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Evaluation of Tabata Training Results on Changes in Body Composition of Overweight and Obese Adolescents

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ABSTRACTS

Purpose: Obesity in adolescents is currently experiencing a significant increase. Caused by an unbalanced lifestyle and lack of physical activity.
Materials and Methods: This study uses the Tabata method of physical exercise which aims to determine the impact of physical activity on body composition and weight loss in adolescents. This study used 30 samples of active college students who engaged in physical activity with moderate intensity, which is around 75-85%, for 30 minutes every day. This study used data collection methods with a descriptive approach and statistical analysis, such as the Wilcoxon test. The Wilcoxon test was used to see differences before and after doing physical activity Tabata exercise.
Result: The results showed a significant difference in body composition before and after doing a physical activity program with the Tabata method regularly carried out 4 times a week for 3 weeks, with a p value <0.05, then training using the Tabata method in this study can only reduce Body Weight (BW), Body Mass Index (BMI), and Body Fat Percentage (BFP).
Conclusion: The conclusion of this study shows that physical exercise with the Tabata method can reduce body weight (BW), Body Fat Percentage (BFP), and Body Mass Index (BMI) in adolescents aged 18-21 years. this study shows that Tabata exercise has benefits in controlling weight and reducing the risk of non-communicable diseases such as diabetes, ischemic heart disease, and cancer. In addition, Tabata training can also improve the well-being of adolescents by increasing physical fitness and increasing self-confidence in adolescents, Tabata training can be an effective strategy and improve the overall quality of life of adolescents.
Keywords: Physical activity; Body composition; Body mass index; Weight; Non-communicable diseases; Adolescents.

INTRODUCTION

The prevalence of overweight and obesity among adolescents, parents and seniors is very high. Based on data released by the Central Statistics Agency (BPS) in 2018, the prevalence of obesity in the population aged 18 years and over. This is most likely due to unhealthy eating patterns carried out by them such as, at this time many foods that contain high glucose and fructose such as boba, and soft drinks. Not only that, it turns out that according to the research "Aesculapius Medical Journal", one of the factors causing obesity is the lack of physical activity carried out (Ayu et al., 2023). According to WHO data, obesity rates worldwide have more than doubled since 1980. In

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2014, 1.9 billion adults over the age of 18 were overweight, (600 million) of whom were obese, with an average BMI of 24 kg/m2 for the world population (Organization, 2019).

According to the "National Institutes of Health" (Zatońska et al., 2021) obesity is associated with an increase in non-communicable diseases such as diabetes, hypertension, stroke and heart disease. This is in line with WHO data in 2006 that non-communicable diseases cause more deaths in Indonesia. Therefore, it is important to pay attention to the condition of your body. It is expected that, since exercise is an important part of the body's calorie-burning process, the body will become stronger and burn more fat, which means weight loss.

Diverse physical exercises play an important role in improving one's fitness, depending on individual preferences and conditions. According to WHO (2020) observing the level of cardiovascular endurance as a method to measure physical fitness, which is considered key in fitness assessment. Engagement in physical activity can prevent various diseases such as heart disease, type 2 diabetes, osteoporosis, cancer risk, obesity, and injuries. Physical activity can also reduce levels of depression, stress, anxiety, and improve self-confidence, energy levels, sleep quality, and concentration ability (Juniarto et al., 2022).

Physical activity is the ability to lose weight for someone who is obese. One of the physical activities that can help lose weight is tabata exercise. Tabata is a type of exercise that includes interval *training* and high intensity interval training (HIIT). this type of exercise is in great demand and occupies a top position in popularity because of its abundant benefits, even though it is done in a short time (Puji et al., 2019). Although Tabata has a number of health benefits, the most important thing to remember is not to push yourself if you feel unable to avoid injury or fatigue that can have a negative impact on the body. It is even better to do Tabata with the guidance of a professional instructor, so that the benefits can be optimized with a lower risk of injury (T Nareza, 2020).

The urgency of this study is that it needs to be conducted due to the high rate of obesity in Indonesia, which is accompanied by low levels of physical activity among the population. It is expected that by incorporating the Tabata exercise program in this study, there will be a reduction in body weight and obesity-related body components. The uniqueness of this study lies in the use of the Tabata Exercise method, which is known for its intensity and is performed over a short period of time, so it is expected to result in weight loss.

The aim of this study was to evaluate the impact of tabata training over a three-week period on the obesity-related weight loss process, the study was designed by taking into account several important factors. During the study period, weight, body mass index (BMI), and body composition data were measured at regular intervals. In addition, other physical activities outside of tabata training sessions were monitored, as well as the diet of the study participants. The aim was to understand the impact of tabata training in isolation and ensure that the changes that occurred were from the tabata training and not from other factors.

METHODS

***Study Participants*:** In this study, there were 30 samples with an average age of 18-21 years.

***Study Organization*:** All samples were directed to perform physical activity in the form of TABATA exercise with a moderate intensity of around 75-85%, for 30 minutes with the same period of time for 3 weeks and carried out 4 times / week. Body composition measurement using the Tanita type BC-545N scale involves a process where a person stands on the scale. The scale

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sends a weak electrical current through the body, and then measures the speed of the electrical current through the body's tissues. From these measurements, the device can calculate a person's body composition. The measurement data is usually displayed as numbers representing various aspects of body composition, such as body weight, body mass index (BMI), body fat percentage, water composition, muscle mass, physical assessment, bone mass, basal metabolic rate (BMR), metabolic age, and visceral fat

Statistical Analysis: Descriptive analysis of data in this study is intended to determine the characteristics and results of sample data. Data normality test was conducted using the Shapiro-Wilk Test. Wilcoxon test was used to evaluate the difference between pre-test and post-test in each group. The SPSS version 16 application was used to analyze the data. Through this approach, the study aimed to determine whether there were changes in the body composition of each sample during the implementation of the TABATA exercise.

Training Program:

Table 1. TABATA Exercise

	Exercise	Duration	Set	Measurement Type
Warm up	Dynamic Streching	40-50% Hr max	10 minutes	
Core Movement	High Knee Cross Knee To Elbow Butt Kick Lunges	- 20 working time: 10 seconds rest (4 minutes/set) -Rest 3 minutes/set	4 sets (30min)	Tabata Timer
Cooling	Static Streching	40-50% Hr max	10 minutes	

RESULT

Table 2. Descriptive Statistics *Profile of* the Sample

No.	Body Composition Components of Treatment Group	N	Mean ± SD	Min ± Max
1	Body Weight (Kg)	30	55.79 ± 10.65	36.30 ± 94.00
2	BMI	30	20.96 ± 3.17	16.00 ± 31.80
3	Fat Percentage	30	19.72 ± 7.99	9.10 ± 45.30
4	Water	30	54.68 ± 5.25	38.50 ± 63.60
5	Muscle	30	42.19 ± 8.09	24.40 ± 56.10
6	Physical Rating	30	5.26 ± 1.50	2.00 ± 8.00
7	Bone Mass	30	2.46 ± 0.44	1.50 ± 3.30
8	BMR	30	1349.50 ± 220.09	963.00 ± 1770.00
9	Metabolic Age	30	18.90 ± 2.94	18.00 ± 33.00
10	Visceral Fat	30	2.82 ± 2.17	1.00 ± 9.00

Table 3. Results of Pre and Post Body Composition Difference Test

No.	Body Composition	N	Sig
1	Pre and post body weight	30	<.001*
2	BMI pre and post	30	<.001*
3	Pre and post FAT percentage	30	<.001*
4	Water compotition	30	.011*
5	Muscle mass	30	.205
6	Physical rating	30	.414
7	Bone mass	30	.047
8	BMR	30	.009*
9	Metabolic age	30	.102
10	Visceral fat	30	1.00

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*sign indicates that the data is included in the data tested with the Wilcoxon test and includes normal data because $p \leq 0.05$

DISCUSSION

The results of this study are quite interesting, because the results of physical activity with the tabata method can affect body weight, body fat percentage and BMI in samples. According to research (Maftukhan et al., 2020), states that Tabata exercise can reduce body weight, body fat percentage and BMI. ccording to research by Domaradzki (2020) shows that Tabata training can reduce BMI and body fat in adolescents who are overweight (Bangkalan, 2022). In the moderate intensity tabata study, the results were significant weight loss due to regular exercise with the Tabata method.

The effect of physical exercise with the Tabata method on body weight, BMI and fat percentage can be proven from the results of this study, namely with an average pretest weight of 55.79 kg and posttest weight of 55.04 kg with a difference of 0.75 kg, with the results of sig < (0.05), average pretest BMI 20.96 and posttest BMI 20.15 with a difference of 0.81, with the results of sig < (0.05), average pretest fat percentage 19.72 and posttest fat percentage 17.97, with a difference of 1.75, and the results of sig < (0.05). (0.05), average pretest fat percentage 19.72 and posttest fat percentage 17.97, with a difference of 1.75, and the results of sig < (0.05), average Based on the Wilcoxom statistical test, the sig value is less than (0.05) indicating that physical activity with the Tabata method has an effect on weight loss. This is in accordance with research conducted (Maftukhan et al., 2020) physical activity with the Tabata method can have an effect on sample weight loss.

In this study, the researchers also used Tabata training with a moderate intensity of about 75-85%. This is different from the research conducted by (Herlan & Komarudin, 2020) which states that Tabata training must be done with high intensity. However, the selection of Tabata exercises with moderate intensity can also improve body composition and body weight and body mass index. (Samodra et al., 2022). And the selection of Tabata exercises with moderate intensity is highly recommended for people who have obesity. Because moderate intensity is considered quite safe (Taufikkurrachman et al., 2021). In addition, Tabata training is recommended not to be done too often, it is recommended to be done once or twice a week, or a maximum of three days a week (Suryakancana et al., 2020).

Based on the results of research and data analysis on Water Composition and BMR, the average pretest Water composition is 54.68 and posttest water composition is 55.17 with a difference of -0.49 and the results of a significant value < (0.05). Also obtained average pretest BMR 1349.50 and posttest BMR 1332.53 with a difference of 16.97 and the results of significant values < (0.05). In this tabata exercise study which was conducted 4x a week for 3 weeks, it showed that the decrease in Water Composition and BMR achieved satisfactory results. Based on the Wilcoxom statistical test shows sig < (0.05), it shows that the tabata exercise program affects the decrease in Water Composition and BMR.

After conducting this study, it explains that Tabata training for someone who wants to lose weight is highly recommended. Because it shows that there is a significant decrease between the percentage of body fat given moderate and heavy intensity exercise.(Hernawan et al., 2021). In addition, training using the Tabata method has interesting and easy movement components so that all samples can do it well. Although Tabata training has a high risk of injury. However, Tabata

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training has significant results for reducing obesity, we can minimize injury by warming up before training. (Herlan & Komarudin, 2020)

So, in this study it can be explained that, Tabata training 4 times a week carried out for 3 weeks with can significantly affect weight loss (BB), body mass index (BMI), and fat percentage. This can also be proven according to research (Maftukhan et al., 2020), Exercise (Ar Rafiq et al., 2021)using the Tabata method also affects water composition (Penggalih et al., 2016)and BMR(Yani et al., 2023). This study also showed that Tabata training was not significant enough to change muscle mass, physical rate, bone, metabolic age, and visceral vat.

CONCLUSION

Based on the research we have conducted, as well as from relevant data, it can be concluded that Tabata Exercise can have an effect on weight loss, body fat percent, and body mass intensity in students who have conducted this study. Tabata training has an effect on pulse rate, body weight and blood pressure in adolescents. In addition, Tabata research also shows that there are other differences in blood pressure and pulse rate before and after physical exercise using the moderate intensity Tabata method.

CONFLICT OF INTEREST

There are no conflicts of interest, the authors assure.

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