



PROCEEDINGS

THE 1ST YOGYAKARTA INTERNATIONAL SEMINAR ON HEALTH, PHYSICAL EDUCATION, AND SPORTS SCIENCE.

Evidence-Based Practice of Sports Science in Education, Performance, and Health.

October 14th, 2017. Eastparc Yogyakarta, Indonesia



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YISHPESS PROCEEDINGS

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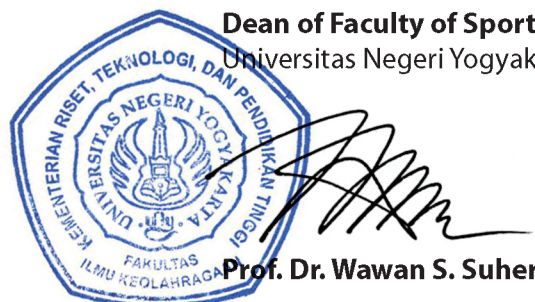
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OPENING SPEECH

As the Dean of Faculty of Sport Sciences Universitas Negeri Yogyakarta, I would like to welcome and congratulate to all speakers and participants of the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) 2017 entitled "Evidence-Based Practice of Sport Science in Education, Performance, and Health".

This international seminar is actually an implementation in the framework of the assessment of the achievements and sports culture in society that can support the achievements of the Indonesian people, so that there will be a significant role of practitioners, academicians, sport people, and sports observers from Universities, Institutions and Sports Organizations to help actively facilitate in the development, assessment of innovative sports science development so as to achieve sport achievements at the National and International level.

Finally, we thank all the committee of YISHPESS for their hard work in organizing this activity, and congratulate the invited speakers and all participants. Hopefully, this seminar is significant for the development of physical education, health, and sports sciences.

**Dean of Faculty of Sport Sciences,
Universitas Negeri Yogyakarta**
Prof. Dr. Wawan S. Suherman, M.Ed.


PREFACE

Alhamdulillahirobilalamin, thank Allah the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) has been prepared well and on time. With all humility, we welcome and congratulate the speakers and participants of Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) organized by the Faculty of Sport Sciences, Universitas Negeri Yogyakarta.

The YISHPESS 2017 is designed to updating and applying evidence-based practice in sports science aspects, including: education, performance and health. We hope that the invited speakers of this seminar can reduce the gaps between academic and field to get best output in the daily sport and health practices.

We would like to thank to Rector and the board of Universitas Negeri Yogyakarta for supporting this seminar come true. Praise and be grateful to the Lord, so that this proceeding can be issued. Hopefully, the publication of this proceeding can bring benefits to the participants in particular and readers in general.

Yogyakarta, October 14th, 2017
Chairperson of the Committee



Dr. Or. Mansur, M.S.

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THE EFFECTS OF PHYSICAL EXERCISE THROUGH GAME-MODEL AND CIRCUIT-MODEL EXERCISES APPROACH ON THE MAXIMUM AEROBIC CAPACITY

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Abstract

Objective: This study was intended to analyze the effect of physical exercise through game-model and circuit model exercises approach on the maximum aerobic capacity.

Method: This type of research is quasi-experiments, with treatment in the form of a game model exercise and circuit model exercise. Pre-test of Maximum Aerobic Capacity using the MSFT (Bleep test) instrument was given before treatment. The treatment was given 16 times with details of 3 times per week. Target population is Faculty of Sports Science students of Universitas Negeri Padang, while the affordable population is 30 students of Sports Education Program academic year of 2013/2014. The sample was selected by using purposive sampling. The data were analyzed by using descriptive and inferential statistics, using t test at significance level α 0.05.

Results: The game model exercise gives a significant effect on the increase of Maximum Aerobic Capacity of students of Faculty of Sports Science, Universitas Negeri Padang, ($p = 0,000 < \alpha 0,05$). The circuit model exercise gives significant effect on the increase of Maximum Aerobic Capacity of students of Faculty of Sports Science, Universitas Negeri Padang, ($p = 0,000 < \alpha 0,05$.) There is a significant difference of effect between the game model exercise and the circuit model exercise to the increase of Maximum Aerobic Capacity students of Faculty of Sports Science, Universitas Negeri Padang, ($p = 0.001 < \alpha 0.05$).

Conclusion: Both game model exercise and circuit model exercise have a positive effect on the increase of maximum aerobic capacity. However, the data analysis shows that the circuit model exercise is more effective than game model exercises in increasing maximum aerobic capacity.

Keywords: game model exercises, circuit model exercise, maximum aerobic capacity

INTRODUCTION

Creating athletes full of achievements, requires careful planning, as well as tiered coaching. In the Indonesian Constitution number 3 year 2005, about National Sport System, in Chapter V article 33 paragraph 2 mentioned that; "Sports achievement is a sport that nurtures and develops sportsmanship in a planned, tiered and sustainable manner through training and competition to achieve achievement with the support of science and technology athletics (UU RI No. 3 tahun 2005., 2006). Based on the quotation it can be concluded that; to create athletes with achievements the need to perform a planned coaching with the support of science and technology is essential, so that the training process can be maximized in accordance with the organs function physiologically. Without involving science and technology in the exercise process, the ability of athletes can not be increased optimally.

One of the coaching programs is through exercises, because the exercise can help athletes improve skills and achievements, especially on four aspects such as; techniques, physical conditions, tactics and strategies, as well as mental ". If one of these aspects is weak, it will affect other aspects, so that athletes can not perform optimally in every game (Harsono, 1996). One important aspect that an athlete must possess, is the aspect of physical condition which is a fundamental aspect to support another aspects. Elements of physical conditions; strength, speed, endurance, agility, explosive power, balance and coordination. Any elements of physical condition an athlete should possess, it depends on the sport he follows, because each sport has its own characteristics (Bompa, Haff., G.G., 2009).

On sports such as ; medium to long distance run, swimming to 100 meters and up, martial arts, endurance is the main physical components an athlete must have, especially aerobics endurance, because it is needed to be able to perform activities in a relatively long time. Aerobics endurance is the ability of the body to perform activities in a long time without experiencing significant fatigue by using aerobic energy supply.

An aerobic endurance or often called cardio-respiratory endurance is a quality of how the body as a whole supports physical activity and can inhibit the cause of fatigue " (Matt Fitzgerald. 2005). While Robert Hoccey says that; " cardiovascular endurance can be defined as the ability to perform continuous work in performing the tasks of a group of muscles at a relatively long time (Robert Hockey, 1981). The level of this aerobic endurance will be affected by the level of VO₂ max or known as the maximum aerobic capacity. The level of maximum aerobic capacity is affected by organic components such as; lungs, heart, blood vessels, and blood quality (hemoglobin) and skeletal muscles that will consume oxygen for aerobic energy metabolism processes, resulting in energy for cellular work, including muscle cells (Umar, 2014)

A high maximum aerobic capacity (VO₂ max), not only required by athletes when they are exercising or competing, but also needed when they are doing recovery. The defeats often experienced by an athlete in a match, one of which is due to their low aerobic capacity, this can be seen in every game such as a martial arts (Umar, 2014). Usually, athletes appear prime and violent at the beginning of the round, but in the next round, their tendency decreases, it is evident that they are not supported by maximum aerobic capacity (VO₂max), so the recovery process (recovery) is not running perfectly.

Based on the observations done on students of Faculty of Sports Science in Universitas Negeri Padang, there are still many students who have a low aerobic capacity. This is reflected in each of the following practice classes, as well as doing exercises, many students experienced fatigue faster. The low level of maximum aerobic capacity of students in Faculty of Sports Science Universitas Negeri Padang, who are being prepared as a coach who will be on duty field in accordance with his profession as a trainer. In addition, the students of Faculty of Sports Science Universitas Negeri Padang are mostly athletes who are still actively participating in various sports events, either sporting the Provincial Sports Week (Porvrop), National Championships (National Championship), National Sports Week (PON), as well as regional championships such as SEA Games, caused by many factors, one of which is the material of the training program provided by the trainer,

Formulation of the problem

The formulation of the problem is;

1. Can the model of exercise play increase maximum aerobic capacity?
2. Will the circuit training model increase maximum aerobic capacity?
3. Is there any difference in effect between the model of exercise play and the circuit training model on maximal aerobic capacity improvement?

Research purposes;

The purpose of this study is to analyze;

1. Influence of play practice model to maximal aerobic capacity,
2. Effect of circuit training model on maximal aerobic capacity,
3. Differences in influence between the model of playing exercises with the model of the exercise of the circuit to the maximum aerobic capacity.

Benefits of research

The research benefits are as follows;

1. Trainer, as a guide in making physical exercise program,
2. Student / Athlete, as knowledge in performing the right physical exercise,
3. Researchers, increasing the insight of Science and Technology in supporting the profession as educators and trainers.

METHOD

This type of research is quasi experiment (quasi experiment). Quasi experiment is a type of experimental research in which the researcher can not fully control all variables that may affect the dependent variable (Donald Ary, et al., 2004). The research was conducted in the laboratory of the Faculty of Sport Science, Universitas Negeri Padang. The data collection process is done in 2 (two) main stages. The first stage of data collection on the maximum aerobic capacity. The second stage is giving the treatment of exercise model and circuit training model as much as 16 times of practice, (3 times per week).

The design of this research is; the two groups pre test and post test design. Population in this research, is student of Faculty of Sport Science Universitas Negeri Padang as target population (target population). While the affordable population (affordable population) is a student Faculty of Sport Science Negeri Padang Sport Education program class of 2013/2014 registered in the semester of July - December 2013/2014. While the sample used in this study are 30 students with a purposive sampling technique.

The research instrument for measuring the maximum aerobic capacity is Bleep test (MSFT). Data analysis using t test with significance level $\alpha = 0,05$.

RESULTS AND DISCUSSION

Results

A. Data Description

1. Initial Data Aerobic Capacity Maximum Group of Play Training Methods

Based on the results of descriptive data analysis of 15 people group exercise training method, obtained the highest score 47.1, lowest score 30.6, average score 37.7, span 16.5. For more details can be seen in the following table:

Table 1. Initial Data Aerobic Capacity Maximum Group of Play Training Methods

No	Interval class	(Fa)	(Fr)
1	30.6-33.4	4	27
2	33.5-35.7	2	13
3	35.8-38.5	2	13
4	38.6-41.2	4	27
5	41.3-47.5	3	20
	Total	15	100%

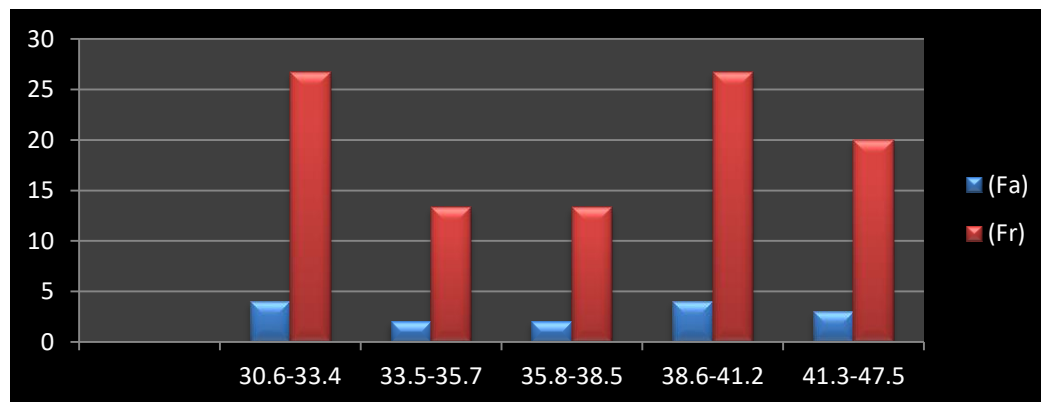


Fig. 1. Histogram frequency score Maximum Aerobic Capacity group of Play Training Methods

2. Initial Data Aerobic Capacity Maximum Group of Circuit Training Methods

Based on the results of descriptive data analysis of 15 people group of exercise training methods, obtained the highest score 46.8, lowest score 30.6, average score 37.7, rantangan 16.2 and standard deviation 5.03. For more details can be seen in the following table:

Table 2. Initial Data Aerobic Capacity Maximum Group of Circuit Training Methods

No	Interval Class	(Fa)	(Fr)
1	30.6-33.4	3	20
2	33.5-35.7	4	27
3	35.8-39.5	2	13
4	39.6-41.2	3	20
5	41.3-46.8	3	20
	Total	15	100%

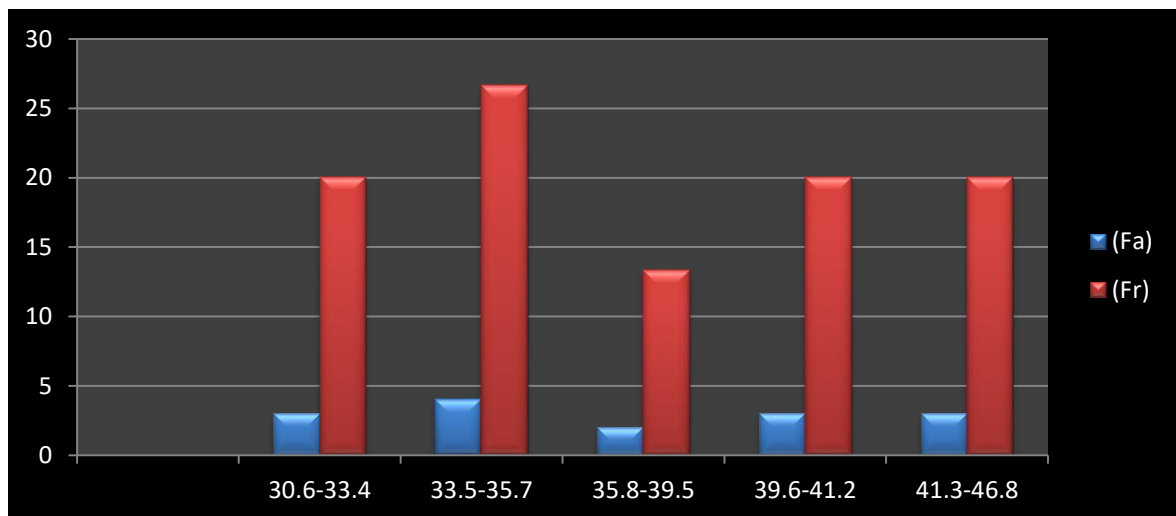


Fig. 2. Histogram frequency score Maximum Aerobic Capacity group of Play Training Methods

1. Final Data Aerobic Capacity Maximum Group of Play Training Methods

Based on the results of descriptive data analysis of 15 people group of exercise training methods, obtained the highest score 48.4, the lowest score 32.5, the average score of 38.8, rantangan 15.9 and standard deviation 4.67. For more details can be seen in the following table:

Table 3. Final data aerobic capacity maximum group of play training methods

No	Interval Class	(Fa)	(Fr)
1	32.9-35.6	4	27
2	35.7-38.4	2	13
3	38.5-40.3	3	20
4	40.4-42.7	3	20
5	42.8-48.5	3	20
	Total	15	100%

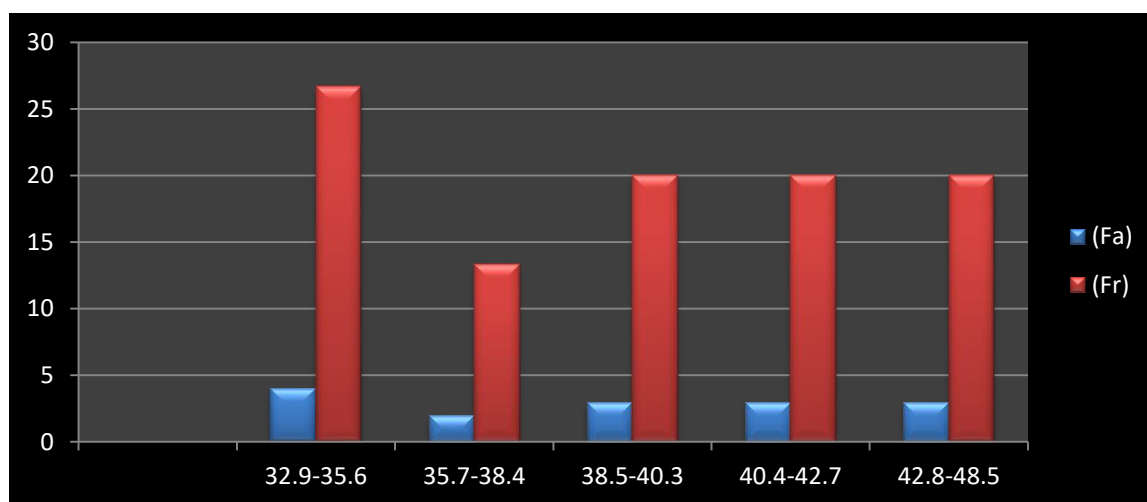


Fig. 3. Histogram frequency score Maximum Aerobic Capacity group of Play Training Methods

2. Final Data Aerobic Capacity Maximum Group of Circuit Training Methods

Based on the results of descriptive data analysis of 15 people group exercise circuit method, obtained the highest score 49.0, the lowest score 34.3, the average score 40.6, rantangan 14.7 and standard deviation 4.56. For more details can be seen in the following table:

Table 4. Final data aerobic capacity maximum group circuit exercise method

No	Interval Class	(Fa)	(Fr)
1	34.3-35.8	3	20
2	35.9-37.6	1	7
3	37.7-40.4	3	20
4	40.5-42.7	3	20
5	42.8-50.00	5	33
	Total	15	100%

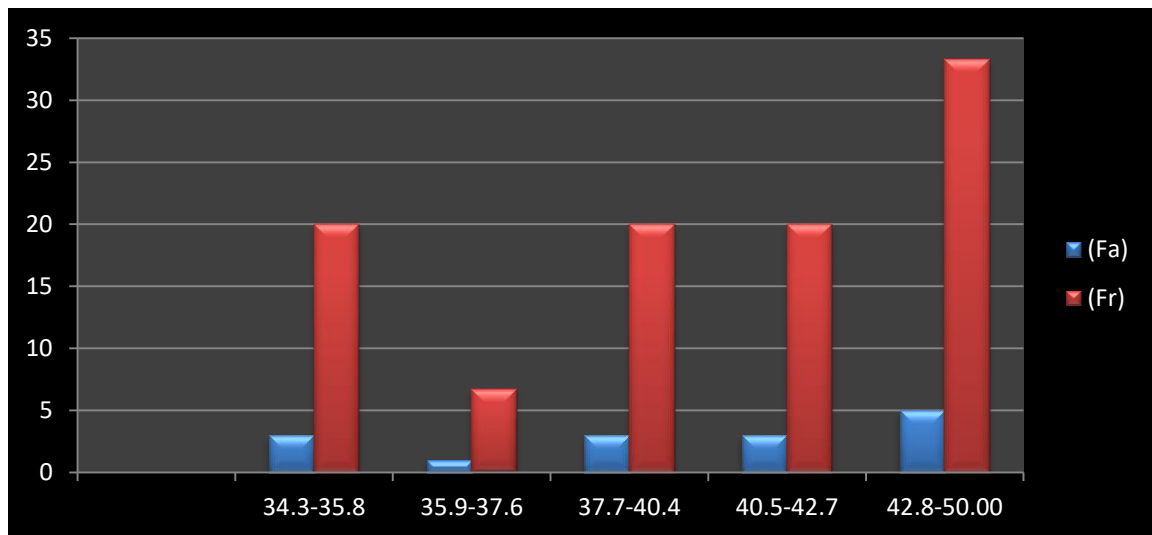


Fig. 4. Histogram frequency score maximum aerobic capacity group of play training methods

B. Hypothesis Testing

1. First Hypothesis

The hypothesis proposed in this study is "There is an influence of the exercise model of play on the maximum capacity aerobic. Based on result of data analysis turns out $p = 0,000 < \alpha = 0,05$. Thus it can be concluded that there is influence of the method of playing exercises on aerobic athlete's capacity. For more details can be seen in the following table;

Table 5. Test Result T Test Data Pretest and Posttest Play Group

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest Pretest	1.1933	.5147	.1329	.9083	1.4784	8.979	14	.000

Thus the hypothesis proposed in this study that says there is influence of the method of playing exercises on aerobic aerobic capacity of athletes is acceptable.

2. Second Hypothesis

The hypothesis proposed in this study is "There is influence of Circuit training model to the maximum aerobic capacity. Based on result of data analysis turns out $p = 0,000 < \alpha 0,05$. Thus it can be concluded that there is influence of circuit training method on aerobic aerobic capacity of athlete. For more details can be seen in the following table;

Table 6. Test result analysis of data pretest and posttest of circuit group

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest Pretest	2.9000	.7521	.1942	2.4835	3.3165	14.933	14	.000

Thus the hypothesis proposed in this study that says there is influence of the method of circuit training on aerobic aerobic capacity of athlete is acceptable.

3. Third Hypothesis

The hypothesis proposed in this study is "There is a difference in the effect between the model of playing practice and the circuit training model on the aerobic capacity of the mask. Based on result of data analysis turns out $p = 0,001 < \alpha 0,05$. Thus it can be concluded that there is a difference of influence between the method of playing exercises and the method of circuit training on aerobic aerobic athlete's capacity. For more details can be seen in the following table;

Table 7. Result of T test analysis posttest data between play group and circuit group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest Sirkuit Posttest Bermain	1.6571	1.3971	.3734	.8505	2.4638	4.438	13	.001

Thus the hypothesis proposed in this study that says there is a difference in the effect between the method of play practice and the method of circuit training on aerobic aerobic capacity of athlete is acceptable, and if seen from the difference of mean score, then the circuit training model is more effective to increase maximum aerobic capacity.

Discussion

1. Influence of Model of Playing Exercise to Maximum Aerobic Capacity

The result of data analysis done in this research turns out $p = 0,000 < \alpha 0,05$. That is, the model of playing practice can increase the maximum aerobic capacity significantly. Increased maximum aerobic capacity as a result of the exercise, possibly caused by several factors as follows; First, the intensity of exercise averages 70% -80% of the maximum pulse rate. The intensity has already entered the training zone to increase maximum aerobic capacity (VO₂ max). This is as it is said by; Matt Fitzgerald that; Research suggests that vigorous-intensity exercise (60-84% oxygen

consumption reserve (V'O2R)) results in greater increases in aerobic capacity than moderate-intensity exercise (40-59% V'O2R). [6].

Research shows that a strong / high intensity exercise (60-84% of reserve oxygen consumption (V'O2R)) results in greater increases in aerobic capacity than moderate exercise intensity (40-59% V'O2R). This is reinforced by Lanty O'Connor, (2009) that the effects of exercise exercise to increase maximum aerobic capacity (VO2 max) can already occur at 70% exercise intensity. For more details can be seen in table 4.

Tabel 8. Zona intensitas latihan untuk meningkatkan VO2 Max, [4].

		EXERCISE ZONES										
		AGE										
		20	25	30	35	40	45	50	55	65	70	
BEATS PER MINUTE	100%	200	195	190	185	180	175	170	165	155	150	VO₂ Max (Maximum effort)
	90%	180	176	171	167	162	158	153	149	140	135	
	Anaerobic (Hardcore training)											
	80%	160	156	152	148	144	140	136	132	124	126	Aerobix (Cardio training / Endurance)
	70%	140	137	133	130	126	123	119	116	109	105	
	Weight control (Fitness / Fat burn)											
60%	120	117	114	111	108	105	102	99	93	90	Moderate activity (Maintenance / Warm up)	
50%	100	98	95	93	90	88	85	83	78	75		

Based on the quote and table 4, it can be concluded that the increased aerobic capacity is maximal as the effect of the training method of play. First, because the intensity of the exercise through pulse measurements achieved in each training session averaged 70% -80% of the maximum pulse. Secondly, the samples in the exercise of this play method are full of vigor, excitement and high motivation. Because this method of play has considerable motion variations that will involve most of the muscles of the body, so the cardiovascular system is maximized, without experiencing significant fatigue from each sample.

2. Effect of Circuit Exercise Model on Maximum Aerobic Capacity

The result of data analysis done in this research turns out $p = 0,000 < \alpha 0,05$. That is, the circuit training model can increase the maximum aerobic capacity significantly. Increased maximum aerobic capacity as a result of the exercise, possibly caused by several factors as follows; First, As with the method of exercise, the intensity of the exercise achieved during the exercise is 70% -80% of the maximum pulse rate. The intensity has already entered the training zone to increase maximum aerobic capacity (VO2 max). Second, circuit training will train most of the muscles of the body, because each station (station) contains different or varied forms of exercise. Third, the exercise circuit model in the implementation of each post is more focused on certain muscles, so the effect of exercise on the muscles involved in each form of exercise can be more leverage.

3. Differences in influence between the model of exercise play and the circuit training model of the aerobic capacity of the masses

Based on the results of data analysis performed in this study was $p = 0.001 < \alpha 0.05$. That is, there is a difference of influence between the model of exercise play with circuit training model to increase the maximum aerobic capacity. These differences indicate that the model of the cyclical exercise is more effective than the exercise-training model to increase maximum aerobic capacity. This is based on the average score of the circuit training model 40.6 is greater than the average score of the exercise-training model is 38.8. The difference in the effect of this exercise may be due to several factors as follows;

First, the circuit training model focuses more on certain muscles only according to the shape of the movements performed in each post, so that the exercise effect is also more focused. Second, the training program such as intensity, repetition, set, duration and well controlled recovery, so that the effects of exercise can be more leverage.

CONCLUSION

Based on some of the things described above, it can be concluded that;

1. The model of playing exercises can increase the maximum aerobic capacity, as evidenced by the results of $t\text{-test} = 0,000 < \alpha 0.05$.
2. Circuit training model can increase maximum aerobic capacity, this is proved by the result of $t\text{ test} = 0,000 < \alpha 0,05$.
3. There is a difference between the exercise model and the circuit training model for maximal aerobic capacity improvement, as evidenced by the result of $t\text{-test} = 0.001 < \alpha 0.05$.

SUGGESTION

1. To increase maximum aerobic capacity of athlete, can be used both kinds of model of this exercise,
2. To get maximum aerobic capacity increase as expected, it is better to use more varied training methods.

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