
SENAM SKJ 2004 TRAINING IMPROVES PHYSICAL FITNESS

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ABSTRACT

Physical training is useful so that the body does not quickly experience excessive fatigue during strenuous physical activity, prevents degenerative diseases and improves health status. Physical training has an important to maintain and improvement the degree of physical fitness during this COVID-19 pandemic. This study aims to determine the Senam 2004 SKJ gymnastics training can improve physical fitness. The subject of this study were 20 students of the Physiotherapy Study Program divided into 2 groups. Group 1 was given SKJ 2004 gymnastics training and Group 2 as a control group, with a frequency of exercise 3 times a week for 6 weeks. The component of physical fitness in this case is VO₂Max measured by the Bleeps Test (MFT) instrument. The results of the study on age, height, weight and BMI were analyzed descriptively in both groups. The results of the VO₂Max test between the 2 groups before and after the training were tested using the t-independent sample test. Average VO₂Max in both groups before training with $p = 0.27$ ($p > 0.05$) and after training with p value = 0.00 ($p < 0.05$). Group 1, average VO₂Max before training 26.45 and the average after training 38.54 with a difference of 12.09 and a percentage increase of 45.70%. Meanwhile in Group 2, the average VO₂Max before training 25.51 and the average after training 27.52 with a difference of 2.06 and the percentage increase 8.07%. This study shows that the treatment of group 1 and group 2 both gave a effect on VO₂Max. However, the improvement in group 1 was better than group 2. It was concluded that gymnastics training can improve physical fitness.

Keywords: *Senam SKJ 2004; training; physical fitness*

INTRODUCTION

Exercising is a very simple and easy effort to do to improve health status during this COVID-19 pandemic. Increased awareness of physical fitness amid of a pandemic and busyness encourages students to maintain their health and improve their fitness. Through exercise we will increase the body's immunity as well as a healthy and fit body. With good immunity and physical fitness, a person will be able to carry out daily activities without significant fatigue and avoid being infected with the corona virus. Physical fitness is improved so that students are not only healthy at rest (static healthy) but also healthy in physical activity¹.

An athlete or sportsman who has good techniques and or strategies will not show his best performance throughout the match or race without being supported by excellent physical abilities, especially general endurance (cardiorespiratory endurance). Endurance is closely related to the maximum oxygen volume which is one of the parameters of physical fitness. VO₂Max, shows the VO₂Max consumed by the body and is expressed in liters or milliliters per minute². Maximum ability of lung and heart organ function is an assessment to measure a person's VO₂Max ability. To increase VO₂Max, physical training programs must be carried out appropriately, carefully, systematically, regularly, and progressively following accurate training principles and methods in order to achieve the expected goals.

Physical fitness is a person's ability to carry out daily work activities or tasks without causing significant fatigue³. Physical fitness is determined by several components, but the most important and closely related to activity and health are the components of endurance, in addition to several other components such as strength, flexibility, and body composition. Physical fitness is very necessary for everyone to support their daily work activities. Physical fitness really needs to be maintained and given continuous training to stay optimal. This physical fitness really needs to be improved because it can prevent various health problems such as avoiding being infected with the corona virus (COVID-19) in general, preventing heart disease, not getting tired easily and increasing work efficiency and productivity in particular⁴. These considerations strengthen the researchers' decision to carry out aerobic exercise activities in the form of healthy gymnastics. The healthy gymnastics chosen to be carried out was "Senam SKJ 2004".

Senam SKJ 2004 training is a physical fitness exercise that can be done by children, adolescents, and adults even for the elderly (elderly). The gymnastics has dynamic movements, is easy to do and the music creates a sense of joy and enthusiasm. This exercise is packed with combining strong muscle movements, flexibility, and coordination with the aim of optimizing physical fitness improvement. SKJ 2004 gymnastics is a series of gymnastic activities that aim to improve and maintain a person's physical fitness involving biomotor components through movements that require general endurance (VO2Max), muscle strength and endurance, flexibility of motion, and regular movement coordination.

Students in the Physiotherapy Study Program, Faculty of Health Sciences, Bali International University is one of the Study Programs in Denpasar districts that applies a health curriculum, community service and in physiotherapy health services, one of which is about aerobic exercise therapy lectures to patients or clients. If it is seen from the development of attendance in lecture journals, it can be seen that there are still some students who are often absent during lectures due to illness and/or being in self-isolation. This causes the need for research to improve health status and find the best solution to increase body immunity during this pandemic. Based on observations during lectures, most of the results of student attendance records were not be present in attendance when they attended lectures. To solve this problem, the provision of healthy exercise before and after lectures and also looking for an empty schedule so that they can do healthy exercise together while staying within the health protocol in the Corona Virus (Covid-19) pandemic. The healthy gymnastics chosen in this research is the 2004 SKJ Gymnastics and provides specific guidance on the ongoing 2004 SKJ gymnastics training. Meanwhile, to improve physical fitness and a good immune system in this Corona Virus pandemic, it is necessary to raise the spirit to rise again.

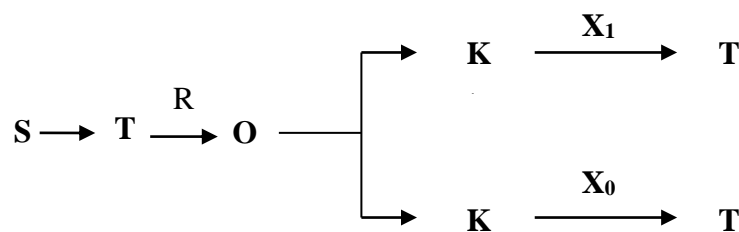
METHOD

This type of experimental research. Experimental research is in events that occur as a result of providing interventions to events that already exist in nature⁵.

a. Methodology

Study Design

The intervention in this case is the provision of training programs and the let's rise gymnastics training model. This type of experimental research. The research design is "The Randomized Pretest-Posttest Control Group Design"⁶. It can be seen in the chart below.



Subject recruitment

The sample of this study used a total sampling method involving all male students of the Physiotherapy Study Program, Faculty of Health Sciences for the year 2020/2021, totaling 20 people.

Sampling technique

The steps of this technique are: (1) the sample is ranked based on the results of initial test, (2) the sample is divided into two groups in the following way. Group 1 with the 2004 SKJ Gymnastics training and Group 2 as the control group.

b. Material and procedure

Material

The results of initial test (pretest) using bleeps test instrument (multistage fitness test), the sample was divided into 2 groups with ordinal pairing technique, which is a way of dividing research sample into several groups so that they have almost the same and balanced abilities, this aims to maintain homogeneity or similarity between the treatment group and control group.

Procedures

SKJ 2004 gymnastics is one of the aerobic activities and this gymnastic activity is carried out accompanied by music, yells, clapping and also tempo in a matter of 1 to 8. Music has a soul to raise the spirit so that the presence of music in the 2004 SKJ gymnastics can help indirectly raise the spirits of people who do the gymnastics and enjoy the movements in gymnastics according to the rhythm and movement. The 2004 SKJ gymnastics is not much different from the gymnastics that is done in general. Use a count of 1 to 8 in static movements and 2 times 8 for dynamic movements or core exercises, 1 to 8 again for cooling down in this series of gymnastic movements. Every movement consists of almost all moving body parts. In addition, the 2004 SKJ gymnastics has elements of physical fitness such as general endurance, muscle strength, balance, flexibility, and movement coordination. This will be very well applied to the wider community both for children, adolescents, and adults, especially for students to prevent being infected with the corona virus and break the chain of spreading this virus. This is because the period of students both in public and private universities is the right time to maintain the degree of physical health due to their age ranging from 18-25 years old, entering the golden age of achievement in their respective fields in growth and development that is qualified to increase the body's immunity and prevent disease in the midst of the COVID-19 pandemic and also busy in lectures.

c. Assessment

Physical fitness gymnastics (SKJ) 2004 is a series of movements aimed at improving, to build and maintaining one's physical fitness. The series of physical fitness gymnastics movements in 2004 is an improvement and development of the previous physical fitness exercises that have been introduced. With the successful compilation of a series of physical fitness exercise movements in 2004, it is hoped that it can improve and provide various alternatives for the community to carry out gymnastics in order to increase their physical fitness. In the sense that a physical activity with a series of gymnastic movements arranged systematically is carried out with static, dynamic, and rhythmic movements as well as in aerobic activities with the aim of improving physical fitness.

Physical fitness is a person's the ability to carry out daily work activity or tasks without causing significant fatigue. Physical fitness is measured by general endurance (cardiovascular-respiratory system), in terms of VO_2Max , which is one of the parameters of physical fitness. The maximum oxygen volume is a level of the body's ability to absorb, circulate, and use oxygen for activities and is processed by the human body during intensive activities as measured by Bleeps test instrument (Multistage Fitness Test).

Place of research is in the ceremonial field of the International Bali University. This research was conducted from July 1 to August 25, 2021. The duration of the training provided in this study was for six week, with frequency of 3 times a week, is Wednesday, Friday and Saturday. Group 1 given the training time is in morning at 06.30-08.00 WITA and in afternoon at 16.30-18.00 WITA and is carried out online. Group 2 not given treatment and as the control group.

d. Data Analysis

Data collection is a very decisive stage in a study in order to obtain the desired results. In this study, the data to be obtained is quantitative data. Data collection was obtained by using test and measurement techniques, while the instrument used in data collection is by using the bleeps test (MFT) procedure. The data of this study were obtained from the measurement of the dependent variable, namely physical fitness (VO_2Max). These data are in the form of pretest and posttest in each group, namely the treatment group and the control group. The final test (posttest) was carried out after the treatment group was given the Senam 2004 SKJ exercise for 6 weeks of training with the same test as the pretest. Furthermore, the data will be analyzed based on the measurement results of each group.

Data analysis obtained were analyzed with Statistics Program Service Solution (SPSS) 16.0. age, weight, height, and Body Mass Index (BMI) were obtained before the pretest started. Data normality test was obtain to show that the tested data is normally distributed. The normality test of the data used the Shapiro Wilk Test instrument, while the homogeneity test of the data used the Levene Test. Hypothesis test, which is a t-paired test to analyze the average increase in the VO_2Max before and after intra-group training, because the data are normally distributed and homogen. To test the hypothesis that the Senam SKJ 2004 can increase VO_2Max , an independent t-test to determine the difference in treatment was done to compare the percentage's increase between groups.

RESULTS

The research has been carried out in the ceremonial field of the Bali International University and online for the Physiotherapy Study Program Students, Faculty of Health Sciences, Bali International University, which is located on Jalan Seroja, Gang Jeruk, Kelurahan Tonja, Denpasar. Experimental research was conducted for 6 weeks involving one treatment group and one control group. The research subject was 20 people, who were divided into two groups, each group consisted of 10 people. Group 1 was given the 2004 SKJ exercise training and Group two is the control group. The data obtained based on the results of the study in the form of data on the characteristics of the research subject and data on the results of physical fitness in the form of maximum oxygen volume (VO_2Max) from the two research groups.

The characteristics of the research sample analyzed include age, body mass index (BMI), weight and height, show is Table 1.

Table 1 is Characteristics of Research Sample Data

Characteristics	n	Group 1	Group 2
		Average	Average
Age	10	20.80	19.90
Height	10	165.80	163.00
Weight	10	65.40	64.60
BMI	10	23.68	24.27

Table 1 shows that there is no difference in the characteristics of age, weight, height and BMI of the 2 groups before training. Therefore each groups has the same physical characteristics and abilities. It just description of subject characteristic, or the characteristics could be divided futher, such as age between grup 1 and 2 is 20.80 and 19.90, subject height is 165.80 and 163.00, subject weight is 65.40 and 64.60, subject BMI is 23.68 and 24.27.

To determine the distribution of the data distribution in the research sample, the data normality test was carried out using the Saphiro Wilk Test and the homogeneity of the data using Levene Test. Tests were conducted on the data obtained in both groups before and after training. The variables tested were VO₂Max before and after training in each study group, Table 2.

Table 5.2 Test Results for Normality and Homogeneity of Data Before and After The Training

Variable	Training	(p) Normality Test (<i>Shapiro Wilk Test</i>)		(p) Homogeneity Test
		Group 1	Group 2	(<i>Levene Test</i>)
Physical fitness	<i>Pretest</i>	0.25	0.20	0.10
VO ₂ Max (L/minute)	<i>Posttest</i>	0.93	0.87	0.13

Table 2. shows that data analysis using normality and homogeneity tests of physical fitness results data (VO₂Max) before and after training, it was found that both groups had a p value better than 0.05 ($p > 0.05$) which means data on physical fitness results (VO₂Max) before and after training were normally distributed and the data variation was homogeneous so that the further test used parametric statistical analysis test.

The results of the different tests were used to determine and compare with average results of physical fitness (VO₂Max), before and after training between Group 1 and Group 2, namely between the 2004 SKJ gymnastics training and the control group. The results of the analysis of significance using T-paired test for intra-group, Table.3.

Table 3 Average Difference Test Results Before and After Intra-Group Training

VO ₂ Max (L/minute)	n	Average	t	p
Group 1 Before Training	10	26.45	-9.847	0.00
After Training		38.54		
Group 2 Before Training	10	25.51	-5.314	0.00
After training		27.57		

Table 3 showed the average results of physical fitness (VO₂Max), before and after the training between the 2 groups with a p-value less than 0.05. This results showed that VO₂Max after training in each group was significantly different compared to before training ($p < 0.05$). Thus the results of the difference in mean VO₂Max before the training between Group one and Group two were comparable. The difference VO₂Max after the training was significantly difference, meaning that difference in the final results was caused by the different types of training given.

To determine the increase in physical fitness (VO₂Max) between two groups both before and after the training. The results of the analysis of significance with independent t-test, Table 4.

Table 4. Improvement Test Results Before and After Inter-Group Training

Variable	Training	Average		t	p
		Group 1	Group 2		
Physical fitness	Before	26.45	25.51	1.13	0.27
VO ₂ Max (L/minute)	After	38.54	27.57	7.27	0.00

Table 4 is showed the average physical fitness (VO₂Max) before training between the 2 groups with a p-value better than 0.05 while after the training with a p-value smaller than 0.05. This means that mean VO₂Max data before the training between the 2 groups was not significantly different (p>0.05). And then the mean VO₂Max before the training is comparable. Meanwhile, the difference VO₂Max after the training was significantly different (p<0.05) which means the difference in the final results was caused by differences in the type of training given.

After training for 6 weeks, there was a difference in the percentage increase. The percentage increasing in physical fitness (VO₂Max) in both groups using Arikunto formula⁷:

$$P = \frac{T2 - T1}{T1} \times (100\%)$$

Table 5. Percentages in Each Group

VO ₂ Max (L/minute)	Group 1 (SKJ 2004)	Group 2 (Control)
Before Training (T1)	26.45	25.51
After Training (T2)	38.54	27.57
Increase Difference (T2-T1)	12.09	2.06
Percentage	45.70%	8.07%

The percentage increase in physical fitness (VO₂Max) in the two training groups for 6 weeks is in Table 5.5 which shows that the increase of VO₂Max after the training in Group one is better than in Group two. This showed that both treatment groups have the same effect on increase after the research data. obtained. The percentage increase in VO₂Max in Group 1 training was higher than in Group 2 training.

DISCUSSION

Physical fitness is the ability or ability of a person to carry out activities or activities with high work power without experiencing significant or excessive fatigue. Physical fitness is everyone's dream to be able to have high physical fitness which will later be able to affect the increase in work productivity, especially during the current Covid-19 pandemic that is hitting the world globally.

To be able to maintain, develop and maintain physical fitness, it is necessary to have regular exercise in physical activity. Providing training means increasing muscle strength and endurance. The method of training must be in accordance with the sport principle. Specificity which is a special way of training not only based on roughly, but the specificity of the chosen exercise must also be in accordance with one's body, not just follow-up⁷. An exercise that must be done gradually so that the body will be more adaptable to the exercise performed. Overload is an increase in the training load in a gradual manner according to the FITT formula. The FITT formula is the frequency to get maximum results, exercise is carried out in one week between 3-5 times per week, the intensity of the training load carried out between 70% - 85% of the maximum heart rate between 70% until 80% of the heart rate is called Training Zone or target zone or training zone. Time: is the time the exercise is carried out continuously between 30-60

minutes. Type and reversibility, namely the exercise must be carried out continuously, which means that it cannot stop training because it will affect the decline in skills, endurance, strength and other motoric components. Exercises carried out in accordance with the formulas and principles will affect the increase in body abilities, especially in physical fitness as a result of exercise⁸.

Senam SKJ 2004 training was using an energy aerobic system, where aerobic endurance is controlled by the capacity of the heart, lungs and respiratory system to provide oxygen to the muscles. Senam SKJ 2004 gymnastics training method is given by adding the load gradually and progressively both from repetitions of each exercise in week. As a form training with an energy aerobic system, this method has a positive effect on increasing VO_2Max which is the predominant factor in showing a person's body ability and then VO_2Max ability will provide overview of magnitude of motor ability (motor power) of a person's aerobic process⁹.

Physical exercise fitness can provide changes to all body system functions. Changes that occur during exercise is called responses. While changes that occur due to continuous and programmed the training in accordance with principles of training is called adaptations. The fast heart rate during exercise is a response from heart, but after a long time of the training the heart rate slowly becomes stable because the strength of the heart muscle increases to pump blood, this is an adaptation of the heart to physical exercise that in undertaken. The heavier the physical activities carried out while exercise, the better the need for oxygen in the all body and to compensate for this the heart and the circulatory system must work more to meet oxygen demand in the body's tissues¹⁰.

Senam SKJ 2004 is gymnastics training using an energy aerobic system, where aerobic endurance is controlled by capacity of the heart, lungs and respiratory system to provide oxygen to the muscles. This training method is given by adding the training load gradually and progressively each exercise in week. As a form of the training with an energy aerobic system, and this method have a positive effect in increasing VO_2Max . The maximum ability of heart and lung function is the best assessment of a person's body ability to measure (VO_2Max) maximum oxygen consumption. VO_2Max has a large effect in a person's physical endurance because it has an important role in the use and transport of the oxygen by muscles¹¹.

A person's level of the oxygen consumption depends in the magnitude and with level of a person's activities. There are several factors that determine the VO_2Max including heart capacity and the ability of the cardiorespiratory system to the function properly, heart function, blood volume, number of red blood cells, hemoglobin concentration must be normal and the blood vessels able to drain blood from the inactive tissue to active tissue especially muscle, must have a normal capacity to use the oxygen or have a normal metabolism as well as their mitochondrial function¹².

The series of aerobic exercise, in this case the 2004 SKJ Gymnastics, is divided into 3 stages, namely warming up, core training, and cooling down. Aerobic gymnastics was popular in the late 1970s, aerobics in this case is the 2004 SKJ Gymnastics which has structured movements, its appearance must be in accordance with the rhythm of the music. Types of aerobic exercise are low impact, (hi/lo) impact aerobic exercise can be tailored to one's taste, special physical health needs and specific goals. The term Aerobic means "with Oxygen" aerobic exercise is a sport movement that is useful for aligning the upper body with the lower body simultaneously in a happy and excited atmosphere. The advantages of doing aerobic exercise are: (1) The heart, the heart muscles will be stronger in pumping blood to send oxygen throughout the body. (2) muscle strength will increase, (3) muscle endurance will increase (4) flexibility around the joints will increase, (5) body composition will be better and more ideal⁸.

It is better for the 2004 SKJ gymnastics training to improve physical fitness (VO_2Maks) due to the training provided during training which will later affect energy consumption during exercise. Thus, Group 1 became more effective than Group 2 in improving physical fitness (VO_2Max), because the research subjects in Group one has the opportunity to do gymnastics movements regularly and consistently provided training so that body will adapt to the treatment. While the research sample in Group two, was given a warm-up first, followed by light and fun movements such as stretching (stretching) statically and dynamically, where the training load is lighter so that it adapts to the training

load given during the training. This factor causes the training load of Group 1 to be greater and to carry out more specific and maximum training compared to Group 2.

This 2004 SKJ gymnastics training will bring positive benefits to the body's physiology, not only in increasing VO_2 Max but also increasing the efficiency of the circulation system and energy formation system in the mitochondria so that you can train longer and harder without exhausting yourself. Other effects are increasing the filling capacity of the heart and increasing contraction power which means more blood is pumped with each beat, increasing the vascularity of the heart which means increasing the input of red blood cells to the heart muscles, increasing blood and red blood cell levels, which means increasing oxygen-carrying capacity¹³.

CONCLUSION

Senam SKJ 2004 Training improves physical fitness for Students of the Physiotherapy Study Program, Faculty of Health Sciences, Bali International University, Academic Year 2020/2021.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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