Dicki

by 1 1

Submission date: 14-Jun-2025 10:15PM (UTC-0500)
Submission ID: 2698971433
File name: Article_Dicki_.docx (49.43K)
Word count: 3017
Character count: 17679

THE EFFECT OF *INTERVAL TRAINING* ON INCREASING CARDIORESPIRATORY ENDURANCE IN FUTSAL EXTRACURRICULAR

Dicki Candra[1], Aridhotul Haqiyah[2], Tatang Iskandar[3], Dindin Abidin[4]
Universitas Islam 45 Bekasi[1,2,3,4]
dikcicandra07@gmail.com[1], aridhotulhaqiyah@unismabekasi.ac.id[2],
tatang@unismabekasi.ac.id[3], dindinabidin70@gmail.com[4]

Abstract
This study aims to determine the effect of interval training exercises on increasing cardiorespiratory endurance. The research method used in this study is the experimental method. The population in this study is students who are members of the futsal extracurricular of Tunas Harapan Junior High School, which amounts to 32 people, The sampling technique uses total sampling where all populations are used as samples. The instrument used by the author in this study is a multistage running test. The test results showed that the significance value (2-tailed) was 0.000, which was smaller than the significance level of 0.05 (p < 0.05). The results of the average score comparison showed that the interval training group had an average of 46,162, while the conventional group had an average of 37,008. The results of this study showed that Tunas Harapan Junior High School futsal players experienced a significant increase in cardiorespiratory endurance after undergoing an interval training program.
Keywords: *Interval Training, Futsal, Tunas Harapan Junior High School.*

INTRODUCTION

Sport is a physical activity that can be done by children to improve their fitness and develop their motor skills (Fathir et al., 2025). One of the sports that is very popular with the Indonesian people is futsal. Futsal is a sport whose basic technique resembles football, so this sport has experienced rapid development not only in Indonesia but in almost all countries (Nurkadri & Kholil, 2021). Futsal is a type of game sport played by two teams of five members. The goal is to put the ball into the opponent's goal and prevent the opponent from putting the ball into the goal (Iskandar, 2019).

To play futsal well, players must be equipped with good physical conditions such as endurance, explosiveness, speed, strength, coordination, agility, balance, flexibility and determination (Achmad Karim & Ikadarny, 2023). Physical condition which includes cardiovascular endurance, muscle endurance, power, and flexibility are important components that futsal players must have in order to achieve optimal performance (Darni et al., 2025). Futsal is one of the sports of big

ball games that demands high physical ability or cardiorespiratory endurance (Khomarul Ninzar, 2018). The game lasts for two times twenty minutes and has alternating actions with high intensity, so players must be quick and precise in each action (Ihsan et al., 2025).

Futsal athletes, especially teenagers who participate in extracurricular activities at school, are in dire need of cardiorespiratory endurance, which is an important component of physical fitness. Since futsal is a high-intensity team sport, players must have the ability to withstand rapid and repetitive physical loads. To support their performance during the game, good cardiorespiratory capacity is essential (Nayla Prameswari & Kirana Permata, 2024).

Interval training is a training method that combines periods of high-intensity training with recovery periods (Khalida et al., 2018). Interval sendri is an excellent exercise method to increase vo2max (Harsono, 2015). Interval training is a training system that is interspersed with intervals in the form of rest periods. Interval training can be applied to all sports that require endurance and stamina (Herlan & Komarudin, 2020). Some factors that must be considered in internal training, namely; a) Intensity/load of training. b) Duration of training. c) Repetition/repetition of exercises, and d) Internal recovery (rest period between exercises) (Brastangkara & Jatmiko, 2019).

Cardiorespiratory endurance is the ability of the heart, lungs, and blood vessel systems to function optimally at rest and work in taking oxygen and channeling it to active tissues so that it can be used in the body's metabolic processes (Faza et al., 2019). Cardiorespiratory fitness reflects the ability of the heart and lungs to efficiently circulate oxygen-containing blood to meet the metabolic needs of muscles while working during sports activities (Grivas, 2019).

Based on the author's observations and the results of discussions with PJOK teachers who also train futsal extracurriculars at Tunas Harapan Junior High School, it is known that most of the students who participate in futsal extracurriculars still experience problems of weak physical condition and fatigue easily. The goal to be achieved in this study is to find out how much the effect of

interval training exercises on increasing cardiorespiratory endurance in the futsal extracurricular of Tunas Harapan Junior High School.

The novelty of this study 1) In contrast to previous research conducted in the environment of sports academies or professional clubs, this research was carried out in the school extracurricular environment 2) This study highlights the influence of exercise intervals on junior high school students, who are physiologically in the growth stage and 3) This study offers a simple but systematic interval training model that can be applied by PJOK teachers at the junior high school level to increase the power of cardiorespiratory resistance (VO_2 max).

METHOD

The research method used in this study is the experimental method. This method is used on the basis of the consideration that the nature of experimental research is to try something to find out the effects or consequences of a treatment or treatment (Siyoto & Sodik, 2015). In addition, the author wants to know the influence of the independent variable on the bound variable that is investigated or observed. The population in this study is students who are members of the futsal extracurricular of Tunas Harapan Junior High School, which amounts to 32 people. Sampling technique using Total Sampling where all populations are sampled. The The instrument used by the author in this study is a multistage running test (Widiastuti, 2015).

Procedures for conducting the multi-stage running test: 1) Make a track by measuring a distance of 20 meters and at each end is marked, 2) The subject warms up first before running, 3) Then the subject does a multi-stage run on the field that has been measured and marked by following the rhythm "TUT" on the CD/MP3 player, 3) The subject must run according to the rhythm and must arrive at the end of the field before the second sound, 4) If the subject has been hit twice in the middle of the trajectory or has not reached the end, then that is where the subject's ability lies, and 5) In each rhythm the level that the subject has gone through will be read, then if the subject stops recording the level then look at the VO_2 Max value scale.

Statistical data analysis techniques used the SPSS Series 25 program. The prerequisite tests for statistical analysis include, normality test using Smirnov kolmogorov, Paired Sample t-test, Homogeneity Test, and independent sample t-test.

RESULT

The results of tests and measurements in the field are part of data collection to prove the research hypothesis. The statistically processed data shows the following description.

Table 1. Data Description

	N	Min	Max	Mean	Std. Deviation
				Statistics	Std. Error	Statistics
Pre test Experiment	16	33.6	38.5	36.375	.3902	1.5610
Post Test Experiment	16	41.8	49.8	45.163	.5676	2.2704
Pre Test Control	16	31.8	39.2	35.537	.5154	2.0617
Post Test Control	16	32.9	40.5	37.087	.5556	2.2223
Valid N (listwise)	16					

Before conducting a hypothesis test, an analysis requirements test is first carried out to ensure that the data meets the necessary statistical requirements. The following is the prerequisite test of the normality test as illustrated in table 2.

Table 2. Normality Test

		Kolmogorov-Smirnova			Shapiro-Wilk		
	Exercise	Statistics	Df	Sig.	Statistics	Df	Sig.
Cardiorespiration	Pre-test-Experiment	.179	16	.182	.933	16	.268
	Post-test-Experiment	.236	16	.018	.915	16	.139
	Pre-test-control	.103	16	.200*	.984	16	.986
	Post-test-control	.129	16	.200*	.957	16	.614

Based on the table above, the significance value for the pre-test of interval training was 0.268, the post-test interval training was 0.139, the pre-test of the control group was 0.986 and the post-test of the contril group was 0.614. Because the value is greater than the significance level ($\alpha > 0.05$), H0 is accepted. Thus, it can be concluded that the pre-test and post-test data are distributed normally.

Once it is known that the data is normally distributed, the next step is to perform an average difference test to see if there is a significant difference between two paired data. In this study, the paired samples t-test method was used. The results of the hypothesis test can be seen in Table 3 below.

Table 3. results of the hypothesis test

	t	Df	Sig. (2-tailed)
Pair 1 Pre test Experiment - Post Test Experiment	-12.985	15	.000
Pair 2 Pre Test Control - Post Test Control	-4.317	15	.001

Based on the paired samples t-test table, it is known that Pair 1 obtained a significance value of 0.000 < 0.05, so it can be concluded that there is a difference in the average results of cardiorespiratory endurance for pre-test interval training and post-test interval training. Based on the paired samples t-test table, the Pair 2 value was obtained with a significance value of 0.001 < 0.05, so it can be concluded that there is a difference in the average cardiorespiratory endurance results for the pre-test of the control group and the post-test of the control group. So it can be concluded that there is an effect of interval training exercises on cardiorespiratory endurance as evidenced by the difference between the post-test and pre-test interval training groups (experiments).

The next stage of the procedure is a homogeneity test which aims to find out whether a variance (diversity) of data from two or more groups is homogeneous (same) or heterogeneous (not the same) (Anas Sudijono, 2015). The following homogeneity test data is presented in table 4 below.

Table 4. Homogeneity Test

		Living Statistic	df1	df2	Sig.
Cardiorespiration	Based on Mean	.005	1	30	.942
	Based on Median	.054	1	30	.818
	Based on Median and with adjusted df	.054	1	28.740	.818
	Based on trimmed mea	.009	1	30	.924

Based on the data in Table 4, the significance value of 0.942 is greater than the significance limit of 0.05. Therefore, it can be concluded that the variance of the data Post-test Experimental Group (Exercise Interval Training) and Post-test The control group is the same or homogeneous.

Table 5. Independent Test Sample t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	Df	Sig. (2-tailed)
Cardiorespiration	Equal variances assumed	.005	.942	10.167	30	.000

	Equal variances not assumed	10.16729.986	.000

Based on table 5, a Significance value (2-tailed) of 0.000 < 0.05 was obtained, so it can be concluded that there is a difference in the average results of cardiorespiratory endurance between interval training (experimental group) and conventional training (control group). The average score of the interval training group (experimental) was 45,162 and the average of the conventional (control) group was 37,088. The following is the data from descriptive statistics.

Table 6. Descriptive Statistical Results

Group Statistics

	Exercise	N	Mean	Std. Deviation	Std. Error Mean
Cardiorespiration	Post-test experiment	16	45.162	2.2704	.5676
	Post-test-control	16	37.088	2.2223	.5556

DISCUSSION

Physical activity is an important component that must be done consistently to balance other activities, especially for athletes to maintain an optimal level of body fitness. One of the most important components of physical condition is cardiorespiratory endurance, as it plays a major role in supporting the body's ability to carry out activities continuously without quickly experiencing fatigue (Nadya Gantarialdha, 2021).

This study aims to determine the effect of interval training exercises on increasing cardiorespiratory endurance in futsal extracurricular participants at Tunas Harapan Junior High School. Based on the results of the prerequisite test, the significance value of the pre-test interval training group was 0.268 and the post-test was 0.139. Meanwhile, the significance value in the pre-test of the control group was 0.986 and the post-test was 0.614. Since all of these significance values are greater than the set significance level ($\alpha > 0.05$), H0 is accepted. Thus, it can be concluded that the pre-test and post-test data in both groups are distributed normally.

Furthermore, a paired samples t-test was carried out, the results of the analysis showed that the value of pair 1 was 0.000 and the value of Pair 2 was 0.001 stated to be less than 0.05. Therefore, it can be concluded that there is an effect of interval

training on cardiorespiratory endurance as evidenced by the difference between the post-test and pre-test interval training groups (experiments). Meanwhile, the results of the homogeneity test showed a significance value of 0.942 greater than the significance limit of 0.05 ($\alpha > 0.05$). Therefore, it can be concluded that the variance of the data of the post-test experimental group (interval training exercise) and the post-test control group is the same or homogeneous.

After conducting a prerequisite test, the next step is to conduct an independent test of the t-test. The test results showed that the significance value (2-tailed) was 0.000, which was smaller than the significance level of 0.05 ($p < 0.05$). Thus, it can be concluded that there was a significant difference in mean cardiorespiratory endurance between the group that followed interval training (experimental group) and the group that followed conventional exercise (control group). The results of the average score comparison showed that the interval training group had an average of 46,162, while the conventional group had an average of 37,008.

Based on the results of the data analysis that has been carried out, it can be seen that after undergoing a training program Interval Training , the futsal players of Tunas Harapan Junior High School experienced a significant improvement in terms of cardiorespiratory endurance. This improvement shows that the training method Interval Training effectively able to develop the body's capacity to provide oxygen during physical activity, which is an important component in supporting the optimal performance of futsal players during the match The results of the research that have been carried out show that it is in accordance with the findings of previous studies. High-Intensity Interval Training (HIIT) has been shown to be effective in improving muscle and skeletal function, accelerating the body's metabolism, and improving the capacity of the respiratory and cardiorespiratory systems (Brian & Kraemer, 2015). Interval training has a positive impact on the development of endurance and stamina (Hakim et al., 2020). Physical exercise using the interval training method can significantly increase aerobic endurance (Sepriadi et al., 2018).

CONCLUSION

Based on the results of data analysis, description, testing, and research discussion, it can be concluded that interval training exercises have a positive effect

on increasing cardiorespiratory endurance. Good cardiorespiratory endurance is needed by futsal players in order to perform optimally throughout the match. The results of this study showed that Tunas Harapan Junior High School futsal players experienced a significant increase in cardiorespiratory endurance after undergoing an interval training program.

REFERENCES

Achmad Karim, & Ikadarny. (2023). Analisis Komponen Fisik Terhadap Kemampuan Menggiring Bola Pada Permainan Futsal Club Skansa Makassar. *Jurnal Dunia Pendidikan*, *3*(November), 67–78. http://jurnal.stokbinaguna.ac.id/index.php/JURDIP/article/view/2083

Anas Sudijono. (2015). *Pengantar Statistik Pendidikan*. Raja Grafindo Persada.

Brastangkara, G., & Jatmiko, T. (2019). Pengaruh Latihan HIIT (High Intensity Interval Training) dan Continuous Running Terhadap Perubahan Denyut Nadi Basal dan VO2 Max Pada Mahasiswa Aktif Non-Atlet. *Jurnal Prestasi Olahraga*, *1*(2), 1–8.

Brian, M. W., & Kraemer, R. R. (2015). Comparison Of Cardiorespiratory And Metabolic Responses In Kettlebell High-Intensity Interval Training Versus Sprint Interval Cycling. *Journal of Strength and Conditioning Research*, *29*(12), 3317–3325. https://journals.lww.com/nsca-jscr/fulltext/2015/12000/comparison_of_cardiorespiratory_and_metabolic.7.aspx

Darni, Saputra, D. E. W., Sabillah, M. I., Ilham, Orhan, B. E., & Geantă, V. A. (2025). The Impact of Circuit Training on Muscular Endurance, Cardiovascular Endurance, Power, and Flexibility of Academy Emran Futsal Players. *Annals of Applied Sport Science*, *13*(Special-Issue), 337–340. https://doi.org/10.61186/aassjournal.1485

Fathir, L. W., Indahwati, N., Widiawati, P., Bin Mohd Masiruddin, N. J., Wibowo, S., Kartiko, D. C., Ridwan, M., Nur Muhammad, H., Hidayat, T., Nurhasan, Ristanto, K. O., Al Ardha, M. A., & Kustrapsila, P. S. (2025). The Effectiveness of 8-Week Small-Side Games (SSGS) and Daily-Physical Activity in Increasing Endurance Cardiovascular and Motoric Skills. *Annals of Applied Sport Science*, *13*(Special-Issue), 479–483. https://doi.org/10.61186/aassjournal.1485

Faza, A. B., Rahayu, S., & Setiowati, A. (2019). Perbandingan Antara Daya Tahan Kardiorespirasi Perokok Aktif Berolahraga Dengan Bukan Perokok Aktif Berolahraga. *Journal of Sport Science and Fitness*, *5*(2), 84–91. https://journal.unnes.ac.id/sju/index.php/jssf/article/view/40055

Grivas, G. V. (2019). The effects of detraining on cardiovascular parameters in

distance runners. *Med Sci Sports*, *4*(2), 91–95.

Hakim, A. L., Subandowo, M., & Rohman, U. (2020). Pengaruh Circuit Training Dan Interval Training Dalam Tes Kebugaran Jasmani Pada Ektrakurikuler Futsal Siswa SMP. *Jurnal Kejaora: Jurnal Kesehatan Jasmani Dan Olah Raga*, *5*(1), 86–95. https://ejournal.unibabwi.ac.id/index.php/kejaora/article/view/847/596

Harsono. (2015). *Kepelatihan Olahraga Teori dan Metodologi*. PT Remaja Rosdakarya.

Herlan, H., & Komarudin, K. (2020). Pengaruh Metode Latihan High-Intensity Interval Training (Tabata) terhadap Peningkatan Vo2Max Pelari Jarak Jauh. *Jurnal Kepelatihan Olahraga*, *12*(1), 11–17. https://doi.org/10.17509/jko-upi.v12i1.24008

Ihsan, N., Ramadhan, M. A. M., Putra, A. N., Mario, D. T., Ayubi, N., Efendi, R., Karacam, A., & Németh, Z. (2025). Android-Based Training Media for Practicing Passing Skills in Futsal. *Annals of Applied Sport Science*, *13*(Special Issue), 99–104. https://doi.org/10.61186/aassjournal.1485

Iskandar, T. (2019). Perbandingan Antara Interval Training Dengan Fartlek Terhadap Daya Tahan Atlet Futsal U-16 Ranggon Dalam Liga Assosiasi Akademi Futsal Indonesia 2018. *Jurnal Olahraga*. https://doi.org/10.37742/jo.v5i1.89

Khalida, N. A., Agus, K., & Doewes Muchin. (2018). Analisis penerapan prinsip-prinsip latihan terhadap peningkatan kondisi fisik atlet. *Journal Power Of Sport*, *1*(1).

Khomarul Ninzar. (2018). Tingkat Daya Tahan Aerobik (Vo2 Max) Pada Anggota Tim Futsal Sib A Semarang. *Jurnal Mitra Pendidikan*, *2*(10), 1063–1077.

Nadya Gantarialdha. (2021). Hubungan Indeks Massa Tubuh Terhadap Ketahanan Kardiorespirasi Dinyatakan Dalam Vo2Max. *Jurnal Medika Hutama*, *02*(04), 11621168.https://jurnalmedikahutama.com/index.php/JMH/article/view/242/161

Nayla Prameswari, N., & Kirana Permata, A. (2024). Pengaruh Latihan Interval terhadap Peningkatan Daya Tahan Kardiovaskular Atlet Muda. *Jurnal Pendidikan Dan Olahraga Aktual*, *1*(2), 5–8. http://dx.doi.org/10.1038/s41421-020-0164-0%0Ahttps://doi.org/10.1016/j.solener.2019.02.027%0Ahttps://www.golder.com/insights/block-caving-a-viable-alternative/%0A???%0Ahttp://dx.doi.org/10.1038/s41467-020-15507-2%0Ahttp://dx.doi.org/10.1038/s41587-020-05

Nurkadri, & Kholil, R. (2021). Korelasi Kekuatan Otot Tungkai, Kelincahan Dan Koordinasi Mata-Kaki Terhadap Kecepatan Dribbling Dalam Permainan Futsal Pada Pemain Futsal Inang Fc Tahun 2021. *Journal Coaching*

Education Sports, *2*(2), 137–150. https://doi.org/10.31599/jces.v2i2.706

Sepriadi, Arsil, & Mulia, A. D. (2018). Pengaruh Interval Trainingterhadap Kemampuan Daya Tahan Aerobik Pemain Futsal. *Jurnal PENJAKORA*, *5*(2), 121–127. https://ejournal.undiksha.ac.id/index.php/PENJAKORA/article/view/17288/10379

Siyoto, S., & Sodik, M. A. (2015). *Dasar Metodologi Penelitian*. Literasi Media Publishing.

Widiastuti. (2015). *Tes dan Pengukuran Olahraga*. rajawali pers.

Dicki

ORIGINALITY REPORT

10%	11%	17%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	aassjournal.com Internet Source	4%
2	ejournal.unmus.ac.id Internet Source	2%
3	journal.walisongo.ac.id Internet Source	2%
4	jurnal.univpgri-palembang.ac.id Internet Source	2%
5	journal.uinsgd.ac.id Internet Source	2%

Exclude quotes	On	Exclude matches	< 2%
Exclude bibliography	On		