

**Developing Pilates Training Model for Decreasing The Body Fat Ratio Among
Overweight Women****Ari Ghazali¹✉, Mansur², Neva Widanita³, Guntur⁴, Firmansyah Putra⁵, Syarieff
Fajaruddin⁶**Program Studi Ilmu Keolahragaan, Program Pascasarjana, Universitas Negeri Yogyakarta.
Jalan Colombo No. 1, Karangmalang, Yogyakarta, 55281, Indonesia¹²³⁴⁵⁶**Article History**Received 27 Desember 2018
Accepted 03 January 2019
Published February 2019**Keywords:**Pilates; Over-
Weight; Body Fat**Abstract**

The study aims at generating a sufficient alternative training model for decreasing the body fat ratio among overweight women. The study refers to the research and development model by Borg & Gall. When the study was conducted, a total of 10 respondents were involved in small-scale test, a total of 17 respondents were involved in big-scale test and a total of 12 respondents were involved in product effectiveness test. Then, in order to be selected as the subject in the study the respondents should be overweight women who became the members of gymnastics studio in the Province of Yogyakarta Special Region. Then, the instrument in the study was attained from the expert judgment and the suggestions by Pilates instructors through questionnaire distribution and body fat ratio measurement. In analysing the data, the descriptive analytical technique was employed and the paired sample t-test was employed specifically on the product effectiveness test. The results of the study are in the form of Pilates training model that has been validated by 2 experts. The Pilates training model itself consists of 14 warming-up movements, 22 main movements and 11 cooling-down movements. Furthermore, the results of the study show that the development of Pilates training model for decreasing the body fat ratio has already been valid in terms of burning the body fat. In addition, the results of the test show that the development of Pilates training model has belonged to the "Good" category.

How to Cite

Ari Ghazali et al. (2019). Developing Pilates Training Model for Decreasing The Body Fat Ratio Among Overweight Women. *Journal of Physical Education, Sport, Health and Recreation*. 8(1), 9-17.

© 2019 Universitas Negeri Semarang

✉ Correspondence address :
Address: Jalan Colombo No. 1, Yogyakarta 55281
E-mail: syarieff@uny.ac.id

INTRODUCTION

It has already been found that life style and life pattern are associated to the socio-economic improvement, which triggers the people to suffer from overweight. In relation to the statemet, developing countries such as Indonesia has quite significant figure of overweight. The data from WHO in 2005 shows that the figure of overweight in Indonesia is 12.00% for men and 28.00% for women. Then, the results of a survey that was conducted in 2015 confirm that the percentage of overweight people in Indonesia has been increasng namely 13.00% for men andf 38.00% for women with total number of population ±257 million people. These data show that within 10 years there has been an enormous increase in the number of overweight women within Indonesia.

Overweight people have difficulties in performing exercises with high intensity due to the body weight that they have; as a result, the movement flexibility of their body becomes decreasing. The exercises that they might perform are also limited due to the rapid exhaustion. The fundamental cause of obessity and overweight is the energy imbalance between the calorie that has been consumed and the calorie that has been burned. Another factor that might trigger the overweight among the people is the habit and the life pattern.

In the Province of Yogyakarta Special Region, there have been many gymnastics studios and health clinics that offer multiple physical exercises in order to overcome the overweight problems. In order to identify the physical exercises that hav e been frequently committed in both the studios and the clinics, the researcher has distributed 15 questionnaires to gymnastics instructors throughout the Province. The questi-onnaires have been distributed in order to gather the data from the field. Then, the data that have been gathered show that 93.30% instructors report that many members of their studios suffer from the overigh problem. Furthermore, 66.60% instructors report that the training programs that have been performed are of high-intensity aerobic exercise while 33.40% instructors report that the members of their studios perform other types of exercise. In addition, 73.37% instructors state that overweight women often have difficulties in performing physical exercise. Last but not the least, 86.67% instructors state that overweight women are able to perform physical exercise with slower movement such as Pilates.

The data that have been attained from the instructors throughout the Province of Yogyakarta-

ta Special Region show that there should be an appropriate training program for the overweight women for performing physical exercise in order to decrease the body weight. The emphasis on the overweight number is performed by creating a physical exercise that might be enjoyable and easy to perform for the overweight women. In response to the statement, gymnastics is one of the ways that might be pursued for keeping the body shape in its ideal posture. One of the gymnastics that might be suitable for keeping the ideal body shape is Pilates.

Pilates is a physical exercise that demands balance, strength, flexibility, concentration and stretching. Pilates should be performed slowly and accurately. Pilates that has been continuously performed will create the ideal shape of the body. During the long period of physical exercise, the use of energy will also be increasing; as a result, the metabolism within the body will also be increasing and thus there will be significant effect toward the efforts of burning the body fat (Budia-wan & Suharjana, 2016; Lestari, Fajaruddin, & Sacko, 2018).

Every physical exercise demands energy for keeping the movement of the body. Principally, regular training in combination with appropriate training portio will burn the body fat (Cakmakçi, 2012, p. 436). With regards to the statemet, Pilates is a sequence of movement that involves all body parts. Thus, Pilates can be defined as a training program that has been designed to stretch and strengthen the body with the emphasis on the balance, the harmony, the appropriate inhalation, the body balance and the body strength. Pilates is performed under the natural body movement and stimulates the muscle involvement through inhalation (Geweniger & Bohlander, 2014, p. 13).

Pilates training program employs the method of slow exercise in combination with 6 Pilates principles. Pilates exercise that has been performed continuously will increase the muscle flexibility, the muscle strength, the body health and the balance in body composition in overall (Page, 2011, pp. 1–2). In a study by Bergamin et al. (2015), Pilates training that has been performed by menopause women for three months with the duration of two meetings in a week is able to improve the muscle strength. The results of their study also show significant improvement. In the same time, the results of their study show that Pilates training has been effective for improving the muscle strength of upper body parts, lower body parts and abdomen.

On the contrary, Sevimli & Sanri (2017) conducted a study of Pilates training that in-

volved 40 female participants. Their study was conducted in order to identify the influence of cardio-pilates training program for four weeks toward female physical characteristics. A measurement was conducted by measurement the decreasing body fat ratio and the band of waist and hips. The results of their study then show that the cardio-pilates training program has significantly decreased the body fat ratio and the band of waist and hips. Another study on Pilates training was also conducted by Bavli & Koybasi (2016) by implementing the Pilates training method for six weeks with 18-25 years old women as the subjects. Their study was conducted in order to identify the improvement of biomotoric capacity and self-esteem among the young women. The results of their study then show that the Pilates training program that has been implemented for 6 weeks is able to improve the flexibility, the balance and the abdomen muscle strength. In addition, the results of their study also show that the Pilates training is able to improve the positive aspects in the self-esteem and is an appropriate training method for young women.

Based on the problems that have been elaborated, it is found that overweight women have limited capacity in performing physical exercise due to their bodyweight. In relation to the statement, the appropriate physical exercise that might help burning the body fat ratio is the slow exercise with long duration since overweight occurs because of the fat accumulation in the body. Therefore, there should be appropriate physical exercise that might burn the body fat. Then, the results of several studies show that Pilates might increase the muscle balance, flexibility, balance and endurance. Therefore, Pilates might be the sufficient physical exercise for the overweight women.

In order to identify whether Pilates is able to decrease the body fat ratio or not, a Pilates training model will be developed for the overweight women through the study. The development of the training model is expected to assist controlling the overweight figure for the Indonesian women. In other words, departing from the problems that have been elaborated in the previous paragraphs the researcher is interested to develop the movement of Pilates into a training model that will be appropriate for the overweight women.

METHODS

The study was a research and development effort; research and development strives to generate certain product that might be disseminated

(Sugiyono, 2015, p. 298). Then, according to Gall, Gall, & Borg (2007) in the research and development method within the study there were 10 stages that should be performed namely preliminary study, preliminary draft analysis and design, preliminary draft validation, small-scale experiment, first product revision, big-scale experiment, second product revision, product manufacture, product effectiveness test and dissemination-implementation.

The study was conducted in the gymnastics studios throughout the Province of Yogyakarta Special Region. Then, the small-scale test was conducted in Kamila Gymnastics Studio Bantul while the big-scale test was conducted in Nova Gymnastics Studio Kulon Progo. Next, the product effectiveness test was conducted in Cakra Gymnastics Studio Kulon Progo. The study took place from April until August 2016. Both the small-scale test and the big-scale test were conducted in one day in order to identify the results of the acceptability test for the product under development. On the contrary, the product effectiveness test was conducted for four weeks with three meetings in a week.

The subjects in the small-scale test were 10 members of Kamila Gymnastics Studio Bantul while the subjects in the big-scale test were 17 members of Nova Gymnastics Studio Kulon Progo. In addition, the subjects in the product effectiveness test were 12 members of Cakra Gymnastics Studio Kulon Progo.

Procedures

- Preliminary Study
- Preliminary Draft Analysis and Design
- Preliminary Draft Design Validation
- Small-Scale Test
- Product Revision
- Big-Scale Test
- Product Revision
- Final Product Manufacture
- Effectiveness Test

Data Gathering Technique and Instrument

The instrument that had been employed for measuring the variable in the study consisted of statements and calculation for decreasing body fat ratio. The statements were compiled into a questionnaire while the calculation for decreasing body fat ratio was designed in the effectiveness test. Questionnaire is a data gathering technique that takes the form of statements proposed to an individual or a group of individuals in order to elicit answers, responses or information that might be necessary for a researcher (Sugiyono, 2015, p. 199).

In the context of the study, the questionnaire contained a set of question with regards to the usefulness of the product. The usefulness of the product would be assessed by the instructor in each gymnastics studio. Then, the conduct of the effectiveness test employed the body fat scale monitor and also waist and hip ratio-measurement band. Body Mass Index, or BMI, in this occasion served as the measurement guidance between the body fat mass and the muscle mass. Therefore, the waist ratio became a measure that had been widely accepted for identifying the people with health risks that might be caused by overweight.

Table 1. Classification of Overweight and Obesity

Category	BMI (kg/m ²)
Underweight	18.4
Normal	18.5-24.9
Overweight	25.0-29.9
Low Obesity	30.0-34.9
Obesity	35.0-39.9
Extreme Obesity	≥ 40

(Bray & Ryan, 2006, p. 77)

Data Analysis Technique

The data analysis technique that had been employed was percentage and assessment for evaluating the feasibility, the quality and the acceptability of the product under development. The data analysis was divided into two stages. The first stage was the conversion from the quantitative data to the qualitative data. The conversion from the quantitative data to the qualitative data was intended to assess the product feasibility. In this stage, the data analysis was attained from the expert validation by assessing the exercise forms that had been developed throughg the use if descriptive qualitative analysis.

The assessment on the feasibility of the Pilates training form that had been developed was based on the following score category: very good (5), good (4), moderate (3), poor (2) and very poor (1). The data that had been attained through validation then were analysed by using the descriptive statistics and later were converted into the qualitative data in order to assist the researcher in drawing the conclusions toward the product under development. The formula for determining the score interval within the conversion from the quantitative data to the qualitative data were adopted from the study by (Widoyoko, 2013, p. 238) and the formula might be consulted in **Table 2**.

For analysing the data that had been gathered from the results of effectiveness test, the rese-

archer ran the SPSS 19 application. The analysis yielded quantitative data in the form of mean score from both the pre-test results and the post-test results. The pre-test and the post-test mean score technique was used in order to determine the gap during the conduct of product effectiveness test.

Table 2. Conversion from the Quantitative Data to the Qualitative Data

Quantitative Data	Interval	Qualitative Data
5	$X > X_i + 1.80 S_{bi}$	Very Good
4	$X_i + 0.06 S_{bi} < X < X_i + 1.80 S_{bi}$	Good
3	$X_i - 0.6 S_{bi} < X \leq X_i + 0.60 S_{bi}$	Moderate
2	$X_i - 1.8 S_{bi} < X < X_i - 0.6 S_{bi}$	Poor
1	$X \leq X_i - 1.8 S_{bi}$	Very Poor

Explanation:

X_i : Ideal Mean

S_{bi} : $\frac{1}{2}$ (maximum score – minimum score)

S_{bi} : Ideal Standard Deviation

X : $\frac{1}{6}$ (maximum score – minimum score)

X : Empirical score (mean score)

RESULTS AND DISCUSSION

Results of Preliminary Product Development

Preliminary Product Design

Pilates training program has been selected as the training model that will be developed in the study by referring to the results of needs analysis, which show that there should be a safe, fun and effective training model for decreasing the body fat. The development of Pilates training model is based on the review toward the supporting theories so that the training model under development will be effective and reliable.

As having been explained previously, theoretical review becomes the basis of designing the Pilates training model in the efforts of decreasing body fat among the overweight women. Then, the theories that have been reviewed are the ones that entail the problems of decreasing the body fat ratio and the aspects of associated to physical exercise, specifically Pilates exercise. These theories become the basis for the design of the training model. Then, the relevant theories that have been reviewed are Pilates-associated theories (definition, principles and models) overweight-associated theories (definitions, causes, risks and treatment).

The design of Pilates training model as the product in the study has been developed in accordance to the sequence of exercise and pro-

duct presentation. The Pilates training model consists of warming up by performing standing Pilates, main exercise in the form of mat exercise and cooling down in accordance to relaxation process. After the product has been designed in the form of training model, the researcher should consult and evaluate the product by involving the relevant experts in order to identify the level of validity and objectivity and also to identify the level of effectiveness within the test.

Results of Validation

The expert validation toward the training model under development is performed in order to identify how far the concept, the content and the layout of the product is able to meet the target in a valid manner. The technique that has been selected for identifying the level of the product validity is the Delphi technique. In addition, the researcher has also held a systematic discussion by distributing a number of questionnaires and asking for direct opinions from the experts. The results of the review from the expert evaluation consist of quantitative data in the form of Likert scale and qualitative data in the form of suggestion description.

Table 3. Summary from the Results of Expert Validation

Expert	Score	Maximum Score	%	Note
SH	33	40	82.50	Valid
FS	34	40	85.00	Valid
67	80	83,8	Valid	Total

The results in **Table 3** show that the design of Pilates training model for decreasing body fat ratio among overweight women belongs to the “Valid” category (80.00% - 100.00%) with the percentage 83.80% and thus the design of the model is feasible for the subsequent test namely the product effectiveness test. Then, the suggestions from the experts on the Pilates training model will be explained in the following paragraphs.

In overall, the results of expert evaluation show that the product is feasible for the subsequent test but the module should be revised first in accordance to the suggestions and the feedback that have been provided. Afterward, the model might be run in the small-scale test.

Then, the norm category for the assessment based on the score in the question is defined as follows: Maximum score (ideal) = 5 (maximum score item) x 10 (statement items) x 1 (number of subject) = 50; Minimum score = 1 1 (minimum score item) x 10 (statement items) x 1 (number of subject) = 10. The score in the questionnaire

later will serve as the assessment guidance. Furthermore, the assessment norm in the small-scale test might be consulted in **Table 4**.

Table 4. Category Norm of Small-Scale Test

Category Interval	Category
>4.21	Very Good
3.41 – 4.21	Good
2.61 – 3.40	Moderate
1.80 – 2.60	Poor
≥1.79	Very Poor

Results of Small-Scale Test

The small scale test is conducted in order to identify the preliminary response and the acceptability of the product under development. In order to identify the acceptability of the training model under development, namely the Pilates training model for decreasing body fat ratio among overweight women, the researcher has distributed a questionnaire to several respondents. Then, the product acceptability is identified from the instructor’s responses toward the training product by means of the questionnaire. The questionnaire itself contains several questions related to the aspects within the product under development. The response of the subjects toward the product under development will be the evaluation materials for revising the product.

The results of the assessment in the small-scale test are attained from the questionnaires that have been distributed. The data summary from the results of the small-scale test might be consulted in **Table 5**.

From the data summary in **Table 5**, it is apparent that the design of Pilates training model for decreasing body fat ratio among overweight women belongs to the “Good” category with the total mean score 3.90.

Results of Big-Scale Test

After the small-scale test has been completely conducted, the study will progress to the big-scale test. The number of subjects in the big-scale test is 17 members and 2 instructors. Then, the big-scale test is performed in order to identify the product acceptability within the wider scale. The data summary from the big-scale test might be consulted in **Table 6**.

From the data summary in **Table 6**, it is apparent that the design of Pilates training model for decreasing body fat ratio among overweight women belongs to the “Good” category with the total mean score 4.15.

Results of Product Effectiveness Test

After the small-scale test and the big-scale

Table 5. Data Summary from the Results of Small-Scale Test

Aspects	Assessment			
	Score	Total of Max. Score	Mean Score	Category
Movement is easy to understand.	3	5	3.00	Moderate
Movement is easy to perform.	4	5	4.00	Good
Movement is in accordance to the principles of training program for decreasing body weight.	4	5	4.00	Good
Movement is appropriate for overweight women.	5	5	5.00	Very Good
Movement is already various.	4	5	4.00	Good
Movement is performed in low intensity.	4	5	4.00	Good
Movement is interesting.	5	5	5.00	Very Good
Pilates movement might be a body-weight loss program.	3	5	3.00	Moderate
Movement is in already in accordance to the sequence of warming up, main exercise and cooling down.	4	5	4.00	Good
Movement is easy to memorize	3	5	3.00	Good
Total	39	50	3.90	Good

Table 6. Data Summary from the Results of Big-Scale Test

Aspects	Instructor		Assessment		
	1	2	Total Max. Score	Mean Score	Category
Movement is easy to understand.	4	4	10	4.00	Good
Movement is easy to perform.	4	5	10	4.50	Very Good
Movement is in accordance to the principles of training program for decreasing body weight.	4	4	10	4.00	Good
Movement is appropriate for overweight women.	4	5	10	4.50	Very Good
Movement is already various.	4	4	10	4.00	Good
Movement is performed in low intensity.	4	4	10	4.00	Good
Movement is interesting.	4	5	10	4.50	Very Good
Pilates movement might be a body-weight loss program.	4	4	10	4.00	Good
Movement is in already in accordance to the sequence of warming up, main exercise and cooling down.	4	4	10	4.00	Good
Movement is easy to memorize	4	4	10	4.00	Good
Total	40	43	100	4.15	Good

test have been completely conducted, the product effectiveness test will be performed. The objective of performing the product effectiveness test is to identify the effectiveness (or the feasibility) of Pilates training model for decreasing body fat ratio among the overweight women.

The product effectiveness test is conducted in Cakra Gymnastics Studio Kulon Progo for one month, starting from June 6th, 2016 until July 4th 2016 with the total number of subjects 12 people. The data for the product effectiveness test are attained from the results of body fat ratio measu-

rement before and after the treatment, namely the Pilates training model. The description on the pre-test and the post-test data with regards to body fat ratio of the subjects will be provided in the following sections.

Pre-Test Data

The pre-test data for the body fat ratio are attained from the results of waist and hip ratio measurement before the subjects perform the Pilates training treatment. The Pilates training that has been performed is in accordance to the training model from the manual that has been deve-

loped. The subjects for the product effectiveness test in the study consist of 12 people. The pre-test data might be consulted in **Table 7**.

Table 7. Description of Pre-Test Data for Body Fat Ratio

BFR Category	Norm/Cat- egory Interval	Frequency	
		f (n)	%
Skinny	3.00 – 12.40	0	0
Thin	12.50 – 16.40	0	0
Normal	16.50 – 22.00	0	0
Moderate	22.10 – 26.00	2	17
Fat	26.10 – 30.40	4	33
Obese	30.50 – 50.00	6	50
Total		12	100

The pre-test data from the body fat ratio of the subjects show that 17.00% subjects (2 people) belong to “Moderate” category, 33.00% subjects (4 people) belong to “Fat” category and 50.00% subjects (6 people) belong to “Obsessed” category. Therefore, it might be concluded that most of the subjects suffer from obesity or overweight.

Post-Test Data

The post-test data for the body fat ratio are attained from the results of waist and hip ratio measurement after the subjects perform the Pilates training treatment. The results of the post-test are inputted to the table and are calculated based on the changes that have been displayed after performing the Training pilates treatment for 13 meetings in a month. The pots-test data might be consulted in **Table 8**.

Table 8. Description of Post-Test Data for Body Fat Ratio

BFR Category	Norm/ Cat- egory Interval	Frequency	
		f (n)	%
Skinny	3.00 – 12.40	0	0
Thin	12.50 – 16.40	0	0
Normal	16.50 – 22.00	1	8
Moderate	22.10 – 26.00	2	17
Fat	26.10 – 30.40	5	42
Obese	30.50 – 50.00	4	33
Total		12	100

The post-test data from the body fat ratio of the subjects show that 8.00% subjects (1 people) belong to the “Normal” category, 17.00% subjects (2 people) belong to the “Moderate” category 42.00% subjects (5 people) belong to “Fat” category and 33.00% subjects (4 people) belong

to “Obsessed” category. As a result, it might be concluded that the subjects have experience body fat ratio decrease after performing the Pilates training model. A better description in the form of histogram for the pre-test data and the post-test data of the subjects might be concluded in **Figure 1**.

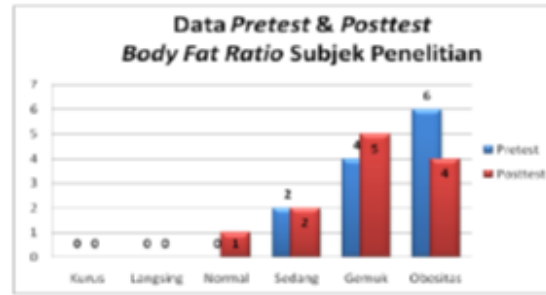


Figure 1. Histogram of Pre-Test and Post-Test Data

Effectiveness Test of Body Fat Ratio

The conduct of the effectiveness test has employed the paired t-test in order to identify the influence of Pilates training model (treatment) on the overweight status of the subjects. The results of the data analysis from the product effectiveness test might be consulted in **Table 9**.

Table 9. Results of t-test for Body Fat Ratio

Variabel	Mean	Change	t-test	Sig.
BFR	Pre-test			
	30.933			
		1,55	5,425	0,000
	Post-test			
	29.383			

From the results in Table 9, it is apparent that in general the body fat ratio decreases around 1.55 point from the pre-test result, namely 30.933 point, to the post-test result, namely 29.383 point. The decreasing point also implies the decreasing body fat ratio within the subjects. Then, the results of paired t-test show that the probability (p) is 0.000 and significant on 0.01 level. Since the t-count (5.425) is higher than the t-table (2.718), the Pilates training model is effective in decreasing the body fat ratio among the overweight women based on the fat content that has been burned.

The Effectiveness Test of Waist and Hip Ratio

Similarly, in this stage the effectiveness test of waist and hip ratio has employed the paired t-test in order to identify the influence of Pilates training model (treatment) that has been provided to the overweight status of the subjects. The results of data analysis from the product effectiveness test might be consulted in **Table 10**.

Table 10. Results of t-test for Waist and Hip Ratio

Variabel	Mean	Change	t-test	Sig.
Waist	Pre-test	87.670	8.676	0.000
	Post-test	84.750		
Hip	Pre-test	96.917	6.823	0.000

From the results in Table 10, it is apparent that in general the waist ratio has decreased around 2.92 point from the pre-test data, namely 87.67 point, to the post-test data, namely 84.75 point. The decreasing point thus implies waist ratio decrease within the subjects. Then, the results of paired t-test show that the probability (p) is 0.000 and significant at 0.01 level. Since the t-count (8.676) is higher than t-table (2.718) for waist ratio and since the t-count (6.823) is higher than the t-table (2.718) for hip ratio, the Pilates training model is effective in decreasing the waist and hip ratio.

Discussions

The results of the study that have been attained show the answer upon the hypotheses that have been previously developed. In other words, the Pilates training model that has been developed is appropriate for the overweight women. Such conclusion is confirmed by the results of the effectiveness test from the product development that has been pursued within one month with 13 meetings. The results of the study show that in general the body fat ratio has been decreasing around 1.5500 point, the waist ratio has been decreasing around 2.9170 point and the hip ratio has also been decreasing around 4.2917 point. These results are similar to a study by Sevimli & Sanri (2017) with 40 female participants who also perform the Pilates training model. Sevimli & Ramli conduct their study in order to identify the influence of 4-week cardio-pilates training program on the female physical characteristics. The female physical characteristics are measured through the decreasing body fat ratio and also waist and hip ratio. The results of their study show that the cardio-pilates training program has significantly decreased the body fat ratio and the waist and hip ratio. In addition, it is also found that the 4-week cardio-pilates training program has effectively decreased the body fat ratio and also the waist and hip ratio among the female physics. The impact of the training effect depends on the training program duration and intensity.

Another study under the similar topic is conducted by Hashemi, Taghian, & Kargar-Fard (2015). The objective of their study is to identify the effects of Pilates training program on cortisol and fat among obsessed women in 8 weeks. In conducting the study, they employ the quasi-experimental method with 20 obsessed women as the subjects. The Pilates training is performed 3 times in a week and each training sessions takes around 60 minutes; the complete duration of the training is 8 weeks. In the final training session, the content of fat, LDL, trigliceride and cortisol is measured. The results of their study show that the Pilates training is able to decrease the body weight, the BMI, the cholesterol and the LDL. In the same time, the results of their study show that the Pilates training is able to increase the content of cortisol.

The significant decrease in body fat ratio and also waist and hip ratio might be explained by the physical exercise in the Pilates training program. The Pilates training program that has been performed is able to improve the body fitness and metabolism since Pilates training is an isometric training regenerates the bone-muscle system. Then, the Pilates training program that has been continuously performed might increase the parameter of metabolism fitness namely glucose tolerance, insuline sensitivity and fat metabolism. The body starts to adapt and mobilize the fat that has been stored in the cell and burn the fat as part of energy intake. With these characteristics, the Pilates training program is able to train the muscle so that the mass and the strength of the muscle might be increased. Based on the results of several studies that have been previously conducted, it is clear that the Pilates training that has been performed continuously for 4 weeks or more might decrease the body fat ratio among the overweight women.

In the context of the present study, a difference between the decrease of body fat ratio and the decrease of waist and hip ratio has been found in the product effectiveness test. In general, the decrease of waist and hip ratio is higher than the decrease of body fat ratio. In specific, the average decrease of fat content in waist and hip ratio is more significant than the average decrease of fat content in body fat ratio. Such difference implies that the Pilates training model that has been developed is more effective in decreasing the fat ratio around waist and hip. The reason might be that the Pilates training model that has been developed focuses on the impact point between abdomen muscle and waist; as a result, the fat ratio decrease seems to be more significant on the

waist and hip area. This might be a new fact that has been found in the discussion: the Pilates training program that has been developed is more effective in decreasing the fat ratio around the waist and hip area for the overweight women.

CONCLUSION

Based on the results of the study and the development of the Pilates training model, it might be concluded that the Pilates training model that has been developed aims at creating a safe and accurate training model for the overweight women. Then, the complete results of the product under inquiry might be elaborated as follows. First, the data from the expert validation and the gymnastics practitioner validation show that the Pilates training model that has been developed is appropriate for the overweight women. Second, the Pilates training model should be performed under low intensity and sufficiently long duration in order to decrease the body fat ratio among the overweight women. Then, the Pilates training model that has been developed consists of warming up (14 movements), main exercise (22 movements) and colling down (11 movements) and the duration of the Pilates training model is 30 minutes. Third, the results of the data analysis from the product effectiveness test show that the Pilates training model that has been developed is effective in decreasing the body fat ratio among the overweight women.

In relation to the conclusions, the suggestions that might be provided in relation to the use of the Pilates training model that has been developed are as follows. First, the Pilates training model that has been developed for the overweight women might be used as an alternative training model in the effort of decreasing the body fat ratio. Second, the product that has been developed, namely the Pilates training program, should be equipped with exercise supporting facility in order that the Pilates training program will be more enjoyable. Third, the Pilates training program that has been developed might be applied to all age range with the overweight problem in adjustment to the characteristics and the conditions of the participants. Fourth, the Pilates movement might be performed in variation with other movements so that the boredom in performing the exercise might be avoided. Fifth, for the instructors it is expected that the instructors would like to be more active and more creative in implementing the Pilates movement to the members so that the Pilates training program will be more enjoyable.

REFERENCES

- Bavli, O., & Koybasi, O. (2016). Investigation the effects of 6 weeks pilates exercises on biomotorical variables and self-esteem scores of young women. *Turkish Journal of Sport and Exercise*, 18(1), 127–131.
- Bergamin, M., Gobbo, S., Bullo, V., Zanotto, T., Vendramin, B., Duregon, F., ... Neunhaeuserer, D. (2015). Effects of a Pilates exercise program on muscle strength, postural control and body composition: results from a pilot study in a group of post-menopausal women. *Age*, 37(6), 118.
- Bray, G. A., & Ryan, D. H. (2006). Evaluation of the overweight and obese patient. In *Overweight and the metabolic syndrome: From bench to bedside* (1st ed., pp. 169–186). Boston, MA: Springer US. https://doi.org/10.1007/978-0-387-32164-6_10
- Budiawan, D., & Suharjana, S. (2016). Pengaruh taekwondo high dan low impact terhadap ketahanan otot dan lemak tubuh ditinjau dari VO2Maks. *Jurnal Keolahragaan*, 4(1), 12. <https://doi.org/10.21831/jk.v4i1.8129>
- Cakmakçi, O. (2012). The effect of 10 week Pilates Mat exercise program on weight loss and body composition for overweight Turkish women. *World Applied Sciences Journal*, 19(3), 431.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction*. Boston: Pearson/Allyn & Bacon.
- Geweniger, V., & Bohlander, A. (2014). *Pilates-A teachers' manual: Exercises with mats and equipment for prevention and rehabilitation* (1st ed.). Berlin, Heidelberg: Springer Berlin Heidelberg. <https://doi.org/10.1007/978-3-642-38114-0>
- Hashemi, A., Taghian, F., & Kargar-Fard, M. (2015). Effect of pilates for 8 weeks on cortisol and lipid profile in obese women. *Quarterly of Horizon of Medical Sciences*, 20(4), 249–255. <https://doi.org/10.18869/acadpub.hms.20.4.249>
- Lestari, T., Fajaruddin, S., & Sacko, M. (2018). Developing booklet-type learning media for improving the students' learning results in computer application data processing course. *Proceeding International Seminar*, 0(0). Retrieved from <http://jurnal.ustjogja.ac.id/index.php/pep2019/article/view/3600>
- Page, P. (2011). *Pilates illustrated*. Human Kinetics.
- Sevimli, D., & Sanri, M. (2017). Effects of cardio-pilates exercise program on physical characteristics of females. *Universal Journal of Educational Research*, 5(4), 677–680.
- Sugiyono, S. (2015). *Metode penelitian dan pengembangan*. Bandung: Alfabeta.
- Widoyoko, S. E. P. (2013). *Evaluasi program pembelajaran: panduan praktis bagi pendidik dan calon pendidik*. Yogyakarta: Pustaka Pelajar. <https://doi.org/2013>