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THE EFFECT OF FARTLEK TRAINING ON INCREASING VO_2MAX CAPACITY IN FUTSAL PLAYERS

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Abstract
Futsal is a form of indoor soccer played on a smaller field compared to regular soccer, with fewer players on each team. The purpose of this study was to determine the effect of fartlek training on increasing VO_2Max of Sinjay FC Bangkalan futsal players. This study used an experimental method with a one group pretest-posttest design. The population in this study were 25 samples and the sampling technique used cluster sampling, which is a sampling method that involves dividing the target population into groups that are made into research samples so that the sample of this study is U 17-18 athletes who follow the Sinjay FC Bangkalan club. Based on the results of the study that there is a significant effect of fartlek training there is an increase in VO_2Max futsal club Sinjay FC Bangkalan which has been taken from the pretest with an average of the total initial test of 35.254. With the treatment of fartlek training VO_2Max in Sinjay FC Bangkalan futsal athletes can increase. The results of VO_2Max measurements after treatment showed that the overall average of the final evaluation showed an increase to 37.992. So that it has been tested by, prerequisite test and hypothesis test from the analysis of research data obtained it can be seen that the Sig value. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the effect of fartlek training on increasing VO_2Max athletes who are real between fartlek training and control training. The results of this analysis will show how strong or weak the relationship between fartlek training performed by futsal players and the increase in their VO_2Max.
Keywords: *VO_2Max, Fartlek, Futsal.*

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INTRODUCTION

Futsal is a sport that is increasingly popular among various young people, such as groups of futsal players. The first futsal game was held in Montevideo, Uruguay in 1930, initiated by Juan Carlos Ceriani (Mustof & Rumini, 2022). The goal of futsal games is to pass the ball to the opposing team as often as possible and ensure that the opposing team stays together to prevent ball penetration from

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the opposing team. (Mashud, Hamid, & Abdillah, 2019). Futsal sport which is identified with a game played in a closed environment with a more limited number of participants than football, futsal is very easily accepted by the community, especially in Indonesia itself (Ramadhan & Aji, 2021). The point of this futsal game is that the most important thing in a futsal game is to get as many points as possible as a form of victory in a team (Maretno & Arisman, 2020).

The overall nature of futsal is to create a game environment that supports the development of technical skills, speed of thought, and quick response of players. Maintenance from an early age hopes to publish outstanding athletes (Aswadi, Amir, & Karimuddin, 2015). One advantage of the futsal game is that the field is relatively small, so it does not require as much space as a soccer field (Narlan, Juniar, & Millah, 2017). This sport, we can grow and develop with several exercises such as fartlek training to have the potentials, talents and skills possessed by children since early development. In futsal, there is a tendency to run back and forth. Therefore, exercises that are in accordance with running back and forth are one of them fartlek exercises.

Fartlek exercise is an endurance training method used to develop, restore, or maintain physical condition (Warni, Arifin, & Bastian, 2017). In fartlek training, participants will alternate between sprinting, walking, and running at a moderate pace without a fixed time interval. Fartlek, or speed interval training, involves a combination of high- and low-speed running, often without strict timing rules, to increase endurance and improve speed, making it a flexible and effective exercise for various sports (Kurnia & Kushartanti, 2014). Fartlek training can produce physiological effects by increasing not only VO_2Max, but also other physical abilities such as speed and strength, this is due to the variations contained in fartlek training that help stimulate various aspects of physical condition (Syahroni, Muliarta, Dinata, Sutjana, Pangkahila, & Adiputra, 2020). A person's aerobic ability has a significant impact on a player's physical fitness or body health (Arisman et al., 2021). Therefore, fartlek training can support to increase the VO_2Max capacity of the athlete's physical condition, so this farltek

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training is very good for the development of technical skills, tactics, strength and endurance. Fartlek training can control the running speed during training with the ability of an athlete.

VO_2Max is the capacity of an athlete's body to overcome fatigue caused by long-term physical activity (Anggraini & Widodo, 2021). The VO_2Max monitors the amount of oxygen that the body uses during maximal exercise; this is typically expressed in liters per minute (L/min) or milliliters per kilogram per minute (ml/kg/min). Factors that affect VO_2Max involve heart capacity, lung capacity, and the ability of muscles to use oxygen. VO_2max determination is an important indicator of cardiovascular fitness and athletic performance, but its role in predicting sporting success is still debated in the literature (Jatmiko, Kusnanik, Nurhasan, Muhammad, & Purwoto, 2024). VO_2Max is used as an indicator of health and physical fitness, as well as being an important parameter in designing exercise programs and measuring the body's response to aerobic exercise.

The difference between previous research and this study is that there are different research locations, populations and samples, and differences in the results in this study, previous research states that to increase VO_2Max an athlete can be given a supportive exercise with an appropriate training program. Therefore, fartlek training can maximize high VO_2Max levels that can support aerobic endurance, so that this exercise can affect VO_2Max capacity.

This study aims to evaluate the positive effect of fartlek training on increasing the VO_2Max capacity of Futsal Sinjay FC Bangkalan players. Thus, this study can not only make a theoretical contribution to the understanding of the effectiveness of fartlek training in the context of futsal, but also make a practical contribution to the coaches and players of Futsal Sinjay FC Bangkalan.

METHOD

This research employs a quantitative research design using the type of research known as experimentation research. Sugiyono (2015: 107) explains that "Experimental research methodology can be defined as a research methodology

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used to search for effects of a particular study on other studies in conditions that are sensitive to variation". This study used a one group pretest-posttest design. Where this research will be given treatment before and after or called pre-test and post-test. In this way, the outcome of the transaction can be evaluated more accurately since it can be compared to the situation prior to and depending on the transaction being given. (Sugiyono, 2013).

Table 1. Research Design (Pranata, 2020)

Pre-test	Group	*Post-test*
O1	X	O2
	Y	O2

Description:
O1 = Initial *Bleep Test*
X = *Tretment* Exercise *Fartlek*
Y = Control Group
O2 = Final *Bleep Test*

The time and place of research were conducted from February 22 to March 26, 2024, carried out during a period of approximately 1 ½ months including (Pretest and postest). And the research site was conducted at Soka Sportorium Bangkalan. The population of this study were 75 athletes who attended the Sinjay FC Bangkalan club. The sampling technique used in this study makes use of cluster sampling, where the sampling method involves dividing the target population into groups that are made into research samples so that the sample of this study is U 17-18 athletes who follow the Sinjay FC Bangkalan club. The U 17-18 group is suitable for fartlek training, due to the lack of physical condition to increase VO_2Max during training and matches and in this study the sample used was 25 samples. In this study, there were 25 athletes in U 17-18 years, so that the bleep test was divided into 2 groups. Fartlek group (1-12 athletes) and Control group (13-25).

The bleep test provides a snapshot of aerobic endurance and a person's ability to cope with high-intensity physical activity over an extended period of time. The results of this test are often expressed in terms of the level or stage a

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participant manages to reach before they are unable to continue. The test can be adapted for different age groups and fitness levels, making it a flexible tool for cardiorespiratory fitness measurement.

The data analysis technique used in this study is one that is restricted by the SPSS 21 program. In the context of this study, prerequisite tests and hypothesis tests will be carried out. The equality of the two averages aims to determine whether the results obtained from the VO_2Max results of futsal athletes have increased between the pretest and post-test one group design, so the hypothesis test used is the t test with the Paired Sample T-test method (Related t test) with a significant level = 0.05. One method of hypothesis testing involving data that is not independent (paired) is the Paired t-test. This method is used to compare the rata-rata of two related groups that are identified prior to and following a certain event or intervention.

RESULT AND DISCUSSION

This study began by conducting a pre-test or initial test on the sample, then providing treatment in the form of fartlek training for 16 sessions. After that, a post-test or final test was conducted. The following is data on changes in pre-test and post-test results.

Table 2. Description of VO_2Max of futsal athletes Sinjay FC Bangkalan

Description	Mean	Sd	Varians	Min	Max	N
Pretest	35,254	5,07	25,74	29,8	43,6	25
Postest	37,992	4,48	20,12	29,8	44,6	

The initial test (pretest) in this study which was not given the treatment of fartlek training for Sinjay FC Bangkalan club athletes. Based on this initial test, the maximum score was 43.6, the minimum score was 29.8, with an overall score of 846.1, standard deviation 5.07 and an mean of 35.254 for Sinjay FC Bangkalan club athletes.

The final test (postest) in this study which has been given fartlek training treatment to athletes of the Sinjay FC Bangkalan club. Based on this final test, the

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maximum score was 44.6, the minimum score was 29.8, with an overall score of 949.8, standard deviation 4.48 and an average of 37.992 for Sinjay FC Bangkalan club athletes.

There is a noticeable difference between the two sets of results, according to the results of the test taken by athlete Sinjay FC Bangkalan. The test taken at the beginning had a score of 846,1, and the test taken at the end had a score of 949,8. The two results can be compared to the initial and final tests. H0 : There are no differences in the results of the fartlek training that would indicate a decline in the VO_2Max player capacity of Sinjay FC Bangkalan. Hα: there is a striking difference in the results of the implementation of fartlek training on increasing the VO_2Max capacity of Sinjay FC Bangkalan futsal players.

Analysis Prerequisite Test

Normality Test

The following table shows the results of the normality test of fartlek training on increasing VO_2Max for athletes of the Sinjay FC Bangkalan club.

Table 3. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.231	25	.001	.838	25	.000
Postest	.126	25	.200*	.932	25	.229

Based on the one sample kolmogrov-smirnov out put, the data obtained is 0.200> 0.005. This means that the data above is normally distributed. In shampiro-Wik, the data obtained is 0.229> 0.05, meaning that the data is also normally distributed.

Homogeneity Test

The following table shows the results of the homogeneity test of fartlek training on increasing VO_2Max for Sinjay FC Bangkalan club athletes.

Table 4. Test of Homogeneity of Variances
Hasil Pretest dan Postest

Levene Statistic	df1	df2	Sig.
3.103	1	48	.084

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Based on the out put of homogeneity of Variances, the sig (significance) value of 0.084 is greater than 0.05 (0.084 > 0.05). Therefore, the alternative hypothesis is accepted so that the differences in each sample are similar (homogeneous).

Hypothesis Test

Hypothesis testing using paired sample t-test is a statistical method used to compare the means of two groups that are related or paired. In this situation, the data in the two groups are taken from the same subjects or similar elements, which are measured at two different times or conditions.

Table 5. Paired Samples Test

	Paired Differences 95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)
Pretest - Postest	-1.40311	-4.108	24	.000

It can be seen that the Sig. (2-tailed) of 0.000 <0.05, then we can conclude that there is a real difference between fartlek training and control training on pretest and posttest data.

Discussion

From the data analysis and hypothesis testing using t-tests in this study, it is expected to produce conclusions that are accurate and in accordance with the data findings obtained. So that in the framework of the conclusions made later, it will reflect a direct picture of the data expected during the implementation of this experiment. From the start of taking the initial test data (pretest), the sample has not been given a fartlek training program, the initial test results (Pretest) VO_2Max has the highest test score of 43.6 and the lowest score of 29.8, with an average of the total initial test of 35.254. From the process of this activity, it can be seen that VO_2Max of Sinjay FC Bangkalan futsal athletes from week to week produces changes which in the initial stage as a sample there is still no one who has a good

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VO_2Max, with the fartlek training VO_2Max in Sinjay FC Bangkalan futsal athletes can increase. The results of the VO_2Max measurement are of course after a programmed or systematically arranged exercise. After the treatment phase, in the last stage, namely the final evaluation (Postest), the procedure for implementing this final evaluation was carried out one day after the completion of the treatment phase. The final evaluation was carried out to measure the impact of the fartlek exercise treatment. Here it will be seen whether there is an increase in VO_2Max or not. The VO_2Max measurement results after treatment showed the highest value was 44.6 and the lowest value was 29.8, with the overall average of the final evaluation showing an increase to 37.992.

Based on the completed data analysis, it can be concluded that the alternative hypothesis (Ha) used in this study may be differentiated by highlighting the differences between the first and final tes. In other words, there was a significant improvement between the two tests. This implies that fartlek training has a real impact on increasing VO_2Max of Sinjay FC Bangkalan futsal athletes. So get the results of the t-test on the paired sample t-test with Sig. (2-tailed) of 0.000 <0.05, then we can conclude that there is a real difference between fartlek training and control training on pretest and posttest data.

CONCLUSION

Based on the results obtained in this study, it can be concluded that there is a significant effect of fartlek training on increasing VO_2Max futsal club Sinjay FC Bangkalan which has been taken from the pretest with an average of the total initial test of 35.254. With the treatment of fartlek training VO_2Max in Sinjay FC Bangkalan futsal athletes can increase. The results of VO_2Max measurements after treatment show that the overall average of the final evaluation shows an increase to 37.992. Thus, after being examined, the results of the prasyarat and the hipotesis from the analysis of the study data allow us to conclude that Sig. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the effect of fartlek training on increasing VO_2Max athletes who are real between fartlek training and control training. The results of this analysis will show how strong or

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weak the relationship between fartlek training performed by futsal players and the increase in their VO_2Max.

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