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The Effect of Endurance Training Onincreased Vo2max in Athleteswomen's Ssc Volleyball

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Abstract

The aim of this study was to determine whether there was an effect of endurance training on increasing VO2max in female SSC volleyball athletes. This research is experimental research, where the author wants to know the ability of female SSC (sport science club) volleyball athletes to increase endurance. The design of this research is One Group Pretest-Posttest. The research results showed that the effect of endurance training using fartlek training showed real effectiveness in the sense of the word reliable as an exercise to increase Vo2max in SSC (sprot science club) volleyball athletes.

Keywords: Training, endurance, volleyball, VO2

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INTRODUCTION

Volleyball is a game that is loved by people from the lower classes to the upper classes. This game is a sport that fosters cooperation between players on a team. Apart from that, this game has a very basic method that must be mastered by each player and accumulated in one team game so that they can win an event. A series of basic volleyball techniques that an athlete must master include basic posture and movement techniques, serving, passing, smashing, blocking and net recovery. All the basic techniques referred to can be performed correctly by each player if they are supported by biomotor abilities based on the characteristics of the volleyball game.

Aerobic fitness, which is defined as the maximum capacity to inhale, distribute and utilize oxygen, is the same as Brian J Sharkey's VO2Max (Sabina Andek, Edi Purnomo, and Eka Supriatna 2013). Someone who trains regularly will have strong lung capacity to supply oxygen. If a person stops engaging in physical activity, their heart rate will decrease over time. According to Mohamad Yunus (in Sabina Andek, Edi Purnomo, and Eka Supriatna 2013), to deepen the development of more specific physical condition elements that are in line with the demands of volleyball to increase achievement, physical preparation is very important.

Sport is a form of physical activity carried out to fill free time, improve body fitness and maintain health. Exercise is also done so that the body becomes light and fresh so that the oxygen supply to the brain will also be smoother. Endurance can also be increased by exercising regularly. Endurance training can be done by jogging, skipping, swimming or cycling. If you train according to training principles, your resistance ability will increase by around 40% to 60% Sigit Nugroho (in Herita Warni, Ramadhan Arifin, and Robinsyah Ali Bastian 2017).

The capacity of the heart, lungs and blood vessels to absorb, distribute and utilize oxygen to tissues is called cardiovascular endurance. Good cardiovascular endurance can increase human work ability with greater intensity and time. According to Kasiyo (in Hendri Jaya Utama 2013), states that the ability to carry out fairly intense activities throughout the body and in most muscles for long periods of time is called cardiovascular (aerobic) resistance. Based on the description above, endurance is an individual's capacity to move for a long time and consistently. Athletes must have endurance as a component. When it comes to performing aerobic activities for energy and productivity, a person's ability to do so depends largely on the heart and body organs.

A player's endurance level is the most important factor in training and match success, so good volleyball players will be able to put in their best effort. Maximum oxygen volume level (VO2max) defines good resistance as the capacity to meet maximum oxygen consumption. The body's ability level, known as VO2max, is measured in milliliters per minute or kilograms of body weight per minute. A player with a good VO2max will also have a lot of endurance and stamina. Because athletes will compete effectively if they use effective techniques. Players' high and low VO2max have a significant impact on their physical condition and fitness.

According to (Sukdiyanto, 2011) The following are several variables that can have an impact on the VO2max value: 1) age, 2) gender, 3) temperature, and 4) training conditions. Players' VO2max levels rise in direct proportion to the quality of these factors, as does their endurance, ultimately contributing to their overall health and physical fitness.

From the resultsthe author's direct observations of volleyball events held inathlete women's volleyball*sport science club* that female volleyball athletes*sport science club* don't last long or are already tired after only one round of the match, which will affect their performance in the next round, thus causing the match to be won by the opposing team.Bearing in mind that volleyball is a sport that requires a long period of time to play, so it requires players to have good VO2max endurance.Factors that become obstacles to not achieving the expected training results are related to an athlete's discipline factor in training. The nature of discipline can be seen from the willingness of each individual to react and act in the form of provisions, rules and regulations that apply in the SSC club.

Pay attention to the development of female volleyball athletes' performances*Sport Science Club* (SSC) in three match events, namely the MVBC tournament, the WALET CUP tournament and the 2022 Dean Cup tournament, it was seen that the movements of all the female players still looked slow. Volleyball is a game that requires a lot of time in the game, requiring players to have good VO2max endurance.

Based on the empirical facts mentioned above, the author is interested in researching "The Effect of Endurance Training on Increasing VO2max inAthlete Women's SSC Volleyball".

THEORETICAL STUDY

The Nature of the Game of Volleyball

The sport of volleyball, which has become popular in all levels of society, aims to be a fun entertainment activity. The game of volleyball has developed until now it is known as a competitive sport and is routinely played at every sporting event. When compared to other sports, volleyball has several advantages, one of which is that it can be played by two people like beach volleyball, or up to six people like national level matches. Other advantages are that it can be played indoors or outdoors, requires little equipment, and is fun and recreational. After basketball, badminton and football, volleyball is one of the most popular sports in Indonesia today.

According to Suharno HP (Egirius Vinsensius, Fitruana Puspa Hidasari, and Novi Yanti 2022) "Volleyball is a team sport played by two teams, each team consisting of 6 people, playing on a field measuring 18 X 9 meters. The game is played by bouncing the ball back and forth into the air provided the players are clean and each player tries to knock the ball into the opponent's field." Trying to pass the ball over the net and knock it into the opponent's area is very valuable in volleyball. A maximum of three touches of the ball per possession for each team, so points are awarded if the ball goes into the opponent's area or goes out with the ball last touching the opponent. According to Endang Widiyastuti (in Sulianda Sulianda, Ahmad Atiq, and Eka Supriatna 2021), the sport of volleyball involves a team consisting of six players separated by a net. According to Arif Syarifudin (in Rio Aris Trianto and Willadi Rasyid 2020), volleyball is a game that is included in the "playing sport" category. A direct hit in volleyball refers to hitting the ball directly in the air before it hits the ground. Each team plays this volleyball game with six players. It is possible to use both hands, feet, head and other body parts in the game. Meanwhile, according to Bonnie Robinson (in Jefri N 2021), volleyball is played on a field that is 900 cm wide and 1800 cm long and is limited by lines 5 cm wide. In the middle of the field is spread a net or net 90 cm wide and rising to a height of 243 cm from the bottom for men and 224 cm for women. According to Barbara L Viera (in Dede Nurhuda, Ahmad Atiq 2014), volleyball is played by two teams on a court measuring 30 feet (9 square meters) for each team, two teams consisting of two to six players compete against each other and a net as separation between teams.

Durability Components

Endurance is a state or condition of the body that is able to work for a long time, without experiencing excessive fatigue after completing the work.

According to Sukadiyanto (in Intan Kusumawati, Suci Cahyati, and Suharjana 2020), the ability of an athlete's body organs to avoid fatigue when doing long-term work or sports activities is known as endurance.

The reality of VO2Max

Playing volleyball requires five sets, need to be in good physical condition to play. Aerobic, endurance or VO2max are physical requirements for volleyball players. Aerobic endurance is the capacity of the heart and blood vessel system to perform daily activities to their full potential for long periods of time without becoming significantly worn out (Wahjoedi 2001). The whole body endurance required to complete long distance running, swimming, and cycling can be defined

as aerobic endurance. This opinion is in line with the opinion of Husein Argasasmita (in M. Haris Satria 2018), who said that aerobic endurance can be called*aerobic fitness*where the activity process or activity requires oxygen because it is used for a long period of time, such as long distance running, cycling, etc.

The maximum amount of oxygen the human body can use in one minute (VO2max) is what determines lung and heart endurance. (Werner W.K Hoeger 2010). According to (Sukadiyanto 2011) intensity, frequency, duration, hereditary factors, age and gender are one of the factors that can influence endurance.

According to Sajoto (in Yulinar Yulinar and Erizal Kurniawan 2018), explains that a person's capacity to utilize the cardiac system of blood circulation effectively and efficiently for long-term and sustainable work involving intense large muscle contractions.

The function of the pulmonary system, which consists of the lungs, heart, vascular system, and blood, which are interconnected and support each other in delivering oxygen to working muscles and transporting waste from muscles, is closely related to maximum aerobic maximum aerobic the maximum. In line with this, M. Maqsalmina and Dwi Pudjobarko (in Herita Warni, Ramadhan Arifin, and Robinsyah Ali Bastian 2017) stated that VO2max is the maximum amount of oxygen per kilogram of body weight that can be used in one minute per milliliter.

RESEARCH METHODS

Research design

This research is experimental research, where the author wants to know the abilities of SSC volleyball athletes (*sport science club*) daughter in increasing endurance. The design of this research is:*One Group Pretest-Postest*.

Pre-test	Treatment	Post-tes
	X	

Figure 1. *one group pre test post test design*
Source: (Moh Nazir, 2014)

Information:
: Initial Test (*Pre Test*)
X : Treatment
: Final Test (*Post test*)

Research variable

This research consists of two variables, namely:

1. The independent variable is resistance training (denoted by X) with the indicator being fartlek training
2. The dependent variable is the increase in VO2max (denoted by Y) with the indicator being the 1600 meter running test.

Population and Sample

1. The population is all research subjects (Arikunto, 2014) so the population used in this research is 35 SSC volleyball athletes (15 women and 20 men).

2. According to (Arikunto, 2014), the sample in this study consisted of 15 female SSC volleyball athletes because the sample was representative or representative of the population studied.

RESULTS AND DISCUSSION

Data Description

This study aims to find out how much influence endurance training has on increasing VO2max in SSC (sport science club) volleyball athletes. The data obtained and analyzed in this research includes initial test data (Pree-Test) and final test (Post-Test) from the results of the 1600 meter running test. After all the data has been collected, the data is presented in the following table:

Table 1. VO2Max results distribution table

NO	X	AND	D (X-Y)	D^2 $(X-Y)^2$
1	23	28	-5	25
2	22	26,4	-4,4	19
3	21	25,2	-4,2	18
4	20	24	-4	16
5	20	24	-4	16
6	20	24	-4	16
7	20	24	-4	16
8	19	23	-4	16
9	18	22	-4	16
10	18	22	-4	16
11	18	22	-4	16
12	18	22	-4	16
13	17	20,4	-3,4	12
14	16	19,2	-3,2	10
15	15	18	-3	9
N = 15		ΣX = 285	ΣY = 344.2	ΣD = -59	$\Sigma D^2 = 237$

The scores obtained in the VO2max test result distribution table, symbolized by

Hypothesis test

To find out whether there is an effect of endurance training on increasing Vo2max in female SSC athletes, as follows.

Research Hypothesis Formula

H_1 = There is an influence of variable X on variable Y

H_0 = There is no influence of variable X on variable Y

Statistical Hypothesis Formula

$H_0 = \mu x \neq \mu y$

$H_1 = \mu x = \mu y$

Hypothesis Rejection Criteria

Reject H_0 if t_count> t_table

Accept H_0 if t_count< t_table

Determine $T\alpha = 0.05 = 2.160$

DISCUSSION

Based on the results of hypothesis testing in this research, it is known that there is an influence*durability* towards improvement*VO2max* in SSC athletes (*sport science club*) daughter. This training process is carried out for 6 weeks with the

frequency of training 3 times per week to increase*VO2max* amounting to 26,917. So the value of t_{count}greater than the t $value_{table.}$

This shows that practice*durability* with training indicators that are fartlek can have a strong influence on improvement*VO2max* so it can be explained that practice*fartlek* is one alternative that can be used to improve*VO2max* female SSC volleyball athlete (*sport science club*). Fartlek can increase endurance (VO2max) because fartlek training consists of activities that maximize movements such as walking, jogging, sprinting and jumping, where these movements are the most dominant in volleyball games. Fartlek training can be done effectively in a week with a training frequency of 3-5 times. This result can be achieved through planning a training program that is prepared objectively and systematically based on the abilities of each athlete so that maximum results can be achieved to support the athlete's performance.

CONCLUSION

Based on the results of the discussion described in chapter IV, endurance training is very suitable for use in training programs to increase VO2max. Judging from the research results, it shows that there is a significant influence between variable X and variable Y.

Thus it can be concluded that the effect of endurance training using exercise*fartlek*shows real effectiveness in the sense of the word reliable as an exercise to increase Vo2max in SSC volleyball athletes (*sprot science club*).

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