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Impact Aerobic Toward Body Physiology and VO2max

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Abstract

The purpose of study was to get the influence of aerobic using Yospan movement toward body physiology and VO2MAX. This research used a quasi-experimental study. The research design used The Randomized Pretest and Posttest. The research subjects were Yospan dancers located at the Sports Hall of Cenderawasih University. Data analysis used descriptive statistics, normality test and Paired samples test. The results of finding show that aerobic exercise with yospan movements affects an increase in pulse rate, body temperature, weight loss and VO2Max. This has implications for the level of physical fitness and the development of gymnastics activities with the preservation of local culture.

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INTRODUCTION

Physical fitness plays an important role in supporting activities for both young and old people. To maintain physical fitness, you can do aerobic exercise regularly. Aerobic exercise is popular with all ages and the form of movement in aerobic exercise is also a popular dance that began to be performed in the 1970s. Aerobic gymnastics activities are not only carried out by school children, but the community also often does this activity on field courts. According to Pitnawati (2013), aerobic is a sport that has movements equipped with song rhythms. Gymnastics movements make the muscles of the body or body move, especially aerobic exercise accompanied by beautiful music or songs with popular dance forms. In addition, aerobic exercise can improve the efficiency of the lungs and heart work. Aerobic exercise movements have a beautiful artistic value.

Art is an idea or movement that produces works of aesthetic value (Rumansara, Kondologit, & Sarini, 2014). The framework of movements and behaviors that are born from the culture of society has a cultural creation. But art has a distinctive style in certain groups of people. Variations in the arts in certain groups of people are variations in dance movements such as in gymnastics. One of the dance movements that has a distinctive regional movement for aerobic exercise is the Yospan dance. The Yospan dance movement is the creation of the Papuan people in the range of 1980. It is rooted in the Yosim and Pancar dance which developed in the Sarmi and Biak areas (Rumansara et al., 2014). Along with its development, this dance expanded to the Sorong area.

The movements in the Yospan dance which are rooted in the culture of the people in Papua, in this modern era are similar to the Aerobics movement in the sports field. Yospan is a typical Papuan dance that is categorized as an aerobic sport because it is performed with a long duration besides fulfilling CRIPE criteria as well as giving pleasure to those who perform this dance.

The effect of this dance is similar to the results of aerobics which train the body›s capabilities for heart health (Pribadi, 2015).

Aerobics emphasizes the circulation of oxygen in the body which depends on each continuous movement with precise measurements. While the Yospan dance is centered on the preservation of cultural arts, every movement provides a capability value for health. Aerobics is seen as a sport that can support a person›s body fitness because of its continuous movement so that the muscles continue to work with adjustments to the body›s abilities (A. Candra, Rusip, & Machrina, 2016). This exercise is considered a light exercise because it is accompanied by music so that it relaxes nerves, but in the long time aerobics has the effect of slowing down fatigue. Another benefit of aerobics is to increase the capacity of the heart and strengthen the pulse so that it has a good physiological impact on the body (C. M. Palar, 2015).

So, aerobics has a considerable influence on improving body fitness (body physiology) (Dwijayanti, 2015; Chrisly M. Palar, Wongkar, & Ticoalu, 2015) and VO2max as seen from ethnic differences (Muhammad, 2020). Many previous studies have approved the usefulness of aerobic exercise on human health and endurance (Purwanto, 2011). Aerobic exercise also provides changes in the VO2max (Lestari, Liana, & Setiono, 2019; Darsi, 2018). Aerobic exercise affects the flexibility and endurance of the heart lung. Aerobic exercise 3 times per week with a duration of 60 minutes for 12 weeks can increase flexibility and increase cardiovascular endurance (Candrawati, Sulistyoningrum, Ap, & Pranasari, 2016). The results of aerobic endurance related to the cardioraspiratory system can be seen by looking at VO2Max or maximum oxygen capacity (Sulaiman & Wibowo, 2016; Tanzila, 2018). Everyone has a different VO2max value (Dini Nugraheni & Ayu Indraswari, 2017). It is not only in aerobic movement, but also another sport has influence for VO2max level, like as basketball (O. Candra, 2020).

From previous research, it was concluded that aerobic exercise has an influence on a person›s physical fitness, including the aspects of the body›s physiology components. However, this study has a different concept from previous studies. This research is focused on the implementation of aerobic exercise in the form of ethnic Papuans through the Yospan dance type to improve body physiological fitness and VO2max. Increasing the experience of residents with rhythmic movement skills accompanied by music makes residents in doing aerobics with full concentration, singing, having fun and enjoying the beauty of togetherness, making the people involved in the activities feel the benefits. Aerobic exercise can help change body composition, prevent the body from becoming fat and build stronger muscles, increase endurance and strength, improve flexibility, and the body feels light and fresh so that activities are carried out

easily.

Aerobics can also be said to be a health sport that includes all exercises using oxygen by moving large muscles rhythmically, dynamically, long enough without stopping, quite intensively and achieving beneficial changes for the body. In addition, aerobic exercise is related to VO2max. VO2max often regarded as the most important variable describing rate one›s fitness and is routinely used to describe the cardiorespiratory capacity of a person. In aerobic, it provides a different VO2max level value. People with good fitness levels have more VO2max values tall and can do more vigorous activity than those who dont in good condition.

Based on this explanation, this study aims to get the significance of aerobics on physiology body and VO2max with the ethnicity concept (Yospan). The results of this study are also expected to increase the spirit of introducing aerobic exercise through the Yospan movement and also the level of health. Therefore, the problem of research is, "how is the influence of aerobics on physiology body and VO2max?".

METHOD

This research used a quasi-experimental study (Sugiyono, 2008). The research design used The Randomized Pretest and Posttest. The research subjects were Yospan dancers located at the Sports Hall of Cenderawasih University. The research instruments used to measure the impact of aerobic exercise on the physiological level of the body include pulse, body temperature, body weight and VO2Max. The instrument was measured with a duration of 20 minutes for 6 days to determine the implementation of aerobic exercise using the yospan dance movement. The pulse including blood pressure is measured with a digital tension device. While the thermometer is used to determine body temperature. Measurement of body weight using digital scales and the level of accuracy of 0.05 kg. Meanwhile, VO2Max is measured using a beep test or multistage fitness test (MTFT).

Data collection was carried out for six days with regular observation and consecutively in the morning and evening. The research data were processed with statistics at a significance level of 5%, through the help of the SPSS version 21.0 program including: descriptive statistics, normality test and Paired samples test.

RESULTS AND DISCUSSION

The results showed that the identification components of the study on pulse, body temperature, body weight and VO2Max changed after receiving aerobic exercise with Yospan movements. For more details, it can be described as follows:

Pulse

The pulse is a wave that is palpable in the arteries as a result of the blood being pumped by the heart, the pulse is the frequency of the circulation of the amount of blood circulating to the heart and its measurement is used to determine the heart rate. The pulse rate is used as a parameter of cardiovascular function. Reduced fat blood vessels will increase their elasticity due to the burning of fat, and affect the decrease in the respondent's pulse at resting time (C. M. Palar, 2015).

The following is a summary of the respondents' pulse rates measured during the aerobics training, both in the morning and evening sessions.

Table 1. Pulse Recapitulation of Respondents Before and After Yospan Aerobic Exercise.

Day	Morning Pulse Before Exercise	Morning Pulse After Exercise	Afternoon Pulse Before Exercise	Afternoon Pulse After Exercise
1	81,7	113,1	89,3	103
2	77	84,3	84,6	96,6
3	81,8	91,3	84,6	94,6
4	81	91,1	83,1	94,3
5	78,5	91	81	92,8
6	77,6	89	81,1	91

Table 1. can be concluded that the pulse rate before and after Yospan aerobics exercise, both in the morning and evening sessions has increased. Increased pulse rate is an indicator that the heart is working to pump blood to target cells, especially the contracting muscles. In addition, the basal pulse rate from day one to day six during the exercise process decreased.

Body Temperature

The core temperature of the body is greatly influenced by the temperature of the environment. Exercise intensity also has a direct effect

on body temperature, the higher the exercise intensity, the higher the temperature that occurs in the body. In these conditions, the temperature in the body's peripheral tissues (skin and muscles) reflects the temperature of the surrounding environment.

The following is the respondent's body temperature measured during Yospan aerobic exercise, both in the morning and the afternoon session.

Table 2. Respondents' Body Temperature Recapitulation Before and After Yospan Aerobic Exercise

Day	Morning BT Before Exercise	Morning BT After Exercise	Afternoon BT Before Exercise	Afternoon BT After Exercise
1	36,6	37,2	36,7	37,2
2	36,8	37,3	36,5	37,2
3	36,9	37,2	36,6	37,3
4	36,9	37,3	36,8	37,3
5	36,7	37,1	36,4	37,2
6	36,6	37,2	36,5	37,1

*BT : Body Temperature

Table 2. can be concluded that the body temperature before and after Yospan aerobic exercise, both in the morning and afternoon sessions, has increased. The increase in body temperature during exercise reflects the metabolic rate, the higher of the exercise intensity, the higher of the body temperature.

Body Weight

The effect of exercise on weight loss is caused by the loss of body fluids through sweat, but weight loss is able to be caused by the metabolism of fat (the body's energy reserves) in the long-term to become a source of energy. Of course, weight loss will be more significant if exercise is accompanied by a diet or a reduction in calories from daily food. Weight loss can be done by applying a low energy diet with low-fat or low-carbohydrate composition with aerobic exercise (Dewantari & Ambartana, 2017).

Person can do activities normally with an ideal body weight. In addition, the effect of fatigue on the body can be slower than normal with a proportional body weight. Yospan aerobic exercise program can reduce body weight if it is balanced with needs.

Table 3. Respondents' Body Weight Recapitulation Before and After Yospan Aerobic Exercise

Day	Morning BB Before Exercise	Morning BB After Exercise	Afternoon BB Before Exercise	Afternoon BB After Exercise
1	53,9	53,2	53,9	53,6
2	53,8	53,6	53,8	53,5
3	53,9	53,6	54,1	53,9
4	53,7	53,5	53,7	53,4
5	53,8	53,3	53,3	53,0
6	53,8	53,6	53,3	52,9

Table 3. can be seen that, there was a decrease in body weight due to Yospan aerobic exercise, even though the decrease was not significant. Weight loss in this case is not suspected because of the use of fat or other body energy reserves but the loss of body fluids.

VO2Max

VO2Max is the maximum volume of O2 processed by the human body during intensive activities. This volume of O2 maximum is a level of body capability expressed in liters per minute or milliliter / minute / kg body weight. VO2Max describes the ability of the body to take in and use oxygen for the needs of your exercise activities. It is the higher VO2Max, then the higher the endurance. Endurance exercise training results in profound adaptations of the cardiorespiratory and neuromuscular systems that enhance the delivery of oxygen from the atmosphere to the mitochondria and enable a tighter regulation of muscle metabolism (Jones & Carter, 2000).

Some of the things that affect VO2Max in a person are gender, age, genes, place of training factors, and nutrition in the body (Indrayana & Yuliawan, 2019). Thus, Physical exercise is affected by a person's VO2Max. Other research shows that VO2Max is more influenced by a person's genetic factors (Fahruzi & Rusman, 2017).

The following is a summary of the respondent's back and forth running ability measured before and after doing the aerobics yospan training.

Table 4. Recapitulation of Respondents' Back and forth Running Ability before and after Aerobic Yospan Training.

Respondent	Before Running Back and forth	After running back and forth
FK	5,1	5,2
SR	3,3	3,7
PW	3,3	3,5

RR	3,4	3,6
SP	7,2	7,5
YS	3,3	4,1

Table 4. can be seen that the respondent's ability to run back and forth before and after the lowest aerobics yospan training is level 3 inverse 3 (3,3), while the highest is level 7 inverse 5 (7.5). On average, the respondents 'ability to run back and forth before doing the aerobics yospan exercise was 4.2 and after doing the aerobics yospan exercise the respondents' ability to run back and forth was 4.6.

The next finding is testing result. The data analysis is done by testing the normality of the data and testing the hypothesis.

Normality Test

The normality test is a pre-requisite test before performing a paired sample t test or a paired 2 sample difference test. The normality test used the Kolmogorov Smirnov One Sample Test, the significance was seen by comparing the value of α= 0.05. If Sig> α= 0.05 then the data is declared Normal, and vice versa if Sig <α= 0.05 then the data is declared abnormal. The following are the results of the Kolmogorov Smirnov test of the respondent's ability to run back and forth before and after getting aerobics yospan exercise.

Based on the test results above **Table 5.**, it can be seen that the Sig values of the two variables are 0.377 and 0.882> α= 0.05, so it is declared normal, so that it meets the requirements for the Paired Sample T Test.

Hypothesis Testing

To test the hypothesis, the sample t test was used. This test was conducted to see the difference in VO2Max of the respondents before and after getting the aerobics yospan exercise. The significance of the test results is seen by comparing the Sig value with α= 0.05. If Sig <α= 0.05 then it is stated that there is a significant difference, and vice versa if Sig> α= 0.05, it is stated that there is no significant difference.

Based on the test results above **Table 6.**, it is known that the value of Sig = 0.02 <0.05, it means that there is a significant difference in VO2Max between before and after aerobics yospan exercise.

People with a good fitness level have higher VO2max values and can do more vigorous activity than those who are not in good condition. That way, VO2max is also the limit of aerobic ability, so it is considered the best parameter to measure a person's aerobic ability. VO2max is the highest value at which a person can consume oxygen during exercise, and is a reflection of the cardiorespiratory and haematological elements of oxygen delivery and muscle oxidative mechanisms. Naturally, humans are created as dynamic creatures, because they have a very large ability to move, because the structure of the human body which rests on two legs and its point of gravity is high. It is clear that humans have a higher potential for movement, move flexibly and can avoid or overcome problems faced by humans in carrying out daily activities, such as aerobic movements using musical rhythms from the yospan dance movement.

CONCLUSION

The results of the research can be concluded that: 1) aerobics yospan exercise affects the increase in pulse rate. 2) Aerobics yospan exercise affects the increase in body temperature and aerobics yospan exercise affects weight loss through fluids. 3) Aerobics yospan exercise affects the increase in VO2Max

This study suggests that to get maximum exercise results in the aspect of weight loss, the duration of exercise should be increased by at least 30 minutes and combined with restriction of calorie intake. 2) It is necessary to study other components due to aerobics yospan exercise such as blood glucose profile and body fat profile.

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Table 5. Results of the Kolmogorov Smirnov Test of Respondents Before and After Getting Aerobics Yospan Exercise

One-Sample Kolmogorov-Smirnov Test		
	BleepTestPre	BleepTestPost
N	6	6
Normal Parametersa,b	Mean	4,267
	Std. Deviation	1,6033
Most Extreme Differences	Absolute	,372
	Positive	,372
	Negative	-,273
Kolmogorov-Smirnov Z	,912	,718
Asymp. Sig. (2-tailed)	,377	,682
a.	Test distribution is Normal.	
b.	Calculated from data.	

Table 6. Results of Paired Sample T Test of Respondents Before and After Getting Yospan Exercise

Sample	Mean	N	Sig
Bleep Pre Test	4,26	6	0,02
Bleep Post Test	4,60	6	