

Evaluation Of The Results Of Calisthenic Exercise And Walking On Changes In Body Composition In Adolescents

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ABSTRACTS : *This study aimed to explore the effect of physical activity on body composition and weight loss in healthy adolescents. Participants were divided into two groups: the Treatment group, who performed moderate physical activity at 75-85% intensity, and the control group, who performed physical activity at low intensity for 30 minutes of exercise per day. This study used descriptive tests to collect data and used statistical methods such as the Wilcoxon test to analyze the pre-test and post-test differences between the groups. The results showed a significant difference in body composition before and after the physical activity program. Body weight (BW), Body Mass Index (BMI), Body Fat Percentage (BFP), Fat Mass (FM), and Free Fat Mass (FFM) were significantly affected by the physical activity program. The increase in body weight was due to the adaptation of the muscular system and an effective hydrostatic hypertrophy mechanism. The study also found that the increase in muscle mass led to an increase in body weight and lean body mass index. This was due to the adaptation of the muscular system and the effect of the hydrostatic hypertrophy mechanism. This study concluded that physical activity can affect body metabolic rate (BMI) in adolescents, this study also found that regular physical activity can reduce the risk of obesity, such as type 2 diabetes and type 1 diabetes. These findings suggest that physical activity can be beneficial for maintaining a healthy body composition and weight.*

KEYWORD: **Body Composition, Body Mass Index, Calisthenics, Weight**

1. INTRODUCTION

Obesity is a body condition characterized by the accumulation of excess fat. Obesity can significantly affect health, including increasing the risk of hypertension or high blood pressure. This high blood pressure puts a strain on the heart and blood vessels, which often leads to a faster pulse and can damage arteries and other vital organs. Obesity is a global health problem, including among adolescents. According to the World Health Organization (WHO), adolescent obesity has become a global epidemic. The prevalence of obesity among young people in Indonesia is also very high, with the percentage of obese adolescents reaching 28.7% (BMI 25). Obesity can contribute to increased pulse rate and blood pressure in healthy adolescents. A high body mass index (BMI) at puberty has a significant association with the onset of hypertension. Adolescents with high BMI have a greater risk of developing hypertension (Nur Rahmah, 2019).

Teenagers today are more prone to becoming overweight, especially obesity. This is due to weight gain, which is one of the things that contribute to adolescent obesity. Teenagers' lack of understanding of the value of physical activity can also contribute to obesity. In general, they would rather be lazy than



active. A sedentary lifestyle can also have a negative impact on blood pressure, pulse rate and overall body fitness. Data shows that teens today are becoming less physically fit, as well as that this decline coincides with an increase in body mass index (BMI). Many studies have shown that overweight and obese adolescents have lower fitness levels compared to adolescents with normal nutritional status (Dumith, 2010).

According to existing research, BMI is often considered to be an indicator of obesity, measuring excess body weight rather than excess body fat (Archilona, 2016). Obesity is also associated with indicators such as body mass index (BMI), body weight (BW), and body fat percentage (FAT). Major risk factors for obesity also include obesity, high body fat percentage, and being overweight. BMI, which is calculated using dividing weight by height, is one approach to assessing obesity. A person is considered obese if their BMI is more than 27 kg/m². Engaging in physical activity can help in weight loss. By doing physical activity, it will burn calories in the body so that if the calorie intake in the body is hyperbolic and not balanced using physical activity, the body will experience obesity (Fitri et al., 2018).

The WHO defines physical activity to be skeletal muscle-generated body movements that require energy expenditure. This movement for any purpose, including recreation, travel, or work, is considered physical activity. Engaging in intense and moderate physical activity can improve one's health. It is recommended that adults between the ages of 18-64 engage in a minimum of 2.5 to 5 hours of moderate-intensity physical activity, and 1 to 2.5 hours of high-intensity aerobic physical activity, or a comparable mix of moderate-intensity activities, each week. However, many adolescents continue to fall below the established minimums.

Teenage obesity rates are increasing as a result of them being too lazy to exercise, and this feeling of lethargy is caused by boring physical activity exercises. But, teenagers' interest in physical activity can be interrupted by customized exercises in this way. Moreover, Calisthenics exercises can be customized using only one's own body weight. Calisthenics is a type of exercise that improves strength and fitness. Calisthenics exercises use various muscle groups and can be performed with or without specialized equipment. Calisthenics has benefits such as improving muscle strength, torque, coordination, balance, and endurance. Some popular calisthenics movements include push-ups, squats, and planks. Calisthenics can not only be done to build muscles, but also to lose weight. Calisthenics practitioners will get used to lifting their own weight, which can accelerate weight loss efforts.

This study was conducted to explore the effects of Calisthenics exercise on blood pressure and pulse rate in healthy adolescents. Participants will undergo a Calisthenics exercise program for 3 weeks with a week of exercise for 4 consecutive times, with measurements of pulse rate and blood pressure before and after exercise. So that the final results of this study can be distinguished between participants who do physical exercise control and physical exercise treatment. For participants who do physical exercise treatment will have a greater effect on Body Weight (BW) plus Height (TB), body fat presentation (Fat), water content (Water), and muscle mass (Muscle Mass) than participants who do physical exercise control.

2. METHODS

In this study, a total of 20 samples with an average age of 19-20 years were divided into 2 groups, namely, 10 children in the treatment group & 10 children in the control group. The treatment group was directed to do physical activity in the form of Calisthenic exercise with a moderate intensity of around 75-85%, while the control group was directed to do physical activity in the form of walking for 30 minutes with the same period of time for 3 weeks and carried out 4 times / week.

Body composition measurements using Tanita type BC-545N scales with the procedure when a person stands on this scale, a weak electric current will be sent through the body, and this tool will



measure how fast the electric current moves through the body tissues. Based on the results of this measurement, the tool will calculate a person's body composition so that the results of Tanita Body Composition are usually displayed in the form of numbers that represent body composition such as Body Weight, BMI, Metabolic Age, Fat Percentage, Visceral Fat, Bone Mass, Muscle Mass, Physical Rating, BMR, and Water Composition.

Descriptive data test in this study was used to determine the characteristics of sample data and results. Saphiro-Wilk test to test the normality of the data. Wilcoxon test was used to test the results of differences in pre-test and post-test in each group. The SPSS version 16 application was used in analyzing the data. Through this method, it can be seen whether during the running of Calisthenics exercises and walking for 30 minutes there are changes in the body composition of each group.

Table 1. Calisthenics Exercise Treatment and Control Groups

Calisthenics Exercise Treatment and Control Groups				
	Exercise	Duration	Set	Type of Measurement
Warm Up	Dynamic Stretching	40-50% Hr max	10 minutes	
Treatment Groups	Calf Raises	- 20 working time : 10 seconds rest (4 minutes/set)	4-5 (35 minutes)	Tabata Timer
	Burpees			
	Mountain Climbers			
	Planks			
	Push Up			
	Russian Twits			
	Squat			
Lunges				
Control Group	Walk	30 Minutes	1 set	Stopwatch
Cooling Down	Static Stretching	40-50% Hr max	10 minutes	

3. RESULT

Table 2. Profile Statistical Description of Sample

No	Body Composition Component Treatment	N	Mean ± St. Dev	Min ± Max	Sig	Body Composition Component Control	N	Mean ± St. Dev	Min ± Max	Sig
1.	Body Weight Pre	10	65.64 ± 9.88	49.20 ± 85.30	.898	Body Weight Pre	10	56.53 ± 10.23	46.60 ± 80.00	.082
2.	BMI Pre	10	22.42 ± 2.84	17.40 ± 26.60	.907	BMI Pre	10	21.48 ± 2.11	18.60 ± 25.20	.380
3.	Percentage Fat Pre	10	17.92 ± 7.14	7.00 ± 29.90	.567	Percentage Fat Pre	10	24.57 ± 7.22	12.70 ± 36.30	.888
4.	Water Pre	10	55.35 ± 5.53	48.90 ± 65.30	.187	Water Pre	10	49.01 ± 7.16	32.40 ± 58.80	.155
5.	Muscle Pre	10	50.65 ± 6.13	42.40 ± 63.70	.472	Muscle Pre	10	41.50 ± 10.48	31.80 ± 59.50	.041*
6.	Physical	10	5.30 ±	2.00 ±	.047*	Physical Rating	10	4.40 ±	2.00 ±	<.001*



	Rating Pre	0	1.57	8.00		Pre	0.97	5.00	
7.	Bone Mass	1	2.84 ±	2.40 ±		Bone Mass Pre	10	2.31 ±	1.80 ±
	Pre	0	0.29	3.50	.213			0.45	3.20
8.	BMR Pre	1	1569.00	1329.00		BMR Pre	10	1064.	
		0	± 184.19	±	.239			1309.70	00 ±
				1989.00				± 244.21	1850.00
9.	Metabolic Age	1	19.80 ±	18.00 ±		Metabolic Age	10	18.00	
	Pre	0	2.62	26.00	.004*	Pre		19.40 ±	±
								3.17	28.00
10.	Visceral Fat	1	5.20 ±	1.00 ±		Visceral Fat	10	3.55 ±	1.00 ±
	Pre	0	3.06	9.50	.447	Pre		2.20	8.50

Noted: The * sign indicates that the data is proportional because $p \leq 0.05$.

Table 3. Results of Pre and Post Difference Test in Each Group

No	Body Composition Components of Treatment Group	N	Sig	Control Group Body Composition	N	Sig
1.	Body Weight Pre	10	.169	Body Weight Pre	10	.005*
2.	BMI Pre	10	.645	BMI Pre	10	.005*
3.	Percentage Fat Pre	10	.005*	Percentage FAT Pre	10	.005*
4.	Water Composition Pre	10	.007*	Water Composition Pre	10	.005*
5.	Muscle Mass Pre	10	.092	Muscle Mass Pre	10	.726
6.	Physical Rating Pre	10	.102	Physical Rating Pre	10	.102
7.	Bone Mass Pre	10	.257	Bone Mass Pre	10	.655
8.	BMR Pre	10	.169	BMR Pre	10	.878
9.	Metabolic Age Pre	10	.041	Metabolic Age Pre	10	.109
10.	Visceral Fat Pre	10	.017*	Visceral Fat Pre	10	.011*

Noted: The * sign indicates that the data is normal because $p \leq 0.05$.

Table 4: Independent Sample Test

	Body Weight	BMI	FAT	Water	Physical Rating	Bone	BMR	Metabolic Age	Visceral Fat_
Mann—Whitney U	21.0	31.5	29.5	18.0	28.5	15.5	17.0	46.0	34.5
Wilcoxon W	76.0	86.5	84.5	73.0	83.5	70.5	72.0	101.0	89.5
Z	-2.193	-1.400	-1.550	-2.420	-1.743	-2.621	2.495	-.486	-1.2
Azypm. Sig (2-tailed)	.028	.161	.121	.016	.081	.009	.013	.627	0.2
Exact Sig.	.029 ^b	.165 ^b	.123 ^b	.015 ^b	.105 ^b	.007 ^b	.011 ^b	.796 ^b	0.2



[2*(1-tailed sig.)]

Noted: Based on the data table above, the results of the Independent Sample Test between the Treatment and Control groups are different.

4. DISCUSSION

In the paired samples test, there were relevant differences in post-test and pre-test body composition measurements such as Body Weight (BW), Body Mass Index (BMI), Body Fat Percentage (BFP), Fat Mass (FM), and Free Fat Mass (FFM). It was found that the improvement in the results of gymnastic exercises was the cause of the interaction in these five parameters. Research shows that gymnastic activity reduces body fat levels, according to the literature. In a high-intensity aerobic study, significant weight loss was found due to regular exercise (Ali Erdem Cigerci, Harun Genc, 2020). Rapid and severe weight loss, despite the limitations advised by doctors, can result in the loss of specific nutrients such as water, minerals, electrolytes, proteins and muscle tissue found in free fat tissue. This can be the cause of dehydration, fatigue, disruption of electrolyte balance and resistance.

It is well known that muscle-nervous system adaptations cause the initial increase in muscle strength that occurs during strength training, and that the mechanism of muscle hypertrophy is useful for subsequent strength growth. The amount, type and frequency of training can all affect a person's body weight (BW) and body mass index (BMI). In addition, these characteristics can change based on the type of strength training performed. In strength studies, body strength and BMI are often increased to induce muscle hypertrophy. Based on these results, it was anticipated that the experimental group taking part in the study as a whole saw a statistically significant increase in average lean body mass and body weight before and after the test. The reason for this is thought to be due to the type of training applied to the subjects participating in the study, the severity of the load, different physical, physiological characteristics and Body Fat Percentage (BFP) measurement methods (Ali Erdem Cigerci, Harun Genc, 2020).

The results of the test showed weight loss in walking activity although it was less relevant ($p \geq 0.05$). The recommended number of relevant steps is about 10,000 to 12,000. Walking done every day can reduce weight even though it is relevant. Future research is expected to focus on the intensity of walking (Nursanty, 2021). In accordance with the data above, walking activities for 30 minutes can have an impact on weight loss even though it does not decrease optimally.

Based on the data taken by this study using computerization with the Wilcoxon test on the impact of physical activity walking on reducing BMI in adolescents shows a p value of $0.000 < 0.005$, so H_a is accepted and H_o is rejected. So that this study shows that there is an impact on physical activity walking on reducing BMI in adolescents (Suryani, 2020). It can be interpreted that physical activity walking has an effect on reducing BMI in adolescents.

Walking helps the body burn fat. Regular walking has been shown to reduce body fat percentage. This is important because losing body fat lowers the chances of developing obesity-related diseases including type 2 diabetes and heart disease and helps a person lose weight. When a person's weight goes beyond the typical range because their body has accumulated too much fat, they are considered obese. Obesity can occur because there is an inequality between the energy from incoming food is greater than the energy consumed by the body (Sandjaja and Sudikno, 2014). Many dangerous conditions, including diabetes, heart disease, high blood pressure (hypertension) and others, can become more likely in obese people. Therefore, it is very important to treat obesity as soon as possible as treating obesity can help prevent disorders that pose great danger.



5. CONCLUSION

Relevant research leads to the conclusion that, in healthy adolescents, Calisthenics exercise affects pulse rate but has no discernible impact on blood pressure or body weight. Administering flush fluids is the most effective way to reduce the increase in pulse rate that occurs after physical activity, according to research measuring the effects of rehydration fluids on blood pressure, body weight and pulse rate in healthy adolescents. The increases in body weight and systolic and diastolic blood pressure that occurred after administration of three different types of rehydration fluid, however, were not significantly different.

Furthermore, studies using Calisthenics exercises revealed significant variations in pulse rate and blood pressure before and during moderate-intensity physical activity. Nevertheless, no study has explicitly examined how Calisthenics exercises affect body weight, pulse rate, and blood pressure in healthy adolescents. Living a healthy lifestyle that includes regular exercise and healthy weight control is highly recommended to maintain a healthy heart and lower the risk of health problems such as high blood pressure.

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