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IMPROVING VO2MAX OF STUDENTS OF THE SPORTS COACHING EDUCATION STUDY PROGRAM GUNUNG LEUSER UNIVERSITY , ACEH THROUGH THE INTERVAL *TRAINING METHOD*

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Abstract

The purpose of this study was to determine the increase in VO2Max with the Interval Training method *in* students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh. This study is an experimental study. The research sample consisted of 78 people, with *total sampling* . The design in the study was *Pre Test–Post Test Group Design* . The research instrument used *a bleep test* . Hypothesis testing used paired t-test analysis techniques (independent sample t-test) using SPSS with a significance level of p = 0.05 . Descriptive data analysis. The results of data analysis with paired t-test showed an increase after carrying out the *Interval Training* training method for 6 weeks with a frequency of 3 times a week with the acquisition of *pre-test* results . The results of the paired t-test between *pre* - test and *post-test* data in students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh were obtained with a *significance* value of 0.000 (p <0.05) which means there was a significant increase in VO2Max in students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh.

Keywords : Training , **Interval** Training , VO2Max

INTRODUCTION

Bafirman (2013) Maximum Oxygen Volume is the maximum aerobic capacity usually expressed as Maximum oxygen uptake (VO2Max). (Bompa & Haff, 2009) explains that aerobic power is measured as the highest level at which oxygen can be taken and used by the body during maximum exercise and can also be defined as maximum oxygen uptake (VO2max). (Hoffet al., 2002; Owen, 2016) states that VO2Max is defined as the highest oxygen uptake that can be achieved through dynamic exercise using large muscle groups . Meanwhile (Sidik, et al., 2019) explains the amount of O2 processed in the athlete's body during maximum work or training.

Predominantly anaerobic physical activity can increase the concentration of lactic acid in muscle cells (Yoga Parwarta, 2015), which, when accumulated, will inhibit muscle contraction (Kusumastuti & Widyastuti, 2016). The extreme increase in lactate in the muscles and blood resulting from prolonged strenuous activity is accompanied by increased acidity, which is the main trigger for muscle fatigue . Oliver

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stated that factors causing fatigue or the inability to maintain performance are influenced by muscle function, nerves, and the type of training (Girard et al., 2011). Furthermore, Giriwijoyo (2017) stated that there are many reasons why athletes become fatigued. This is caused by a lack of energy, electrolyte disturbances in the body, and an imbalance between fluid intake and fluid excretion.

According to physiology, muscle fatigue can be said to be a decrease in muscle performance during physical activity, so that individuals are unable to maintain the expected strength, power, and/or endurance (Cavalcante et al., 2016), concerning decreased muscle performance and increased susceptibility to injury (Bishop, 2012). Fatigue comes from a combination of neuromuscular system disorders that can result in: decreased energy delivery rate & substrate availability (phosphocreatine depletion, glycogen depletion, prolonged oxygen depletion) (Finsterer, 2012), increased temperature, failure of muscle contractile mechanisms and changes in muscle nerve control (Hanjabam & Kailashiya, 2015).

Michael Kent (2005:456) states that training is a training program designed to help learn skills, improve physical fitness, and prepare athletes for certain competitions. Then according to Harsono (1992:2) in M. Hatta Fazrie (2004:1) states that the definition of training is a systematic process of training that is done repeatedly , increasing the intensity of the training day by day . According to Bompa (1994) and Marten (1990) in Giri Wiarto (2012:153-155) the characteristics of training are: (a) A process to achieve a better level of ability in sports that requires time and proper planning . (b) The training process must be regular, meaning that training must be continuous and progressive, given from simple to complex . (c) Each training must have a goal and objective.

A student is an identity for an individual who is currently pursuing final education at an institution consisting of a college, academy, and in general a university or college. Students are defined as students who gain high knowledge, where at this level they are considered to have physical maturity and broad development of thought, so that with this added value they can have the awareness to determine their own attitude and be able to be responsible for their attitude and behavior (Putri, 2012:2). Based on the background of the problem, the author wants to further examine the level of benefit of Endurance Training on increasing VO2max of Study Program Students.

RESEARCH METHODS

In this study, an experimental method was used, namely the *"Pretest - Posttest Group Design Experiment* " design. The sample, which is a portion of the population, was taken using certain methods. The sampling technique in this study was total sampling. The number of samples in this study was 78 students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh. Total sampling is a sampling method where researchers mix all subjects in the population so that all subjects can be treated. The data obtained from the pre-test results are raw data which are then processed using statistical procedures to prove whether the hypothesis that has been tested in this study can be accepted or otherwise. The data was first determined for homogeneity and distribution with a homogeneity test and a variance test.

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Normality. If the data is normally distributed, a t- test will be conducted with $\alpha = 0.05$, whereas if the data is not normally distributed, a non-parametric test will be conducted.

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RESULTS AND DISCUSSION

1. Results

According to the pre -test results, the descriptive data for VO2Max results were seen with an average (mean) of 43.91 and a standard deviation (SD) of 4.78 with the lowest pre- test data being 35.7 and the highest
52.5. The results of the VO2Max pre-test measurements of students in the Sports Coaching Education Study Program at Gunung Leuser University, Aceh can be seen in the following table.

Table 1 Frequency Distribution of Pre- test VO2 Max Data of PKO Students

No	Norma	Performance (VO 2 Max) Son	Frequency	Percentage (%)
1	Baik Sekali	59.30-54.30	0	0,0
2	Good	54.20-49.30	14	18,75
3	Currently	49.20-44.20	9	12,5
4	Not enough	44.10-39.20	41	50,0
5	Less than once	Under 39.10	14	18,75
	Total		78	100,0

Based on table 1 above, it is known that the results of the VO 2 Max norm are 14 people (18.75%) in the good category, 9 people (12.5%) are in the moderate category, 50% are in the less category, 41 people and 14 people (18.75%) are in the very less category. From these data, it is concluded that the majority of *the pre-test* results of the VO 2 Max level of students in the Sports Coaching Education Study Program at Gunung Leuser University, Aceh are included in the less category with an average of 43.91. From the results above, it is known that of the 78 students who were samples in this study, there were 14 people or 18.75% who reached the Good Vo 2 Max category.

According to the results of the bleep test measurements, there was a VO2Max level in the post test with an average (mean) of 53.19 and a standard deviation (SD) of 5.82 and the lowest post test results .
44.5 and the highest was 62.7. The post-test results of the VO2Max measurement of students in the Sports Coaching Education Study Program at Gunung Leuser University, Aceh, can be seen in Table 2 below:

Tabel 2. Distribusi Frekuensi Data Post test VO 2 Max student PKO

No	Norma	Performance (VO 2 Max) Son	Frequency	Percentage (%)
1	Baik Sekali	59.30-54.30	20	31,25
2	Good	54.20-49.30	41	50,00
3	Currently	49.20-44.20	17	18,75

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4	Not enough	44.10-39.20	0	0,0
5	Less than once	Under 39.10	0	0,0
		Total	78	100,0

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Based on table 2 above, it is known that the VO2Max norm results of 20 people (31.25%) are in the very good category, 41 people (50%) are in the good category, and 17 people (18.75%) are in the moderate category. From these data, it is concluded that the majority of the post-test results of the VO2max level of students in the Sports Coaching Education Study Program at Gunung Leuser University, Aceh through the Interval Training method are included in the good and very good categories with an average of 53.19.

Based on the results of the comparison of VO2Max results between *the pre-test* and *post-test*, it is known that there was an increase in VO2Max in students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh through the *Interval Training method.*

Based on these results, it can be confirmed that the *Interval* Training method can increase VO2Max in students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh.

2. Research Discussion

The interval training program *was* conducted over 18 sessions, and this study involved 78 students. The first session involved *pre-test* data collection , followed by the 18 sessions of the interval *training program.*

Previous research conducted by Afrizal (2023) with the title " Maximum Oxygen Volume (Vo2 Max) of Students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh". The purpose of this study was to determine the level of VO2 max of students of the sports coaching education study program at Gunung Leuser University , Aceh, in the 2023/2024 Academic Year. The conclusions that can be drawn from this study are the VO2 max of male and female students as follows: in the very good category there were 5 students (4.3%), good as many as 11 students (9.4%), sufficient as many as 45 students (38.4%), less
as many as 24 students (20.5%) and less than 32 students (27.4%).

The results of this study indicate that there is an average increase in VO2Max of students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh from *pretest to posttest* of 9.28 meters. The results of the paired t-test between the pretest and posttest data of students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh are 0.000 ($p < 0.05$) which means there is a significant increase in VO2Max of students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh using the Interval Training training method. This means that through the Interval Training training method, it can increase VO2Max of students of the Sports Coaching Education Study Program at Gunung Leuser University. The Interval Training training method is a training system interspersed with intervals in the form of rest periods. Training (for example, running) - rest - training - rest - training and so on. Interval training is highly recommended by renowned coaches because the results have been proven to be very positive for the development of endurance and stamina of athletes.

This Interval Training training method was given for 6 weeks with a training frequency of 3 (three) times a week, and has provided an increase in VO2-Max in students of the Sports Coaching Education Study Program at Gunung Leuser University for the better, namely the initial average VO2Max obtained was 43.91 (less category) increasing to 53.19 in the Good category.

VO2Max is closely related to endurance and has an impact

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Athletes with low VO2Max will have difficulty performing movements on the field. Therefore, researchers are trying to improve the VO2Max of students in the Sports Coaching Education Study Program at Gunung Leuser University, Aceh, through training methods. Achieving a good VO2Max requires proper training. This is supported by research by Ario et al. (2001) which states that VO2Max can function well if the heart, blood vessels, and lungs are functioning properly. A person with maximum aerobic capacity, meaning a high maximum oxygen volume, will also have high aerobic fitness, good cardiorespiratory endurance, and will be more capable of performing continuous work and achieving good achievements in their field.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that there is a significant increase in VO2 Max of students of the Sports Coaching Education Study Program at Gunung Leuser University, Aceh through the *Interval Training method,* with an average increase in VO2 Max from *pre-test* to *post-test* of 9.28 meters and a significance level of p <0.05.

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