

PHYSICAL ACTIVITY MODELS TO MAINTAIN PHYSICAL FITNESS BASED ON SIMPLE DEVICES DURING THE COVID-19 PANDEMIC FOR ADOLESCENTS

Hana Hafiza^{1*}, Hernawan¹, Asmawi¹, Ayu Purnama Wenly²

¹Pendidikan Olahraga, Pascasarjana Universitas Negeri Jakarta, Komplek Universitas Negeri Jakarta Gedung M. Hatta Jl. Rawamangun Muka, Jakarta Timur, Indonesia 13220

²Pendidikan Jasmani, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Pamulang, Kota Tangerang Selatan, Banten, Indonesia

Corresponding author. E-mail: [Hanahafiza291095@gmail.com](mailto:HanaHafiza291095@gmail.com)

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Abstract Keeping fit is very important during the COVID-19 pandemic. Study aims to maintain fitness during the COVID-19 pandemic based on simple tools. The research subjects were 16 teenagers who live in Kimia Farma II Complex, Duren Sawit. The research instrument used MSFT. In this study, the results of the pre-test for girls showed that the highest score was 29.5 ml/kg/minute, the lowest value was 22.8 ml/kg/minute, the mean was 25.8 ml/kg/minute. The results of the pre-test for boys showed that the highest score was 30.6 ml/kg/minute, the lowest value was 24.4 ml/kg/minute, the mean was 27. The results of post-test girls obtained the highest result 31.8 ml/kg/minute, the lowest value 23.6 ml/kg/minute, Mean 27.5. The results of the post-test for boys obtained the highest result of 33.6 ml/kg/minute, the lowest value of 27.2 ml/kg/minute, the mean 29.8. Paired Sample T-Test for girls and boys obtained the value of Sig. (2-tailed) of 0.000 < 0.05, it was concluded that there was an average difference between the pre-test and post-test of adolescent girls and boys. These findings indicate that the physical activity model for maintaining simple tool-based fitness during the COVID-19 pandemic for adolescents has a significant effect on physical fitness.

Keywords: physical activity; fitness; simple tools; covid-19 pandemic



INTRODUCTION

Physical fitness is very important in supporting daily activities. International and national organizations such as the World Health Organization and the United States Department of Health and Human Services Organization recommend that aerobic exercise and muscle strengthening in certain areas is an appropriate sport for children and adolescents (Roldão da Silva et al., 2020). Physical fitness is a factor that can be associated with improving brain health in humans (Esteban-Cornejo et al., 2021). If someone who has good physical fitness will guarantee that the individual when carrying out his duties will be more prepared and have a high spirit of life.

Humans who have overall freshness are humans who have a healthy and fresh outlook on life and future (Nuurin Hayyah, 2020). There are several terms used for the same purpose for physical fitness, namely physical ability. All of this is intended to translate the original term, namely physical fitness (Puji Ratno, 2016).

Cardiopulmonary endurance is defined as the ability of the lungs, heart, and blood vessels to deliver adequate amounts of oxygen into the cells to meet

the needs of physical activity for a long time (Warner W.K Hoeger & 2020., 2020). Someone who has good heart-lung endurance will not get tired quickly after doing a series of work. For example, when climbing stairs from the ground floor to the 3rd floor, you will not be overly breathless (Vol, No, Daya, Heart, & Muscle, 2014). Doing physical activity has good benefits for the body and mind, lack of physical activity can cause symptoms and the emergence of non-communicable or degenerative diseases, such as overweight, obesity, diabetes, cholesterol, hypertension, colon cancer, anxiety, depression, osteoporosis, and also the risk Heart disease (cardiovascular) is a disease that is the number 1 cause of death in the world (Hasibuan, 2010).

The 2018 Basic Health Research (Risikesdas) also shows that the proportion of the Indonesian population aged more than 10 years who lack physical activity has increased from 26.1% in 2013 to 33.5% in 2018. If a person's physical activity is not sufficient, it becomes one of the factors which can cause obesity and other diseases.

Physical activity is a lifestyle behavior that is usually applied from

childhood that may have an impact on adult behavior. Knowledge of the relationship between Health Related Physical Fitness and physical activity in children of various ages that can help in planning for a healthy life in the future (Pinto, Cruz, Pinho, & Marques, 2020).

The development and growth of children is very important to note. In adolescence there is a very significant change in body composition that affects physical activity and also the response to fitness training. In addition, there was also an increase in bone size and muscle mass (Alamsyah, Hestiningih, & Saraswati, 2017).

Education experts argue that adolescence is the age range of 13-18 years which is divided into two categories, namely: pre-puberty (ages 12-14 years) and puberty (ages 14-18 years). Pre-puberty is the time when true sexual maturity occurs, at the same time it occurs (Information & Individual, n.d.). Adolescents are a population group aged 10-19 years (Wulandari, 2014).

The problem that occurs at this time is the lack of physical activity at adolescence caused by addiction to playing gadgets which can lead to the risk of obesity. The prevalence of overweight in developed countries

ranges from 23.2% in Japan to 66.3% in the United States, while in developing countries it ranges from 13.4% in Indonesia to 72.5% in Saudi Arabia. The prevalence of obesity in developed countries ranges from 2.4% in South Korea to 32.2% in the United States, while in developing countries it ranges from 2.4% in Indonesia to 35.6% in Saudi Arabia. E., Hardinsyah., Afriansyah, 2009).

The prevalence of obese nutritional status in adolescents based on the 2013 Basic Health Research (RISKESDAS) was 10.8%, consisting of 8.3% overweight and 2.5% obese. The prevalence of obesity in adolescents aged 16-18 years is 7.3% consisting of 5.7% overweight and 1.6% obese (Nuraini & Murbawani, 2019).

Coronavirus 2019 (COVID-19) was first identified in December 2019, which can be described as a pneumonia disease that shows clinical symptoms such as fever, fatigue, mild cough, and also dyspnea. As of October 2020, 44 million people have been affected by this virus with more than 1,100,000 deaths (Kalron et al., 2021).

The COVID-19 pandemic has brought significant changes to human life. This change is felt almost all over

the world, including Indonesia (Wenly, Saddle, Wasan, Usman, & Chaniago, 2021).

Currently, the public is being urged to carry out physical and social restrictions (physical distancing) by self-quarantining, in order to minimize the spread of the Corona virus (COVID-19). So that all forms of activities outside the home, such as studying and working are carried out online.

A study shows that there is a lack of physical activity in adolescents worldwide, with data in Indonesia of 86.4% of adolescents experiencing a lack of physical movement. This may be even worse in this Covid-19 condition (Sánchez-Oliva et al., 2020).

If it is related to the condition of the Covid-19 pandemic, it is advisable to stay active and exercise even in a limited space so that the body's immunity is well maintained to prevent exposure to Covid-19. Physical activity can be done at home with a variety of moderate-intensity physical activities, such as walking at home, strength training, flexibility, cardiopulmonary endurance and a combination of these sports (Wong et al., 2020).

Physical activity must still be done while it is a pandemic (Wicaksono,

2020). To anticipate and reduce the number of COVID-19 sufferers in Indonesia, policies have been implemented to limit activities outside the home, teaching and learning activities are carried out at home, work at home, worship activities must be carried out at home, even the fitness center is temporarily closed due to the implementation of physical distancing.

Health workers highly recommend that every community, even though they are required to stay at home, can remain physically active during the physical distancing period and continue to maintain fitness (Nyenhuis, Greiwe, Zeiger, & Nanda, 2019).

Research on the maintenance of physical fitness has been mostly carried out before the COVID-19 pandemic which was carried out outdoors and using public facilities. Like the research conducted by (Sutawijaya, Sugiyanto, & Riyadi, 2020) about Maintaining Physical Fitness through physical activity at the Fitness Center.

Then the research conducted by (Esteban-Cornejo et al., 2021) on Physical fitness, hippocampal functional connectivity and academic performance in children with overweight/obesity. And research from (Carvalho & Gois, 2020)

regarding the Covid-19 pandemic and home based physical activity.

Likewise (Nurhadi & Fatahillah, 2020) regarding the Effect of the COVID-19 Pandemic on Physical Activity Levels. Research conducted by (Arimbi & Arfanda, 2020) on a simple tool exercise model for children with special needs during a pandemic.

As well as research conducted by (Choi, Lim, & Lee, 2021) regarding Body fat-related differences in gait parameters and physical fitness level in weight-matched male adults. Research conducted by (Hita, I putu agus dharma, 2020) regarding the survey of the interest of the Oerang Tjianzoerun running community in carrying out physical activities at home during the covid-19 pandemic. (Nyenhuis, Greiwe, Zeiger, Nanda, & Cooke, 2020) on Exercise and fitness in the age of social distancing during the covid-19 pandemic. (Callow, Arnold, Jordan, 2020) on The mental health benefits of Physical Activity in older adults surviving the covid 19 pandemic).

This previous study showed that there was no comprehensive research on the Physical Activity Model to maintain simple device-based fitness during the COVID-19 pandemic for adolescents.

Thus, this research has an update that is related to tools, using simple tools that are easy to find in the house.

METHODS

In accordance with the formulation of the problem that has been presented in the previous section, which are then used as the objectives of this research are:

1. Design and develop a simple tool-based physical activity model for teenagers.
2. Testing the effectiveness of a simple tool-based physical activity model for teenagers.

The more specific purpose of this research is to produce a physical activity model product that aims to maintain physical fitness during the COVID-19 pandemic for teenagers who are effective, interesting and fun, making it easier for parents, children and teachers to convey material and apply physical activity model exercises.

This research refers to the ADDIE model developed by Robert. Brach Maribe, in which there are 5 steps in it, namely Analysis, design, development, implementation, and evaluation (Wenly, Pelana, & Wasan, 2021). The subjects in this study were children at the high school level who

were domiciled in Kimia Farma II Complex, Duren Sawit District.

Characteristics of the subject in the age level of 13 to 15 years. The implementation phase was applied to 16 teenagers aged 13 to 15 years who live on Jalan Kimia Farma II, Duren Sawit District. During the trial, the researcher made notes about the shortcomings and obstacles that still occurred when the product was implemented. To find out how much effective the product is, a pretest is given before the physical activity training model is applied and a posttest afterwards using a multi-stage fitness test (bleep test) instrument.

RESULTS AND DISCUSSION

Results

Model Eligibility

In this study, it involved experts in conducting model feasibility tests, expert judgments were carried out to obtain input on the design of physical activity models using simple tools for adolescents. After validation, evaluation and revision of the model based on experts, the results obtained were as many as 20 valid physical activity models.

First Stage Expert Validation

Table 1.

Results of the Experts' Assessment on the Preliminary Draft model

	Pakar 1	Pakar 2	Pakar 3	%
Nama Model				
Side to Side	1	1	1	100
Get the Plate	1	1	1	100
Glass high knee	1	1	1	100
Up and Down chair	1	1	1	100
Line and jump	1	1	1	100
V-hold	1	0	1	66,67
Sit and Grip	1	1	1	100
In Clain Push	1	1	1	100
Rice dead lift	1	1	1	100
High push rices	1	1	1	100
V-Slide	0	0	1	33,33
Star Plank	1	1	1	100
Chair Crunch	1	1	1	100
Hot Trap	1	1	0	66,67
Twist Stone	1	1	1	100
Push Broom	1	1	1	100
Stand Up star	0	1	1	66,67
Butterfly and reach	1	1	1	100
Spider Hands up	1	0	0	33,33
Touched toe	1	1	0	66,67
In Clain Push	1	1	1	100
Rice dead lift	1	1	1	100
High push rices	1	1	1	100
Rata-Rata Presentase				86,67

Based on the results of the expert's assessment in the first stage in table 1. there are three experts who provide evaluations of physical activity model products to improve physical fitness based on simple tools. Based on the data presented above, the average percentage of expert validation is 86.67% with the "Good" category. This result states that the product is feasible and needs to make some revisions in accordance with the input given by the expert/expert judgment.

Second Stage Expert Validation

Table 2.
Results of the assessment of the experts in the second stage

Nama Model	Pakar 1	Pakar 2	Pakar 3	%
Side to Side	1	1	1	100
Get the Plate	1	1	1	100
Glass high knee Up and Down chair	1	1	1	100
Line and jump	1	1	1	100
V-hold	1	1	1	100
Sit and Grip	1	1	1	100
In Clain Push	1	1	1	100
Rice dead lift	1	1	1	100
High push rices	1	1	1	100
V-Slide	1	1	1	100
Star Plank	1	1	1	100
Chair Crunch	1	1	1	100
Hot Trap	1	1	0	66,67
Twist Stone	1	1	1	100
Push Broom	1	1	1	100
Stand Up star	1	1	1	100
Butterfly and reach	1	1	1	100
Spider				
Hands up	1	1	1	100
Touched toe	1	1	1	100
Rata-Rata Presentase				98,33

Based on the results of the futsal experts' assessment on the final model in table 2 above, there are three experts who evaluate the physical activity model product to improve physical fitness based on simple tools. Based on the data presented above, the average percentage of expert validation is 98.33% with the "Very Good" category. Thus the model

of physical activity to improve physical fitness based on simple tools is "appropriate" and can be implemented

Model Effectiveness

Pre-test data

Female Pre-test Data

From the results of measurements of physical fitness in adolescents aged 13 to 15 years with female gender, the highest results were 29.5 ml/kg/minute, the lowest value was 22.8 ml/kg/minute, the mean (average) was 25.8 and standard deviation 2.1. To be clear, the distribution of physical fitness pre-test data in adolescents aged 13 to 15 years with female gender can be seen in table 3:

Table 3.
Distribution of physical fitness pretest data in adolescents aged 13 to 15 years with female gender

Category	Interval Class	Frequency	Percentage
Excellent	>30	0	0%
Good	27-29,9	2	25%
Enough	24,8-26,9	3	38%
Low	22,6-24,7	3	38%
Very Low	<22,5	0	0%

Based on table 3. it can be seen that there are no (0%) adolescent girls who have physical fitness at intervals >30 ml/kg/min, as many as 2 people (25%) have physical fitness at intervals of 27-29.9 in the Good category , as

many as 3 people (38%) had physical fitness at intervals of 24.8-26.9 in the sufficient category, as many as 3 people (38%) had physical fitness at intervals of 22.6-24.7 in the low category and none (0%) adolescent girls who have physical fitness at intervals < 22.5 are in the very low category.

Male Pre-test Data

From the results of physical fitness measurements in adolescents aged 13 to 15 years with male sex, the highest results were 30.6 ml/kg/minute, the lowest value was 24.4 ml/kg/minute, Mean (average) 27, 2 and a standard deviation of 2.2. For clarity, the distribution of physical fitness pre-test data in adolescents aged 13 to 15 years with male sex can be seen in table 4:

Table 4.
Distribution of physical fitness pretest data in adolescents aged 13 to 15 years with male sex

Category	Interval Class	Fr	Percent
Excellent	>31	0	0%
Good	28,4-30,9	3	38%
Enough	26,2-28,3	2	25%
Low	24-26,1	3	38%
Very Low	<23,9	0	0%

Based on table 4, it can be seen that there are no (0%) teenage boys who have physical fitness at intervals >31 ml/kg/min, as many as 3 people (38%) have physical fitness at intervals of 28.4-

30.9 in the Good category, as many as 2 people (25%) have physical fitness at intervals of 26.2-28.3 in the moderate category, as many as 3 people (38%) have physical fitness at intervals of 24-26.1 in the low category and none (0%) teenage boys who have physical fitness at intervals < 23.9 in the very low category.

Post-test data

Female post-test

From the results of physical fitness measurements in adolescents aged 13 to 15 years with female gender, the highest results were 31.8 ml/kg/minute, the lowest value was 23.6 ml/kg/minute, the mean (average) was 27.5 and standard deviation 2.4. For clarity, the distribution of post-test data on physical fitness in adolescents aged 13 to 15 years with female gender can be seen in table 5:

Table 5.
Distribution of post-test data on physical fitness in adolescents aged 13 to 15 years with female gender

Category	Interval Class	Fr	Percent
Excellent	>31,3	1	13%
Good	28,8-31,2	1	13%
Enough	26,4-28,7	4	50%
Low	23,8-26,3	1	13%
Very Low	<23,7	1	13%

Based on table 5. it can be seen that as many as 1 person (13%) adolescent girls who have physical

fitness at intervals >31.3 ml/kg/min, 1 person (13%) has physical fitness at intervals of 28.8-31,2 in the Good category, as many as 4 people (50%) have physical fitness at intervals of 26.4-28.7 in the sufficient category, as many as 1 person (13%) have physical fitness at intervals of 23.8-26.3 in the category low and 1 person (13%) adolescent girls who have physical fitness at intervals < 23.7 in the very low category.

Male post-test data

From the results of measurements of physical fitness in adolescents aged 13 to 15 years with male sex, the highest result was 33.6 ml/kg/minute, the lowest value was 27.2 ml/kg/minute, Mean (average) 29, 8 and a standard deviation of 2.4. For clarity, the distribution of post-test data on physical fitness in adolescents aged 13 to 15 years with male gender can be seen in table 6:

Table 6.
Distribution of post-test data on physical fitness in adolescents aged 13 to 15 years with male sex

Category	Interval Class	Fr	Percent
Excellent	>33,6	1	13%
Good	31-33,5	1	13%
Enough	28,6-30,9	3	38%
Low	26,1-28,5	3	38%
Very Low	<26	0	0%

Based on table 6, it can be seen that as many as 1 person (13%) teenage boys who have physical fitness at intervals >33.6 ml/kg/min, 1 person (13%) has physical fitness at intervals of 31-33, 5 in the Good category, as many as 3 people (38%) have physical fitness at the interval of 28.6-30.9 in the moderate category, as many as 3 people (38%) have physical fitness at the interval of 26.1-28.5 in the low category and there is no (0%) teenage boys who have physical fitness at intervals <26 in the very low category.

Normality test

The normality test using Kolmogorov-Smirnov and Shapiro-Wilk through the SPSS.26 application obtained the following results:

Table 7.
Normality Test Results of Women's Physical Fitness

		Tests of Normality		
		Shapiro-Wilk		
Hasil	Kelas	Statistic	df	Sig.
	Pre-test	.985	8	.983
	Post-test	.949	8	.701

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Based on the data in table 7, the Kolmogorov-Smirnov statistic for the pre-test was 0.121 and the sig value. or p-value 0.200 > 0.05 and the results of

the Shapiro-Wilk statistic for the pre-test were 0.985 and sig. or p-value 0.983 > 0.05, so it can be concluded that the pre-test class data is normally distributed. The Kolmogorov-Smirnov statistic for the post-test was 0.227 and the sig. or p-value 0.200 > 0.05 and the results of the Shapiro-Wilk statistic for the post-test of 0.949 and the value of sig. or p-value 0.701 > 0.05, so it can be concluded that the post-test class data is normally distributed.

Table 8.
Normality Test Results of Male Physical Fitness

Tests of Normality				
		Shapiro-Wilk		
kelas	Statistic	df	Sig.	
Pre-test	.953	8	.737	
hasil Post-test	.891	8	.241	

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the data in table 8, the Kolmogorov-Smirnov statistic for the pre-test was 0.140 and the sig value. or p-value 0.200 > 0.05 and the results of the Shapiro-Wilk statistic for the pre-test were 0.953 and sig. or p-value 0.737 > 0.05, so it can be concluded that the pre-test class data is normally distributed. The Kolmogorov-Smirnov statistic for the post-test was 0.187 and the sig. or p-value 0.200 > 0.05 and the results of the Shapiro-Wilk statistic for the post-test of

0.891 and the value of sig. or p-value 0.241 > 0.05, so it can be concluded that the post-test class data is normally distributed.

Paired Sample T-Test

The paired Sample T-Test test through the SPSS.26 application obtained the following results:

Table 9.
Paired Sample T-Test results of women's physical fitness

Paired Samples Test						
	Paired Differences			t	Df	Sig. (2-tailed)
	Mean	Std.	Std. Error Mean			
Pre-test - post-test	1.6500	6887	2435	6.777	7	.000

Based on table 9 obtained the value of Sig. (2-tailed) of 0.000 < 0.05, it can be concluded that there is a difference in the average results of physical fitness pre-test with post-test female gender on Jl. Kimia Farma II, RT;014, Duren Sawit. Based on the output of pair 1, it can be concluded that there is an effect of a simple tool-based physical activity model to improve physical fitness in adolescent girls on Jl. Kimia Farma II, RT 014, Duren Sawit.

Table 10.
Paired Sample T-Test results of male physical fitness

Paired Samples Test						
	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std.	Std. Error Mean			

pre-test - post-test	2.5625	.6301	.2228	11.504	7	.000
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Based on table 10 obtained the value of Sig. (2-tailed) of 0.000 <0.05, it can be concluded that there is a difference in the average results of physical fitness pre-test with post-test male gender on Jl. Kimia Farma II, RT;014, Duren Sawit. Based on the output of pair 1, it can be concluded that there is an effect of a simple tool-based physical activity model to improve physical fitness in teenage boys on Jl. Kimia Farma II, RT 014, Duren Sawit.

Evaluation

The evaluation stage is the final stage in this ADDIE development model. This stage was carried out when the researchers carried out the implementation on adolescent children on Jl. Kimia Farma II, RT:014, Duren Sawit. Based on the implementation in the field that has been carried out, the results show that the product of a simple tool-based physical activity model is considered effective for improving physical fitness and meets the requirements to be applied to adolescents aged 13-15 years.

DISCUSSION

Development of a simple tool-based physical activity model for teenagers on Jl. Kimia Farma II, RT:014, Duren Sawit uses a research and development design developed by Robert Maribe Branch which is commonly called ADDIE (Analysis, Design, development, Implementation, Evaluation).

After the model has been revised, the model product is re-tested by experts/expert judgments. Then the model is ready to be implemented. Based on the results of the implementation of the model that has been carried out, it is found that the product of this simple tool-based physical activity model is considered effective and meets the requirements to be applied to adolescents aged 13-15 years on Jl. Kimia Farma II, RT:014, Duren Sawit.

During the needs analysis process, the preparation of the physical activity model, the feasibility test of the model, and the implementation of the model, there were several obstacles in completing the process of making a simple tool-based physical activity model. The following are inhibiting factors in the preparation and implementation of model products:

1. The COVID-19 pandemic has made it difficult for researchers to apply for research permits.
2. There are some children who do not regularly follow the exercise because of parental permission.
3. Some children have poor motor skills, so it is difficult to follow the Exercise Movement.

After implementing the product on teenagers aged 13-15 years on Jl. Kimia Farma II, RT:014, Duren Sawit, product model Back in evaluation. After reviewing this product, it has several advantages and disadvantages that need to be addressed. So we can say some of the advantages of this product, including:

1. Improving physical fitness in adolescent children.
2. Improve children's motor skills.
3. The tools used are very easy to find in the house
4. The model product can be used in other age groups by modifying the Exercise time.
5. This model can be viewed in the form of modules or books.

The weaknesses of this training model product are:

1. The explanations and regulations in this simple tool-based physical

activity model are far from perfect.

CONCLUSION

Based on the data obtained from the results of implementation and evaluation as well as discussion of research results, it can be concluded that:

1. This simple tool-based physical activity model can be developed and applied to improve physical fitness in adolescents aged 13-15 years.
2. This simple tool-based physical activity model is effectively and efficiently used to improve physical fitness in adolescents aged 13-15 years.

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