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THE EFFECTIVENESS OF PILATES TRAINING MODEL TOWARDS BMI AND MUSCLE MASS FOR OVERWEIGHT WOMEN

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Abstract.

Overweight women need proper physical activities to lose weight. One of physical activities which is suitable for overweight women is pilates. Pilates is a form of mind and body training which focuses on strength, body stability, flexibility, muscle control, body shape, and breathing. This study aims to determine the effectiveness of pilates training model towards BMI and muscle mass for overweight women. This is an experimental research with 12 respondents. The subjects' criterion is overweight women who are members of a gym in Yogyakarta. The statistical analysis uses paired sample t-test. Based on the paired sample t-test, the obtained t value of IMT = 8.249 and significance = 0.000<0.05. It can be stated that there is a significant effect of the Pilates model on the reduction of BMI. Meanwhile, the results of paired sample t-test of muscle mass is t=6.205 and significance = 0.000<0.05. It can be concluded that there is a significant effect of the Pilates training model. The results show that the Pilates training model affects the changes of BMI and muscle mass for overweight women.

Keywords: BMI. muscle mass, overweight, Pilates

INTRODUCTION

In the last decade, the number of overweightwomenat the age of 20 years and over increased by around 54.9%. . Overweight condition is seen in minority groups with a low economy and lack of education (1). In 2015,the percentage of Indonesian overweight women increased by 38% with a population of ± 257 million. The number of overweightwomen in Indonesia will also tend to increase in the coming year. This phenomenon needs to be overcome by developing an exercise model that is suitable for overweight women. The basic cause of obesity and overweight is an energy imbalance between the calories consumed and the calories expended (2). The factors that influence obesity and overweight are: environmental factors, social factors, lifestyle, food choices with high fat and carbohydrate, age, psychological factors, behavior, and alcohol consumption (3)

Body weight consists of muscle, bone, fat, and water weight. The body needs muscles to move. physical activity carried out on an ongoing basis will make muscle mass increase/hiperthropy. Increasing the burden of exercise that is done regularly will give effect to the muscles to work better. (4) Overweight is a deviation of body weight from standard weight or ideal weight. Thus, it can be concluded that overweight is a condition of body weight which exceeds the body's ideal weight.Overweight can be calculated through body fat percentage and body mass index. The indicator to find out the ideal body is to find a balance between height and weight. The BMI was developed by a Belgian statistician and anthropometry named AdolpheQuetelet. BMI was originally proposed by Quetelet more than 150 years ago and

was more closely related to body fat than anthropometry which is related to height and weight. BMI is said to be normal if it is in the range (18.5-24.9 kg/m²). BMI which is above 25 kg/m² is said to be overweight. While it is above 30 kg/m², it is said to be obesity.(5)

The questionnaires were distributed by researchers to gymnastic instructors in DIY where it is known that the number of gymnastic members who experience overweight problems is 93%. 66.6% of gymnastics members get training programs with high intensity. The subsequent data obtained shows that 73.37% of overweight women have difficulty doing physical activity. The latest data shows that 86.67% of overweight women can participate in physical activity with low intensity. From the data obtained from instructors in DIY, it is suggested that there is a need for proper training for overweight women in physical activity to lose weight. The training emphasises on a physical activity that is fun and easy to do for overweight women. Gymnastics is one way that is done to keep the body in order to remain ideal. One of them is doing physical activities such as Pilates.

Pilates exercises can be done by anyone. Pilates combines body and mind so that Pilates training requires concentration. Pilates movement is carried out slowly and principled in the exercise program.(6)Pilates is a sporting activity that requires balance, strength, flexibility, concentration, and stretching. Pilates is done slowly and right on target. Pilates which is done continuously will make the body become more ideal. Long activities, uses a large amount of energy so that metabolism which occurs in the body is also large. Physical exercise can reduce the fat percentage and increase muscle mass. Moreover, regular physical exercise will change muscle mass.

Pilates exercises can train muscles to increase muscle mass and strength. Based on the research that has been done, continuous Pilates training for 4 weeks or more can reduce the percentage of body fat for overweight women.(7). There is a research which conducted by Bavli&Koybasi with the application of Pilates training methods for 6 weeks with the subject of young women aged 18-25 years. It is concluded that Pilates exercises that are applied for 6 weeks can improve the flexibility, balance, and strength of the abdominal muscles. In addition, the Pilates exercise can increase the positive thing about self esteem and is a suitable method for young women (8)

Based on the problems that have been described above, it is known that overweight women are limited in physical activity because of the burden on their bodies. Physical activity suitable for overweight women is activity with low intensity and long duration. Overweight occurs due to a buildup of fat in the body, so burn fat requires proper physical activity. Research shows that Pilates can increase muscle strength, flexibility, balance, and endurance.

METHODS

Procedure

This study was an experimental study using pretest and posttest methods to determine the effectiveness of Pilates training models on BMI and changes in muscle mass in overweight women. This research was conducted at a gym in Yogyakarta, with research subjects who have overweight problems. The statistical analysis used a statistical paired t-test.

Participants

The population in this study were gymnastic members in Yogyakrata with overweight problems. The samples of this study are the members of the chakra gymnastics studio who have overweight problems with a total of 12 members. The obtained BMI data from those 12 people are: 2 people in the moderate category, 4 people in the overweight category, and 6 people in the obese category.

The effectiveness test of the Pilates exercise model was carried out at the CakraKulonProgo gym. The effectiveness test was carried out for 4 weeks to determine the effect of the Pilates exercise model on BMI and changes in muscle mass in overweight women.(7). Pretest data on BMI can be seen in table 1.

Table 1. Pretest BMI description

Category BMI	Norma/Interval Category	Frequency	
		f (n)	%
Underweight	3 – 16,4	0	0
Normal	16,5 – 22	0	0
Average	22,1 – 26	2	17
Overweight	26,1 – 30,4	4	33
Obese	30,5 –50	6	50
Sum		**12**	**100**

The table 1 explains about the description of BMI pretest data which is 17% (2 persons). The research subjects are included in the medium category. Meanwhile, 33% (4 persons) research subjects are included in the fat category, and 50% (6 person) subjects are obese. It can be concluded that the majority of research subjects are obesity.

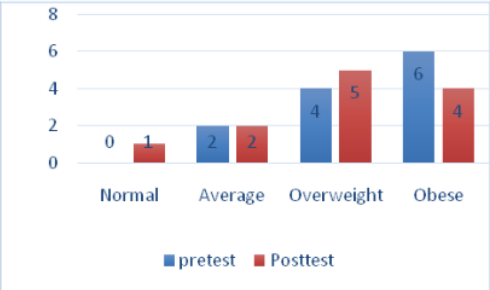
On the other hand, posttest data were obtained from the BMI measurement after the research subjects implemented the Pilates exercise model. Posttest data can be seen in table 2.

Table 2. Description of BMI Posttest

BMI Category	Interval Category	Frequency	
		f (n)	%
Underweight	3 – 16,4	0	0
Normal	16,5 – 22	1	8
Average	22,1 – 26	2	17
Overewight	26,1 – 30,4	5	42
Obese	30,5 –50	4	33
Sum		**12**	**100**

BMI posttest data of research subjects show that 8% (1 person) research subjects are in the normal category, 17% (2 persons) research subjects are in the moderate category, 42% (5 person) research subjects are included in overweight category, and 33% (4 persons) subjects are included in obesity. It can be concluded that after carrying out the Pilates exercise model, the research subjects experienced a decrease in the percentage of body fat that was converted to the BMI classification. For more details, pretest and posttest data histograms of research subjects are presented in Figure 1.

Figure 1. Researches Subject of BMI



In figure 1, it can be seen that after doing treatment for 4 months with the pilates training method, there is a change in the classification of BMI.The normal category changes from 0 to 1 person, average

category still has 2 people, overweight category also changes from 4 to 5 people, and obese category changes from 6 people to 4 people. In Figure 1, it is concluded that there are differences in the number of people in the BMI classification. To find out the effectiveness of the Pilates training model on BMI, the researcher used paired t-test calculations. The following table shows the results of the data analysis on the effectiveness of the pilates training model on BMI. The changes number from pretesttoposttest can be seen in table 3.

Table 3. BMI Effectiveness test results

Variabel		*Mean*	Variance	t-test
BMI	*Pretest*	25.533	0.542	8.249
	Posttest	24.991		

The table 3 explains thechanges of a body mass index which decresesby 0.542 points. It is taken from the results of the pretest which is 25,533 points and the posttest results which is 24,991 points. This means a significant decrease in the average body mass index in the research subjects. Based on the paired sample t-test results, the obtained t value = 8.249 and significance = 0.000 <0.05, it can be stated that there is a significant effect of the Pilates model on the decrease in BMI.

Every sport activity will require energy to move. The principle of regular exercise with the right exercise composition will burn body fat. Pilates is a series of movements that cover all parts of the body. Pilates is an exercise which is designed to stretch and strengthen the body with an emphasis on balance, harmony, proper breathing, balance of the body, and strength of the body. Pilates is done with the body's natural movements and it stimulates muscle involvement through breathing (9). To find out the effect of Pilates exercise model to change the muscle mass, the treatment was carried out for 4 weeks. Pretest data can be seen in table 4.

Table 4. Description of Pretest Muscle Mass

Category BMI	Muscle Mass Range (kg/m2)	result	Frequency	
			f (n)	%
Underweight	–		0	0
Normal	–		0	0
Average	39,6 – 41,0		2	17
Overweight	36,4 – 37,8		4	33
Obese	31,3 – 35,3		6	50
Sum			**12**	**100**

The table 4 explains that two subjects in the medium category have muscle mass between 39.6-41.0 kg/m2. Subjects in the category of overweight are 4 people who have muscle mass of 36.4 - 37.8 kg/m2. Subjects in the category of obesity are 6 people with a range of muscle mass between 31.3-35.3 kg/m2. After treatment for 4 weeks, the results are in Table 5.

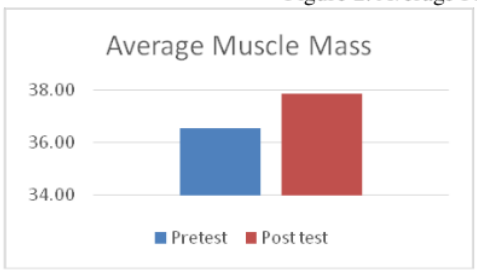
Table 5. Description of Posttest Muscle Mass

Category BMI	Muscle Mass Range (kg/m2) result	Frequency	
		f (n)	%
Underweight	–	0	0
Normal	41,7	1	8
Average	39,2 – 40,2	2	17
Overweight	37,6 – 39,4	5	42
Obese	32,4 – 37,3	4	33
Sum		**12**	**100**

Table 5 explains that one subject in normal category has a muscle mass of 41.7 kg/m2. Subjects in the medium category consist of 2 people who have muscle mass between 39.2-40.2 kg/m2. Subjects in the category of overweight are 5 people with muscle mass between 37.6-39.4 kg/m2. Subjects in the category of obesity are 4 people with a range of muscle mass between 32.4-37.3 kg/m2. It can be concluded that there are differences in the classification of BMI and changes in muscle mass.

For more details, pretest and posttest histogram data of research subjects are presented in Figure 2.

Figure 2. Average Pretest-Posttest Muscle Mass



In figure 2, it is explained that the average pretest muscle mass is 36.50 kg / m2 and the posttestis 37.885. To find out the effectiveness of the pilates exercise model for changes in muscle mass, the researcher used paired t-test.

Table 6. Effectiveness Test Results
Changes in muscle mass

Variable		Mean	Variance	t-test
Muscle mass	Pretest	36.550	1.308	6.205
	Posttest	***37.858***		

The table 6 explains that the muscle mass increases as many as 1,308 points; the pretest result is 36,550 points and the posttest result is 37,858 points. It means the study subjects' muscle mass increase. The paired sample t-test results obtain t value = 6.205 and significance = 0.000 <0.05, it can be stated that there is a significant effect of Pilates model on increasing muscle mass.

RESULT

The results of the research show that Pilates training model is effective towards BMI and changes in muscle mass for overweight women. Thechanges of a body mass index which decresesby 0.542 points. It is taken from the results of the pretest which is 25,533 points and the posttest results which is 24,991 points. This means a significant decrease in the average body mass index in the researchsubjects.An effective exercise model to reduce the percentage of fat can be classified on BMI. The pilates exercise model is also effective at changing muscle mass for overweight women.The muscle mass increases as many as 1,308 points; the pretest result is 36,550 points and the posttest result is 37,858 points. It means the study subjects increasing muscle mass.

DISCUSSION

This study demonstrated that in overweight women, exposure to Pilates exercise for 12 times, three times per weeks for 45 minutes. The methods of Pilates waseffectiveness of Pilates training model towards bmi and muscle mass for overweight women.The effectiveness test of the Pilates exercise model was carried out at the CakraKulonProgo gym. The effectiveness test was carried out for 4 weeks to determine the effect of the Pilates exercise model on BMI and changes in muscle mass in overweight women.

Thechanges of a body mass index which decresesby 0.542 points. It is taken from the results of the pretest which is 25,533 points and the posttest results which is 24,991 points. This means a significant decrease in the average body mass index in the research subjects.It can be concluded that after carrying out the Pilates exercise model, the research subjects experienced a decrease in the percentage of body fat that was converted to the BMI classification.

After doing treatment for 4 months with the pilates training method, there is a change in the classification of BMI.The normal category changes from 0 to 1 person, average category still has 2 people, overweight category also changes from 4 to 5 people, and obese category changes from 6 people to 4 people. In Figure 1, it is concluded that there are differences in the number of people in the BMI classification.

Every sport activity will require energy to move. The principle of regular exercise with the right exercise composition will burn body fat. Pilates is a series of movements that cover all parts of the body. Pilates is an exercise which is designed to stretch and strengthen the body with an emphasis on balance, harmony, proper breathing, balance of the body, and strength of the body. Pilates is done with the body's natural movements and it stimulates muscle involvement through breathing.

After treatment for 4 weeks, the results it can be concluded that there are differences in the classification of BMI and changes in muscle mass. it is explained that the average pretest muscle mass is 36.50 kg / m2 and the posttestis 37.885. the muscle mass increases as many as 1,308 points; the pretest result is 36,550 points and the posttest result is 37,858 points.

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REFERENCES

1. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: executive summary. Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults. Am J Clin Nutr. 2018;
2. Menezes alan. The Complete Guide to Joseph H. ilates Techniques of Physical Conditioning. Second Edi. Mummery A, editor. California: Hunter House; 2004.
3. Levesque RJR. Obesity and Overweight. In: Encyclopedia of Adolescence. 2018.
4. Mobley-Meulman M. Exercise participation during weight loss on a high protein - low carbohydrate diet plan in females aged 15-25 years. Dissertation Abstracts International: Section B: The Sciences and Engineering. 2014.

5. Anderson M. A Complete Guide to fitness, sports & nutrition. First Edit. Delhi: Global Media; 2007. 2–6 p.

6. Isacowitz & Kipplinger. Pilates anatomy. United States: Human Kinetics; 2011.

7. Jago R, Jonker ML, Missaghian M, Baranowski T. Effect of 4 weeks of Pilates on the body composition of young girls. Prev Med (Baltim). 2006;

8. Bavli O, Koybasi O. Investigation the effects of 6 weeks pilates exercises on biomotorical variables and self-esteem scores of young women. Turkish J Sport Exerc. 2016;18(1):127.

9. Geweniger V & Bohlander A. Verena Geweniger, Alexander Bohlander (auth.)-Pilates − A Teachers' Manual_ Exercises with Mats and Equipment for Prevention and Rehabilitation-Springer-Verlag Berlin Heidelberg (2014).pdf. Berlin: Springer; 2014.

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