The Effect of High Intensity Interval Training in Improving Aerobic Capacity

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Abstract. There are many kinds of exercise that can be used to improve aerobic capacity including High Intensity Interval Training (HIIT). The main purpose of this research was to analyze the effect of HIIT in improving aerobic capacity. This was a quantitave research with non randomized control groups pretest posttest design. This research was conducted at 30 male college students. Group 1 (15 players) was given high intensity of HIIT using V drill, 20m yard square, squirm, 40 yard lateral shuffle, 10 cone snake drill, 40 yard sprint for eight weeks period with frequency three times a week. Group 2 (15 players) was given a convensional exercise. Instrument of this research was multistage fitness test. Paired sample t test was used to analyze data. The result of this research seem that there was a significant improved of aerobic capacity after being given high intensity of HIIT. The conclusion can be stated that HIIT has improved aerobic capacity significantly.

Keywords: High Intensity Interval Training, aerobic capacity, high intensity.

1 Introduction

Performance enhancement of athletes has become an interesting topic of discussion and research area in sport science. There are many research that resulted better solution regarding performance in sport. However, the problem of athletes' achievement are still going to analyze by sport scientists in order to achieve sport performance effectively and efficiently. Physical condition of athletes has important role in achieving sport performance. Recently, there are so many methods of physical condition that can be used to improve athletes' physically. High Intensity Interval Training (HIIT) is one of training method of physical condition that can be used to improve anaerobic capacities. In additon, it can be used to increase aerobic capacities of athletes. HIIT is a method of cardio training that can applied to athletes in developing muscle volume, therefore it can increase power, speed and agility.

HIIT is one of the physical training methods that use a shor training period but with the type of strenuous training which make the heart rate increase faster, therefore oxygen consumption become increases too. In addition, the metabolic processes in the body will be faster and the fat used for burning energy becomes more and more [1]. This increased of metabolic process does not only take place when exercising, even if the metabolic process will continue quickly. This condition is called Resting Metabolic Rate (RMR) which can be triggered

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because of the effect of excessive oxygen consumption when training. This effect can cause the body to continue burning fat and producing energy even though it is in a state of rest.

Some previous studies have been conducted of HIIT method in improving some of athletes' physical conditions. HIIT method is able to increase power, speed and agility for basketball players with an average age of 20.8 years old [2]. HIIT training also reported that it increases of VO2 max and improves the performance of soccer players significantly [3]. Furthermore, other studies designed to determine the effects of HIIT training on lower extremities and upper extremities strength in basketball players with ages 18 to 23 years, it shows that the HIIT training has a significant increase of strength compared to the control group [4]. Based on some theories and previous studies, therefore the purpose of this study is to analyze the effect of HIIT exercise in improving aerobic capacity.

2 Methods

This study was a quantitative with quasi-experimental research method. This study used a Non-Randomized Control Group Pretest-Posttest Design. This study was conducted at 30 male college students with mean age ± 20.5 years old. The samples of the study were divided into 2 groups with 15 students of each group. Group 1 was given treatment of HIIT with high intensity (80% - 95%) using V-Drill, 20-Yard Square, Squirm, 40-Yard Lateral Shuffle, 10-Cone Snake Drill, 40-Yard Sprint [5] for six weeks period with frequency of three times a week. The treatment was started at intensity of 80% for the first week, then every two weeks after it increased by 5% until the 8th week to 95%. Group 2 (15 students) was given a circuit training. Instrument of this study was a multistage fitness test, it was taken before giving treatment (pretest) and after 8 weeks training (posttest). The data was analyzed using paired sample t test with SPSS 20.0 series.

3 Result and discussion

The results of this research showed that HIIT exercise have a significant increased in the aerobic capacity. It can be seen that VO2max improved from 42.08 ml/kg/minutes (pretest) to 48.21 ml/kg/minutes (posttest). It increased of 14.6% with $P < 0.05$. The following data were presented in Figure 1, Figure 2 and Table 1.

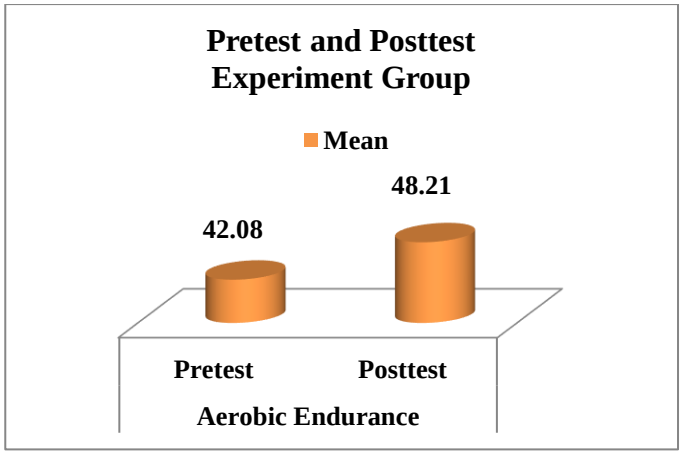

Fig. 1. Pretest and post test data of group 1

As clearly show in the Figure 1 that there was a significant improved of aerobic endurance of Group 1 after being given HIIT exercise program, it increased approximately 6.13ml/kg/minutes from pretest to posttest.

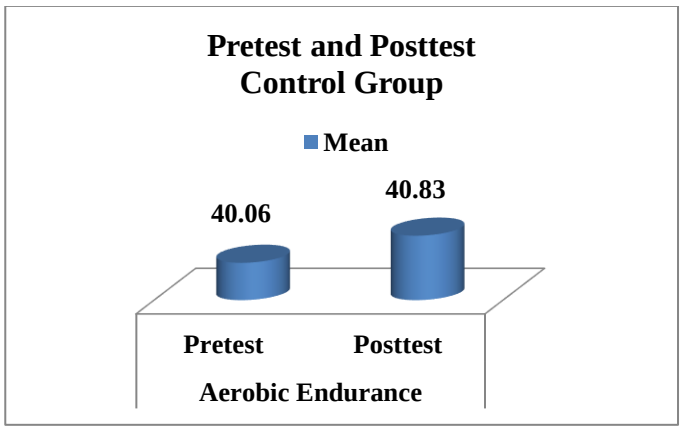

Fig. 2. Pretest and post test data of group 2

As can be seen from Figure 2, there was a slightly increased of aerobic endurance approximately 0.77ml/kg/minutes of Group 2. The VO2max increased from 40.06 ml/kg/minutes to 40.83 ml/kg/minutes.

Table 1. Paired samples test

Variable	*Pair*	Mean	N	t	df	Sig.
Aerobic Endurance Experiment Group	*Posttest – Pretest*	6,14667	15	3.813	14	0,002
Aerobic Endurance Control Group	*Posttest – Pretest*	0,37333	15	2.817	14	0,014

Another crucial finding that depicted at Table 1 indicated that there was a significant increased of HIIT training program in improving aerobic capacity with $p<0.05$.

HIIT training method in this study used the types of exercises consisting of 6 forms of high-intensity interval training: V-Drill, 20-Yard Square, Squirm, 40-Yard Lateral Shuffle, 10-Cone Snake Drill, 40-Yard Sprint [5]. Jogging was carried out during recovery between high-intensity interval training or active recovery.

The result of this study was supported by another studies which found that HIIT method can improve power, speed and agility for basketball athletes [2]. The SAQ training program can increase speed, agility, and quickness [6]. Furthermore, the results of this study are relevance to previous studies that found High-intensity Interval Training (HIIT) exercises have a significant increase in Aerobic Capacity for athletes [7]. In addition, HIIT training program are able to improve endurance and speed of athletes [8].

Furthermore, HIIT indicates as a better exercise in improving cardiorespiratory fitness in healthy children and adolescents compare to moderate intensity continuous training [9]. HIIT can be as an efficient model of training that can improve cardiorespiratory fitness, but it's still unclear effecting on body composition [10]. HIIT may increase in certain important variables of aerobic and anaerobic [11]. Young athlete may have benefit to use HIIT because it requaries less time of training period per session compare to training for sport specific fitness. The limitation of this study is that.

4 Conclusion

The conclusion of this study can be stated that there was a significant improved of High Intensity Interval Training (HIIT) in improving aerobic capacity. High Intensity Interval Training can be used as an alternative method of training to increase athletes' Aerobic Capacity. Future study that can be suggested is to conduct research using HIIT compare to other exercise in increasing aerobic capacity and anaerobic power.

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Conflict of Interest. There is no conflict of interest between authors.

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