the paired sample T-test obtained results for a significance value of 0.000. This result is smaller than 0.05. The results of Tcount 7.278 this result is greater than the results of Ttable 1.796. The results of the calculated and table T values show 7.278> 1.795, it can be stated that there is an influence from the results of interval training on the capacity of the lung's vital capacity, 0.000 <0.05.

Part of the endurance support component is the ability of the heart and lungs to manage the existing respiratory system. One of its components is the lungs, this part of the body plays the main role as its main function is to accommodate the amount of oxygen in the body (Lynch et al., 2021). The lungs carry out a physiological function in the role of storing oxygen which will be used by the human body to carry out daily activities. The amount of oxygen capacity accommodated by the lungs will be distributed to all parts of the body through the blood and blood vessels (Lazovic-Popovic et al., 2016).

Lung vital capacity shows how maximally the lungs can accommodate oxygen, this has a role in providing oxygen especially when doing strenuous physical activities such as exercise. The amount of oxygen that can be accommodated contributes to the availability of oxygen so that it can be used for a relatively longer time intensity without feeling significant fatigue. The amount of oxygen in the lungs is also converted into power in the energy cycle which is closely related to cardiopulmonary endurance or commonly known as VO2Max (Lynch et al., 2021). This is very closely related where the greater the amount of oxygen storage, the better for VO2Max endurance for futsal athletes (Vasconcelos et al., 2017).

The vital capacity of the lungs can be increased in their ability to accommodate oxygen, this is evidenced by the results of the study that the vital capacity of the lungs of futsal athletes at SMA N 1 Toili experienced an average increase of 0.3016±0.1435 in units of measurement liters (L). This can support athletes to have better endurance after undergoing interval training and then experiencing changes in lung physiology, increased lung capacity, strengthened lung muscles, and a good respiratory system, which has a good impact on futsal athletes.

CONCLUSION

Interval training that has been implemented is able to provide significant results to increase the capacity of the athlete's vital lung capacity. Where this has a good impact on the physiology of athletes in carrying out sports activities without feeling excessive fatigue.

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