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The effect of the simple fitness exercise model to improve the vocational students' physical fitness

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Abstract*:* Physical fitness is needed by every human being to support his activities. Vocational Students are no exception when entering the industrial world. Because people who have good physical fitness will not feel tired quickly and still have other energy reserves to continue other activities. Vocational students who are basically required to have 70% skills must a healthty and fit body. As for the research objective, to determine the effect of the simple fitness training model to improve the physical fitness of Vocational students. The population of this research is vocational students with a sample of 24 students. The sampling technique uses a purposive sample with the criteria of final semester Indonesian Traditional Medicine Study Program students who are willing to take part in the study. This study uses mix of methods (qualitative and quantitative) with qualitative using the literature review and quantitative using the two-group pretest and posttest design approach. Data were collected using the focus discussion grup and Cooper test instrument to determine cardiopulmonary fitness and the push-up sit-up test to determine the endurance of the arm and abdominal muscles. The results showed that the simple fitness training model influenced the physical fitness of vocational students with an average increase of 16%, the abdominal and arm muscle endurance groups by 15%. Based on the result of the sit up test and push up test. With the existence of a simple fitness training model, it can be carried out and is useful for students, especially vocational students.

Keywords: training model, physical fitness, vocation

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INTRODUCTION

Indonesia has a quality of life ranking of 111th out of 189 countries according to the 2019 Human Development Index report issued by the United Nations. The annual Human Development Index ranking is calculated using three categories: health, education and income. Strikingly different from the previous industrial revolution, revolution 4.0 was marked by the development of the internet of or for things followed by new technologies in data science, artificial intelligence, robotics, cloud, three-dimensional printing, and nanotechnology.(Puspita et al., 2020; Yoda, 2020). In order to face revolution 5.0, the government needs to make improvements to higher education, especially vocational higher education in the country, for the sake of creating superior and quality human resources (HR).(Fajar & Hartanto, 2019). Quality human resources can only be formed through quality education.

Competent students will be ready to compete in the globalization era. To create quality vocational students, not only requires good knowledge, but also requires good physical fitness to support all daily activities(Nawawiwetu & Lutfiya, 2020). Ideally a student must continue to be active in learning on campus and off campus. Moreover, vocational students who are required to directly face the industrial world (work) after college. Vocational students must use their time as effectively and efficiently as possible, so that they can help students maintain their motivation to excel(Cahyono, 2019). Vocational students must also have good physical fitness to face the industrial world (work) because of the

increasingly advanced technological developments, workers must be fast and precise, this requires good physical fitness(Wibowo et al., 2021).

Based on research resultsSari et al. (2017)the lack of skills in managing time which causes them to use time unequally can affect student learning outcomes themselves, besides that many students have decreased levels of physical fitness due to not having time to do physical sports activities. A fit body is a condition of the body that does not experience fatigue when carrying out daily activities and still has further energy reserves(Gumantan et al., 2021). To get a fit body is not easy just like that, one of the factors that influence the body to stay fit is to do physical activity (exercise) regularly. In general, there are many sports that people can do such as walking, swimming, jogging, sports games that can improve physical fitness(Ninzar, 2018). However, the constraints and problems for final vocational students that often occur are little free time and space to be able to do physical exercise(Arta & Fithroni, 2021). In addition, there are still many students who do not know a good and effective training program. One of the effective exercises in improving physical fitness is simple fitness training, namely variations of aerobic exercise and body weight training carried out by vocational students(Kurniawan & Pudjianto, 2017).

The Simple Fitness training model is an exercise model that is arranged according to the needs of Vocational Students who have short free time. The simple fitness training model consists of two categories, namely exercises to increase vo2max and exercises to increase muscle endurance. On research(Suryadi et al., 2021)states that weight training exercises using the circuit method are proven to have a significant effect on the level of physical fitness. In addition, bodyweight training can be done anywhere without requiring a lot of time, this is according to the needs of vocational students(Rangga & Putra, 2017).

METHODS

This study used the mix of methods (qualitative and quantitative). The first stage of the qualitative approach is a literature review with a literature review. Data collection uses Mendeley technique to collect textbook and journal data. Then conduct interviews and FGDs to understand the needs of Vocational students and as a guide to develop training models. After the training model is compiled, then the expert validity test is carried out. Test validation is carried out through expert judgment. The experts conducted a qualitative test review and provided an assessment of the suitability between items with indicators in the form of a Likert scale with five answer choices. In addition to strengthening the content validity evidence for the purposes of the alignment test, the review sheet also features a format for expert judgment on the revised content.

The population of this research is vocational students. With a sample of 24 people. The sampling technique uses a purposive sample with the criteria of Final Semester Indonesian Traditional Medicine Study Program Students who are willing to take part in the study. Furthermore, the quantitative approach uses the "Two group pretest and posttest design", the population will be divided into two groups. Group 1 (A1); Group 2 (A2); Q1 is a Vo2 max training model; Q2 is a model of muscular endurance training. Both groups were pretested to determine fitness before treatment and after being given treatment a posttest was carried out.

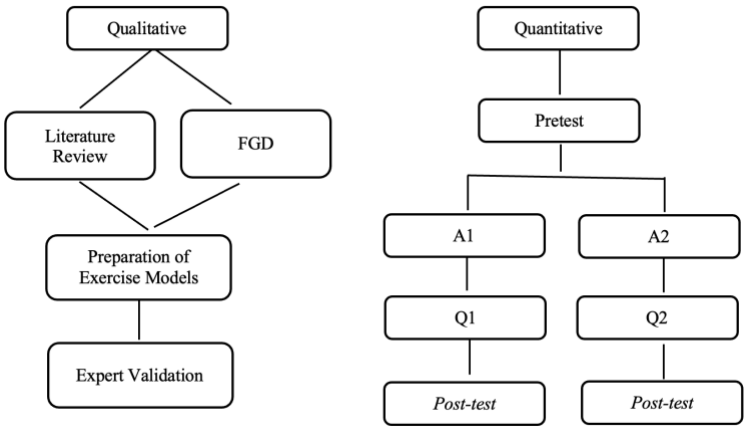

Figure 1. Research Design

VO_2 Max Training Model

Table 1. VO_2 Max Training Model

Exercise	Intensity Zone
Run	70% - 80% of HR. Max
jogging	70% - 80% of HR. Max
Bicycle	70% - 80% of HR. Max
Swimming	70% - 80% of HR. Max

Muscle Endurance Training Model

Table 2. Muscle Endurance Training Model

Arm Muscle Exercises	Intensity
Push-ups	70% - 80% of HR. Max
Deeps	70% - 80% of HR. Max
Mountain climbers	70% - 80% of HR. Max
Abdominal Muscle Exercises	**Intensity**
Sit-ups	70% - 80% of HR. Max
Crunch	70% - 80% of HR. Max
Leg Rises	70% - 80% of HR. Max
V-up	70% - 80% of HR. Max
Leg Muscle Exercises	**Intensity**
Squats	70% - 80% of HR. Max
Lunges	70% - 80% of HR. Max
Sumo Squats	70% - 80% of HR. Max
High Knees	70% - 80% of HR. Max
Squat Jumps	70% - 80% of HR. Max

The data collection technique in this case uses two tests, to find out vo2max with the Cooper test and a muscle endurance test with push-ups and sit-ups. The population of this research is vocational students with a sample of 24 people. The sampling technique uses a purposive sample with the criteria of final semester Indonesian Traditional Medicine Study Program Students who are willing to take part in the study.

Table 3. 12-Minute Run Test Norms

Age	Gender	Category				
		Very good	Good	Currently	Bad	Very bad
20-29	Man	>2800	2400-2800	2200-2400	1600-2200	<1600
	Woman	>2700	2200-2700	1800-2200	1500-1800	<1500

Source: Cooper KH (1968)

Table 4. Push Up Test Norms

Age	Gender	Category				
		Prime	Very well	Good	Enough	Bad
20-29	Man	>48	38-47	30-37	23-29	< 22
	Woman	>37	31-36	24-30	18-23	<17

Source : Brian Mackenzie (2005)

Table 5. Sit Up Test Norms

Age	Gender	Category				
		Very well	Good	Currently	Bad	Very bad
20-29	Man	52-59	42-49	34-40	25-32	17-23
	Woman	52-62	41-49	30-38	19-27	8-16

Source : Brian Mackenzie (2005)

Data analysis using t-test analysis. However, before the t-test was carried out, a normality test and data homogeneity test were first calculated, followed by a hypothesis test consisting of a Paired t-test and an independent t-test.

RESULTS AND DISCUSSION

Analysis of Research Results

After collecting the initial data and giving the treatment 8 times, the final data collection was carried out, the results can be seen in Table 6 below:

Table 6. Research Result Data

Descriptive Statistics		
Data	Means	Std. Deviation
Vo2 Max Group Pre-test	1840	317.97
Vo2 Max Group Post-test	2380.42	241.55
Abdominal Muscle Endurance Group Pre-test	24,42	6,882
Abdominal Muscle Endurance Group Post-test	31,42	7,609
Arm Muscle Endurance Group Pre-test	20,17	5,357
Post-test Arm Muscle Endurance Group	25,83	5,557

Based on the table 6, it is known that the VO2 Max data analysis shows a pretest mean of 1840 increasing in the posttest to 2380.42. In the muscle endurance group the mean pretest was 24.42 which increased to 31.42. In the arm endurance group, the mean pretest was 20.17, increasing in the posttest to 25.83.

For the standard deviation in the VO2 Max group, the pre-test was found to be 317.97 and the post-test was 241.55. In the abdominal muscle endurance group, the results of the pretest data analysis showed a standard deviation of 6.882 and increased to 7.609. In the arm muscle endurance group, pretest data analysis showed a standard deviation of 5.357, increasing to 5.557.

Table 7. Percentage of VO_2 Max Levels

Category	Mark	Pre-test		Post-test	
		Frequency	Percentage	Frequency	Percentage
Very good	>2800	0	0%	0	0%
Good	2400-2800	0	0%	6	50%
Currently	2200-2400	3	25%	4	33 %
Bad	1600-2200	7	58%	2	17%
Very bad	<1600	2	17%	0	0%

In table 7 it is known that the data for the VO2 Max group in the student pretest has a VO2 Max from the moderate category of 25%, from the bad category 58%, and from the very bad category 17%. There was an addition from the Very Bad category to Bad by 17%, the bad category to moderate by 33%, and from the moderate to good category by 50%.

Table 8. Percentage of Abdominal Muscle Endurance

Category	Mark	*Pre-test*		*Post-test*	
		Frequency	Percentage	Frequency	Percentage
Very good	52-62	0	0%	0	0%
Good	41-49	0	0%	3	25%
Currently	30-38	3	25%	6	50%
Bad	19-27	6	50%	3	25%
Very bad	8-16	3	25%	0	0%

From table 8 it is known that the data for the abdominal muscle endurance group showed that in the pre-test students had abdominal muscle endurance in the moderate category by 25%, the bad category by 50%, and the very bad category by 25%. There was an increase in the moderate category turning good by 25%, the bad category turning moderate by 50%, and the very bad category turning bad by 25%.

Table 9. Percentage of Arm Muscle Endurance

Category	Mark	*Pre-test*		*Post-test*	
		Frequency	Percentage	Frequency	Percentage
Prime	>37	0	0%	0	0%
Very well	31-36	0	0%	4	33%
Good	24-30	4	33%	4	33%
Enough	18-23	4	33%	4	34%
Bad	<17	4	34%	0	0%

In table 9 the data collected by the arm muscle endurance group shows that in the pre test the student's arm muscle endurance is in the bad category of 34%, the moderate category is 33%, and the good category is 33%. There was an increase in the moderate category by 34%, the good category by 33%, and the very good category by 33%.

Table 10. Data Normality Results

Ex.	Observation	Sig.	Ket.
VO_2Max	Pretest	0.115	Normal
	Postest	0.169	Normal
Abdominal Muscle	Pretest	0.719	Normal
Endurance	Posttest	0.217	Normal
Arm Muscle	Pretest	0.075	Normal
Endurance	Posttest	0.465	Normal

From table 10 it is known that the data for the VO_2 max group, abdominal muscle endurance, and arm muscle endurance > 0.05, the data are normally distributed.

Table 11. Paired Sample Test Results

Data retrieval	Sig.
Pre-test and Post-test VO2 Max	0.001
Pre-test and Post-test of abdominal muscle endurance	0.001
Pre-test and post-test of arm muscle endurance	0.001

From table 11 it is known that the data is 0.001 <0.05, then H0 is rejected, and Ha is accepted, meaning that there is an average difference between the pre-test and post-test for the Vo2 Max group, the abdominal muscle endurance group, and the arm muscle endurance group.

Physical fitness is a quality of life in the form of the ability to do daily work diligently and swiftly, without significant fatigue, and still have the energy to enjoy leisure time and unforeseen emergencies. Physical fitness is needed not only by athletes for better performance but also for non-athletes to maintain physical and mental health. There are many factors that affect a person's level of physical fitness, including physical activity, nutritional status, and daily activities (smokers, liquor)(Basterfield et al., 2022; Zhai et al., 2022). The benefits of exercise are to increase blood flow and oxygen to the brain, increase endorphins and norepinephrine levels which result in reduced stress and increased mood, increase growth factors which help create new nerve cells, besides that the physiological effects of sports activities can increase concentration(Berhimpong et al., 2020; Cristanto et al., 2021; Wicaksono, 2020). Based on the results of the description, physical exercise can indirectly improve physical fitness when the intensity and variety of movements are in accordance with the training objectives. Appropriate exercise intensity can train cardiovascular and muscle endurance gradually to make it stronger. In addition, the appropriate variation of movement can produce more optimal and efficient targets. Vo2max can increase by 16% because the recommended exercise models are aerobic sports such as running, jogging, cycling and swimming. All of the suggested sports have had many studies stating their benefits in increasing VO2 Max. Likewise with the recommended exercises for arm muscle endurance, namely push-ups, mountain climbers. For muscle endurance, it is recommended to do sit-ups, crunches, leg rises and v-ups.

Exercise is a type of physical activity that requires planning, is structured, and is carried out repeatedly with the intention of improving or maintaining one or more components of physical fitness.(Santoso, 2023; Tanzila & Hafiz, 2019). The goals and objectives of the training in general are

(a) to improve basic physical quality in general and overall, (b) to develop and increase specific physical potential, (c) to add and perfect techniques, (d) to develop and perfect strategies, tactics and patterns of play, (e) improve the quality and psychological abilities of athletes in competition(Mustofa et al., 2020). The exercises carried out should be in accordance with the body's ability to respond to the training response given, if the body is given a training load that is too light then the adaptation process will not occur. Conversely, if the body is given a training load that is too heavy and the body is unable to tolerate it, it can cause tissue damage. Because each exercise will cause a response from the organs of the body to the given training load(Hadi, 2020)

Weight training uses weights to increase a person's ability to exert force with the aim of increasing strength, muscle endurance, hypertrophy, athlete performance or a combination of these goals. Weight training when done properly, besides being able to improve overall physical health, can also increase strength, speed, power, and endurance. Weight training is divided into two, namely external and internal weight training, external weight training uses external weights such as free weights and gym machines, while internal weight training uses the body's own weight. The implementation of internal weight training has different characteristics compared to external weight training where external weight training is exercise that uses tools or weights,(Edy. DP Duhe, 2012; Ilham et al., 2020)

A person's fitness condition is one of the factors that determines his level of health. This is based on how a person's ability to be able to maintain the strength of the heart and lungs properly so that all body systems are able to absorb oxygen optimally. When oxygen can be absorbed by the body's system through the lungs, it is then forwarded by the heart and blood vessels to be distributed throughout the body. Therefore, the ability of the heart and lungs is one of the components that must be considered by someone to always be in good shape. The next component of fitness is related to muscle fitness which includes muscle endurance and muscle strength. Muscle endurance can be interpreted as the ability of muscles to contract both static and dynamic muscles (Kusnanik, 2011: 121).

Physical fitness depends on two basic components, namely organic fitness and dynamic fitness. Organic fitness is inherited genetically from both parents on a special lineage that makes it difficult to change it. Meanwhile, dynamic fitness is categorized into two fitness related to health and skills, which consists of Health, namely: cardiovascular and pulmonary endurance, muscle endurance, muscle strength, flexibility, and body composition. Skill components consisting of: speed, agility, balance, explosive power, and coordination. These two components are very important in overall physical fitness and it is their interaction that determines the level of physical fitness in our body(Fikri, 2018)Physical fitness can be achieved when a person does sports regularly and according to the exercise zone. According to the training model given, the training zone must reach 70%-80% of the maximum pulse. This is in line with the results of research which stated that exercise intensity was between 60% -90% adjusted for the purpose and type of exercise. Exercise is done for 20-60 minutes with a regular exercise frequency of 3-5 times per week(Nur Ayu, 2020)

The training model is divided into 2 categories that can be selected and adapted to the needs of vocational students, namely increasing VO2max with aerobic exercise and physical fitness with muscle endurance using the bodyweight training method(Larasati et al., 2021; Rustiawan & Rohendi, 2021). There are many variations of exercises that can be done to improve cardiovascular fitness with aerobic exercises such as running, cycling, swimming and weight training. With regular aerobic exercise, blood flow becomes smooth and speeds up the removal of waste products of metabolism so that recovery takes place quickly. Physiologically, aerobic exercise has many benefits for the heart, lungs, and muscle elasticity(Alba et al., 2019). At the time of exercise there is an increase in oxygen demand so that the heart volume becomes larger and the elasticity of the lungs to expand and contract increases. Blood vessels become elastic so that blood, which is the medium for carrying nutrients and oxygen needed by body tissues, can carry out its functions properly. With a good cardiovascular (cardiovascular) system, the body's biological needs at work will run smoothly(Oktavian & Nurudin, 2021)

*Body weight training*is a form of exercise using your own weight as a basis before doing exercises using external weights. Bodyweight training is an exercise that can be done anywhere so it is very efficient and we can always maintain our physical fitness without spending a lot of time(Ilham et al., 2020; Lin et al., 2021). The types of bodyweight training exercises are very varied and easy to do, for example with push ups, sit ups, back ups and jumping jacks we can already do muscle strength and lung endurance exercises. Bodyweight training is an effective exercise because all the components of the body's muscles contract the movements so that all the muscles of the body are trained. By adding the

time duration to limit all bodyweight training training items, we can also train our bodies cardiovascular. In doing bodyweight training exercises as an alternative to physical sports activities to improve fitness, of course, an exercise method is needed to make it more effective and get maximum results.(Suharjana, 2018).

CONCLUSION

The level of physical fitness of UNY vocational students increased after being given the simple fitness model treatment in all groups. In the VO_2max group the average increase was 16%, the abdominal and arm muscle endurance group was 15%. When practicing muscle endurance indirectly also increases VO_2max. The highest average increase was in the VO_2max group. This happens because most students prefer simple aerobic sports such as jogging, cycling and swimming. In addition to exercising, students are expected to be able to maintain eating patterns and resting patterns. Future research can find out how the relationship and effectiveness between the dependent variables or create new dependent variables.

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