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HIGH INTENSITY CIRCUIT TRAINING METHODS HAS THE POTENTIAL TO INCREASE VO2MAX IN KARATEKA

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Abstract

This study aims to determine the effect of the High Intensity Circuit Training (HICT) training method on increasing VO2max in karateka. This experimental research uses a One Groups Pretest-Posttest Design. A total of 15 karateka participated in this research. Subjects were selected using a purposive sampling technique according to the inclusion criteria. The inclusion criteria in this study were men aged over 20 years, willing to follow the research protocol, BMI ranging from 18.00-24.99. The exclusion criterion in this study was consuming performance-supporting drugs. The HICT program was implemented for 8 weeks, with a training frequency of three times a week. The treatment given to karateka is the High HICT training method with a duration of 4 minutes and 20-second intervals for each movement, and there are 8 movements, namely plank, wall sit, squat. hold, lunge hold, chair step-up, plank jack, mountain climber, flutter kick. The data collection technique in this research used the Beep Test. The data collected in this study were pre-test and post-test data on cardiovascular endurance abilities. The results of this study report that the HICT training method has a significant positive effect on increasing VO2max in karateka. Therefore, HICT can be recommended as a valuable addition to an exercise program.

Keywords: Karate, High Intensity Circuit Training, VO2Max.

INTRODUCTION

Karate is a branch of martial arts that requires high strength, endurance and agility [1]. VO2max or the body's maximum ability to take in oxygen is an important factor in improving the performance of karate athletes [2]. The higher a karateka's VO2max, the better his ability to overcome fatigue, increase endurance and performance when training and competing.

Some time ago, when the COVID-19 pandemic hit the world, many athletes were affected by a decline in physiological and physical conditions due to infrequent training [3]. Currently, the percentage of COVID-19 has decreased considerably and life has returned to normal [4]. However, currently there is certainly a need for alternative solutions to improve physical performance in athletes.

The High Intensity Circuit Training (HICT) training method is done by combining strength and cardiovascular training in one high intensity training session [5]. A combination of high-intensity cardiovascular and strength training will increase VO2max and improve overall physical performance [6]. However, currently research on the effect of the HICT training method on increasing VO2max in karateka is still limited.

This study aims to analyze the effect of the HICT training method on increasing VO2max in karateka. It is hoped that the results of this research will provide useful information for karate coaches and athletes in improving their physical performance through the application of appropriate training methods.

MATERIALS AND METHODS

Study Design

This research employs an experimental method with a pre- and post-test design. This research uses a single-group design without a separate comparison group.

Subjects

A total of 15 karateka participated in this research. Subjects were selected using a purposive sampling technique according to the inclusion criteria. The inclusion criteria in this study were men aged over 20 years, willing to follow the research protocol, BMI ranging from 18.00-24.99. The exclusion criterion in this study was consuming performance-supporting drugs.

Procedure

1. Before the research begins, the researcher provides an explanation of the research objectives and fills out and collects a form of willingness to become a research subject (Informed Consent) by the research sample.
2. The HICT program is carried out for 8 weeks, with a training frequency of three times a week. The treatment given to karateka is the High HICT training method with a duration of 4 minutes and 20 second intervals for each movement, and there are 8 movements, namely plank, wall sit, squat. hold, lunge hold, chair step-up, plank jack, mountain climber, flutter kick.
3. The data collection technique in this research used the Beep Test. The data collected in this study were pre-test and post-test data on cardiovascular endurance ability or VO2max.

Statistical analysis

Statistical analysis in this study used the IBM SPSS version 27 application, a descriptive test was performed to obtain the mean and standard deviation. Furthermore, the normality test was carried out using the Shapiro-Wilk method, if the data were normally distributed the different test was carried out using the paired t-test, but if the data was not normally distributed, the difference was carried out using the Wilcoxon signed rank test.

RESULTS

Figure 1: Beep Test Fitness test

Table 1: VO2Max at pre-test

No	VO2Max before HICT intervention	Value
1	Minimum Value	24.60 ml/kg/minute
2	Maximum Value	33.60 ml/kg/minute
3	Mean	28.00 ml/kg/minute

Based on Table 1, it is known that VO2Max before the HICT intervention was given was at the lowest value of 24.60 ml/kg/minute, the highest was 33.60 ml/kg/minute, and the average was 28.00 ml/kg/minute.

Table 2: VO2Max at post-test

No	VO2Max before HICT intervention	Value
1	Minimum Value	33.05 ml/kg/minute
2	Maximum Value	37.10 ml/kg/minute
3	Mean	33.05 ml/kg/minute

Based on Table 2, it is known that VO2Max before the HICT intervention was given was at the lowest value of 33.05 ml/kg/minute, the highest was 37.10 ml/kg/minute, and the average was 33.05 ml/kg/minute.

Table 3: VO2max normality test results

Data	n	Shapiro – Wilk P
VO2Max (Pre-test)	15	0.122
VO2Max (Post-test)	15	0.437

Based on the normality test in Table 3, the data is normally distributed (p>0.05).

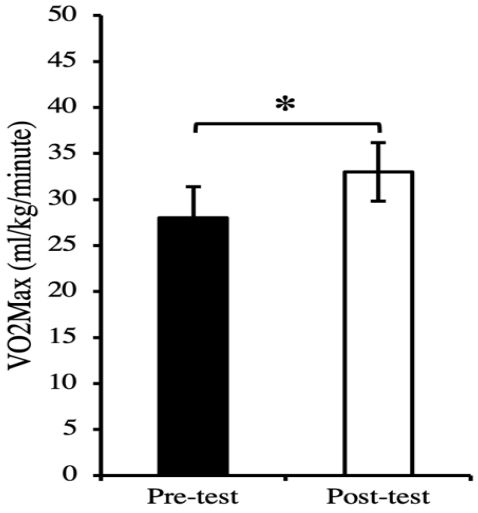

Figure 2: HICT increased VO2Max significantly (p<0.05). Data are presented as Mean ± Std Deviation. P-value was obtained using the Paired t-test to compare the pre-test and post-test

Table 4: Results of VO2Max Difference Tests

Difference Test Method	Data	P
Paired t-test	Pre-test and post-test	0.000

Information
*There is a significant difference in the Paired test (p<0.05)

DISCUSSION

This study aims to analyze the effect of the HICT training method on increasing VO2max in karateka. The results of this study reported that HICT training carried out for 8 weeks was able to increase VO2Max ($p<0.05$).

Karate is a martial arts sport which is also an achievement sport [7,8]. Karate uses physical techniques such as punches, kicks, blocks and dodges with strong moves [9]. One of the important components of physical condition in karate is endurance. We observed that HICT training given for 8 weeks (3 times in 1 week) was able to increase karateka VO2Max. HICT is an abbreviation for High-Intensity Circuit Training, which is a type of exercise that combines high-intensity aerobic exercise and resistance training in a circuit format [10].

Our findings are supported by a study reporting that a combination of high-intensity cardiovascular and strength training increases VO2max and improves overall physical performance [6]. In addition, the results of this study are also strengthened by a study which reports that HICT can improve body composition, peak oxygen uptake, strength, and change certain dimensions of quality of life in obese women. [5].

HICT is an abbreviation for High-Intensity Circuit Training, which is a type of exercise that combines high-intensity aerobic exercise and resistance training in a circuit format [10]. In this regard, physiologically VO2Max is very important in delivering O2 to muscles during continuous physical exercise which is considered a standard of cardiorespiratory physiological fitness and is also a health parameter [11]. In summary, our research findings report that HICT training method can increase VO2Max. We are aware of several limitations in this study. We have not investigated and analyzed the increase in muscle strength resulting from the HICT training method. We hope that further research can analyze the effect of the HICT method on muscle strength.

CONCLUSION

The HICT training method carried out for 4 weeks, carried out 3 times in 1 week, has the potential to increase karateka VO2Max. Since endurance is a component of physical condition that is very necessary for karateka, it is highly recommended to apply the HICT method in preparing training programs.

Conflict of interest

The authors declare no conflict of interest

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