ATLANTIS PRESS

Advances in Health Science Research (AHSR), volume 7

2nd International Conference on Sports Sciences and Health 2018 (ICSSH 2018)

The Influence of Cardio Workout to Aerobic Endurance

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***Abstract*—This study aims to explore how changes cardio workout to aerobic endurance. The research method used is experimental method. Participants were 6 undergraduate students who have time to training and are able to follow the training from beginning to end. The aerobic endurance test instrument were the harvard step test. The participants were monitores over 14 session. The results showed that cardio workouts had a significant and positive effect on aerobic endurance of participants (0.019 < 0.05). Cardio workout contribution to aerobic endurance improvement was 0.8862 = 0.78 (78%). So, 78% increase in aerobic endurance due to cardio workout, the remaining 22% due to other factors. These findings highlight the importance of cardio workout in achieving better physical endurance to overcome fatigue with minimum training 20 minutes of each day.**

Keywords— cardio workouts, aerobic endurance

I. INTRODUCTION

Many people already know about the health benefits of endurance training and try to establish it as a part of daily life [11]. However, the current mode is a sedentary lifestyle.

The sedentary lifestyle is a modern living behavior that has become a habit for today's society. A sedentary lifestyle is a style of living in which an individual does not participate in enough physical activity or exercise to have a healthy living [7]. Sedentary lifestyle is an unhealthy lifestyle due to improper dieting and low physical activity. A sedentary lifestyle is associated with higher health risk and a higher prevalence of diseases (World Health Organization, 2004; [9]). So, sedentary lifestyle is an unhealthy lifestyle due to improper dieting and low physical activity.

Riskesdas in 2007 stated that 48.2 percent of Indonesians aged over 10 years were less engaged in physical activity, whereas women with less physical activity (54.5 percent) were higher than male group (41.4 percent). In addition, less physical activity in the rural area of 42.4 percent while the urban area less physical activity has reached 57.6 percent. Less physical activity also occurs in every population group with the poorest to richest expenditure. This lack of physical activity needs to be studied further in order to make appropriate intervention. Susenas in 2003 found that among the people aged 10 and over, 74 percent less physical activity occurred during the trip, 81 percent less physical activity during leisure time, and 14 percent less physical activity in work [10].

The level of physical fitness of Indonesian society is currently still low, reflected in several research results which are carried out as follows: (1) Indonesian Physical Fitness Test conducted by Center for Physical Quality Development of Ministry of National Education in 2010 on elementary, junior high school, high school and vocational students at 17 The province covered 12,240 students with a good fitness level of only 17 percent, other students had less than 45 percent fitness, and moderate fitness 38 percent; (2) Physical fitness mapping result conducted by the Ministry of Health in 2002 to Civil Servants Health and Local Government Offices of South Sumatera, DKI Jakarta, West Java and Bali Provinces, 73% of civil servants have less physical fitness level and less once [10].

This also happens in students Physical Education Departement at Islamic University 45 of Bekasi. Based on the results of interviews of researchers on some college student of the final semester, the activities are conducted only boarding house going to campus, online social media, hanging out, and less physical activity. The college student also recognize that the physical is not as good as in the early semester, and some people experience weight gain. When given the task to calculate the pulse rate when their wake up in the morning, 90% of the college student have pulse rate in ordinary people category, who are daily activities without exercise. This is evidenced by the results of pulse rate more than 60 times/minute. Supposedly, college students Physical Education Departement are on trained athlete criteria with resting pulse rate between 51-59 times/minute.

Students are aware that physical activity by means of physical exercise or regular exercise can improve health status, and improve physical fitness that is important to maintain stamina. One of the physical conditions in physical fitness is endurance. Endurance is always closely related to the length of work (duration) and the intensity of work, the longer the duration of exercise and the higher the intensity of work that can be done someone, means that the person has good endurance. In addition, good endurance will have an impact on the quality of concentration.

One of the exercises that can maintain body stamina is cardio workouts. Cardio workouts is a term often used to refer to exercise activities using cardiovascular fitness training equipment and endurance exercise. Aerobics is a sport activity that uses air (aero) in the combustion process. The main energy source burned during cardiovascular exercise is fat. Cardio

workouts has many benefits for health. This exercise is very beneficial for the heart, lungs, and respiratory tract. Cardio workouts is also very useful for weight loss. The more cardio workouts in a week the higher the chances of the body to be healthier.

Cardio is a health term for the heart. The term is derived from the Greek word "cardia" meaning heart. Heart serves to pump blood throughout the body tissues. If the heart is damaged it will cause complications in all parts of the body [21]. One of the main causes of death is cardiovascular disease, which accounts for about 30% of all deaths in the world annually [1].

The more popular term for cardio exercise is aerobic exercise. Aerobics is a sport activity that uses air (aero) in the combustion process. The main energy source burned during cardiovascular exercise is fat [3].

Cardio is short for cardiovascular, whisch refers to the body system that the heart at its core [12], Cardio or aerobic, activities involves the continuous, rhythmic contraction of large muscle groups. Cardio activity will not only boost the health of heart, increasing all-round cardio fitness, but will also burn off calories and fat, enabling to manage the weight.

So, cardio workout is a general term relating to running or endurance training within a certain period of time [4]. The cardio workout is also a type of aerobic exercise that requires oxygen. With cardio workout, the trained heart will increase the intake and distribution of oxygen more leverage. This intake and distribution of maximal oxygen will improve the overall health of blood cells and increase calorie burnin [6].

Regular exercise positively influences the cardiovascular system and is a determinant of health and quality of life. Endurance training improves heart and skeletal muscle energy metabolism and function [19].

Cardiovascular workout is one of the most important components of fitness. Cardio workout has many benefits for health. This workout is very beneficial for the heart, lungs, and respiratory tract. Cardio is also very useful for weight loss. The heart is the most important organ for the body. Cardio workout done as much as 3-6 times a week, with a duration of 15-30 minutes per day [04]. [21] stated "just setting aside 15 minutes each day for cardiovascular can make the heart healthy and fit, and will be useful for life". American College of Sports Medicine recommends that cardio workout are performed 3-5 times a week with 20-60 minutes of exercise time [14].

Cardio workout are important, especially if want to lose a lot of weight. The best time to do a cardio workout is on an empty stomatch. Don't take any vitamins at this time. If will do your cardio workout at night, don't eat anything for 2 or 3 hours prior. This last meal should only be fruits or vegetables, possibly with a protein drink [5]. Furthermore, [8] stated “We dont not recommend engaging in any early morning cardio workout on a empty stomach, with the body in a hypoglycemic state.”

The more cardio workout in a week the higher the chances of the body to be healthier. The intensity of cardio exercise is 65% (medium). Medium intensity in cardio workout can burn fat optimally. According to [14] during cardiovascular workout, calorie and fat burning will reduce the occurrence of unnecessary and sometimes hazardous accumulation, and can balance the chemical composition in the body.

Cardio workout with moderate intensity in the first week can burn fat without appetite change drastically. Basically, the increase in physical activity will also increase the appetite to the detriment of weight loss. Increased appetite is a protective mechanism of the body. Thus, an increase in appetite allows one to workout without damaging health [18].

The cardio workouts in this study consisted of: (1) jogging on the spot, (2) squat plank, (3) push up progression, (4) double step, (5) climbing, (6f) lunging, (7) heel touch, and (8) jumping jack.

Fig. 1. Cardio Workouts Items

Based on the above explanation, it can be concluded that cardio workout is aerobic exercise with medium intensity that used some exercise items and is beneficial for the heart, lungs, and respiratory tract.

Endurance is an expression of the body's aerobic system, includes aerobic muscle fibers that burn fat for energy, the nerves and blood vessels associated with the muscles, and all the support mechanisms to put them in action, including the heart and lungs [15].

Furthermore, Endurance always involves energy fitness and muscle fitness so that the training goal can not be separated. Endurance is always closely related to the length of work (duration) and the intensity of work, the longer the duration of exercise and the higher the intensity of work that can be done someone, means that the person has good endurance [2].

Aerobic endurance is the ability of the cardiorespiratory system to supply the exercising muscle with oxygen, which can be assessed through a variety of different protocols. Aerobic exercise are those exceeding one minute [16]. Endurance

training produces positive adaptations to the muscular and cardiovascular systems. Cardiovascular endurance is the capacity to sustain prolonged bouts of exercise via the efficient delivery of oxygen to the body's working tissues [17].

Individual endurance is determined by its aerobic capacity to meet the energy requirements required by the body during work. [20] explains there are two kinds of energy metabolism system needed in every activity of human motion that is energy system aerob and energy system anaerob.

Furthermore, aerobic capacity is determined by the ability of organs in the body to transport oxygen to meet the entire system [20]. A person who has good aerobic endurance will be able to self-recovery quickly so as to perform the exercise with a high intensity for a long time. The effect of aerobic enhancement will have an impact on anaerobic enhancement during activity has not resulted in oxygen.

Almost all sports, the first physical exercise is to establish a good general endurance through aerobic exercise so that it can serve as a foundation for the development of other elements. Aerobic exercise aims to prepare the circulatory and respiratory system, strengthening the tendons and ligaments, reducing the risk of injury, as well as providing energy sources to perform activities with high intensity and long lasting.

The outline of good aerobic exercise component rules include (1) low intensity, (2) duration, (3) without recovery time and interval (if any in short time), and (4)) using varied loads [20]. So, it can be concluded that aerobic endurance is the ability of organs work (heart and lungs) within a certain period.

Based on the above explanation, this study aims to explore how changes cardio workout to aerobic endurance.

II. METHOD

The research method used is experimental method. Participants were 6 undergraduate students who have time to training and are able to follow the training from beginning to end. [13] stated the participation in endurance exercise program cannot be overemphasized because body composition and abdominal fat distribution (body composition topology). The participants were monitores over 14 session.

The cardio exercise program is performed 4 times a week, consisting of three parts: (1) first week 20 minutes one set, (2) second week 20 minutes 2 sets, and (3) third week 20 minutes 3 sets. Each training session started with a 10-min warm-up periode, including stretching, and finished with stretching exercise for all body. The aerobic endurance instrument used is a harvard step test performed at the beginning and end of the program.

Data analysis techniques in this study include the normality test, and test data difference analysis by using statistical tests. Calculation of data normality in this study using Kolmogorov-Smirnov on SPSS version 17 for windows. Analysis of research data is done by comparing data of pretest and posttest result after treatment. To know whether there is influence on dependent variable and independent variable by using T test on SPSS version 17 for windows.

III. RESULTS

The first analysis was a normality test. In statistics, normality tests are used to determine if a data set is well-modeled by a normal distribution. The normality test using kolmogrov-Smirnov test, the test criteria as follows: (1) Significant> 0.05, then the normal data distribution, and (2) significant <0.05, then the data is not normally distributed.

TABLE I. NORMALITY TEST RESULTS

	Pretest	**Posttest**
Kolmogorov-Smirnov Z	0.420	0.451
Asymp. Sig. (2-tailed)	0.995	0.987

Based on the normality test with Kolmogorov-Smirnov Test obtained KSZ pretest value of 0.420 and posttest of 0.451 and asymp.sig pretest of 0.995 and posttest of 0.987 more than 0.05. So, the data is normal distribution.

The next step is testing the hypothesis. To see if H_0 or H_1 is accepted, the following table presents the t test results against the results of the study.

TABLE II. AEROBIC ENDURANCE RESULT WITH T TEST

		N	**Correlation**	**Sig.**
Pair 1	Pretest and posttest	6	0.886	0.019

The results showed that cardio workouts had a significant and positive effect on aerobic endurance of participants (0.019 < 0.05). Cardio workout contribution to aerobic endurance improvement was 0.8862 = 0.78 (78%). So, 78% increase in aerobic endurance due to cardio workout, the remaining 22% due to other factors.

To know more about the results of the increase, the following is presented data about the results of the results of harvard step test results.

TABLE III. AVERAGE AEROBIC ENDURANCE TEST RESULTS

The Body's Biomotor Component	**Average Results**		
	Pretest	**Postest**	**Increase**
Aerobic endurance	31.6	47.8	16.2

Based on the above data, it can be seen that the average value of pretest on aerobic endurance is 31.6, the average posttest value of 47.8, and the average increase of 16.2.

The results of this study also show that continuous cardio workouts will result in an increase in the aerobic endurance of the body. The better the aerobic endurance of the body the better the heart's lung capacity of a person. Someone who has a good heart resistance means to have good cardiovascular endurance as well. If a person has cardiovascular endurance then the heart, lung, and blood vessel systems are able to work optimally at rest and work conditions in taking oxygen and channeling it to the active tissue so that it can be used in the

body's metabolic processes. That is, cardiovascular endurance is the most important component of physical fitness. Thus, if a person has high cardiovascular endurance, it shows high ability to work which means the ability to expend considerable amount of energy over long periods of time.

That is, physical exercise is good and right will trigger all organs to perform its functions so as to adapt to any given load. Physical exercise will cause the muscle to become strong and the improvement of muscle function, especially the respiratory muscles causing more efficient breathing at rest. Thus, organ work is more efficient and the maximum work capability achieved is greater.

Another thing that researchers found was five times a week exercise can improve a person's physical condition but must be balanced with adequate rest. These findings highlight the importance of cardio workout in achieving better physical endurance to overcome fatigue with minimum training 20 minutes of each day. Furthermore, at the time of exercise should use clothes that absorb sweat and use a yoga mat. In addition, it should pay attention to the principles of practice to minimize the occurrence of injury.

IV. CONCLUSION

The results showed that cardio workouts had a significant and positive effect on aerobic endurance of participants ($0.019 < 0.05$).

ACKNOWLEDGMENT

Special big thanks to Research Institute at Islamic University 45 of Bekasi and college students who are willing to be a research sample.

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