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The Impacts of Body Sculpting Exercise and Age on Body Fat and Waist Circumference

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Abstract

Large waist circumference and excessive body fat, more than that normal size, is a red flag that has contributed negatively for the human body. This study aims at recognizing and analyzing: the difference between the impacts of *Zumba toning* and *piloxing SSP* exercise on body fat, the difference between the impacts of *Zumba toning* and *piloxing SSP* exercise on waist circumference, the difference between the impacts of early and late adulthood on body fat, the difference between the impacts of early and late adulthood on waist circumference, the interaction between the types of body sculpting workout and age on body fat, the interaction between the types of body sculpting workout and age on waist circumference. Experiment method with 2x2 factorial design was used as the method of this study. The data were analyzed using the Analysis of Varian (ANOVA) on the significance level $\alpha = 0.05$. The independent variable is *Zumba toning* and *piloxing SSP*. An early and late adulthood become the attribute variable, while body fat and waist circumference become the dependent variable. The result of this study is there is no difference in impact between *Zumba toning* and *piloxing SSP* exercise on body fat with the significance value is $0.977 > 0.05$, there is a difference in impact between *Zumba toning* and *piloxing SSP* exercise on waist circumference with the significance value is $0.028 < 0.05$, there is a difference in impact between early and late adulthood on body fat, with the significance value $0.034 < 0.05$, there is no difference in impact between early and late adulthood on waist circumference, with the significance value, is $0.360 > 0.05$, there is an interaction between the types of body sculpting workout and age on body fat, with the significance value is $0.561 > 0.05$, (6) there is an interaction between the types of body sculpting workout and age on waist circumference, with the significance value is $0.001 < 0.05$.

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INTRODUCTION

The phenomenon of excessive fat in a human body had been noticed since the Caliph Period. Even under Umar Bin Khatab Caliphate, he forbade Muhammad's followers, as also His people, for having a potbelly. In an instance, Umar said "O' People, beware of eating too much, for it makes you lazy in prayer, is bad for your body and causes sickness. Allah dislikes the obese man. Rather you should be moderate in your eating, for that is closer to righteousness and farther removed from extravagance, and makes ones stronger to worship Allah." His statement depicts a potbelly, in which a human body condition is associated with large waist circumference and excessive body fat accumulated in the belly, or what we so-called central obesity. It has a bad impact on the human body, especially damaging the organs and causing many diseases. This notion is strengthened by the recent study postulating that the excessive body fat level has made a detrimental impact. The excess of body fat possible happens because of the unbalance energy in the body; that is, the energy intake is greater than the energy expenditure in a long period (Astrup, and Tremblay, 2009). 3.2 million deaths worldwide is due to disease caused by obesity and 62% amongst are women (World Health Organization, 1998). Indonesian Society for the Study of Obesity (ISSO/HISOBI) in 2004 found that the prevalence of general obesity is 11.02% for women and 9.16% for men.

Moreover, it is also noticed the prevalence of central obesity on men is 41.2% and 53.3% on women. The sufferers of central obesity have a higher risk to experience metabolic syndrome, which is one of the factors of degenerative disease (Novitasary, 2013). Those studies above show that women are more easily suffered from obesity, especially central obesity related to the accumulation of excessive fat in the abdomen area, so it makes the waist circumference is bigger than normal size.

Waist Circumference (WC) is an anthropometric measurement that can be used to assess the central obesity, the criterion for the Asia Pacific is ≥ 90 cm for male, and ≥ 80 cm for female. Waist circumference is proven to detect central obesity and metabolic syndrome with high accuracy compared to Body Mass Index (BMI) and pelvic circumference (Lean, Han, and Morrison, 1995). Nutrition and lifestyle counseling have influenced the waist circumference and BMI in which made a positive impact on the improvement of health status (Pusthika, Tjahjono, and Nuggetsiana, 2011). In addition to lifestyle, the physiological function has also impacted on obesity. The elasticity of the lungs will not be changed in 7-39 years old, yet there is a tendency to degenerate after 25 years old, and this degeneration becomes more obvious after 30 years old, thus the breathing strength will be weaker, then, as a result, the air volume during respiration is lesser (Ardyanto, and Atmaja, 2007). According to him, the decrease of the respiratory strength will retard the metabolism process of fat changing into energy. Starting to reach late adulthood, a fat accumulation process becomes easier if balancing physical activity and controlled dietary habit are absent.

WHO (World Health Organization) has promoted a 'move for health' campaign to raise the society's awareness about the importance to move to stay healthy. The physical activities suggested are walking, physical fitness program in the school, walking in exchange for the transportation, health care, urban design, sport for all, sports community, and public health education. These activities are considered effective to prevent the detrimental impacts of the lack of physical activities (World Health Organization, 2016). The government must be at full tilt in developing the policy related to improving the public interest in doing exercise and creating a good and comprehensive sports development for the community. Some policies in sports are the use of facilities and infrastructure and the open spaces as a free recreational place for sporting the society and socializing the sports (Riyoko, Soegiyanto, and Sulaiman, 2014). The disruptions confronted as the older of individuals can be minimized by performing a healthy lifestyle, one of those is by having exercise.

Irianto (2004) physical activities or exercises are open media that can be carried out by common people based on personal ability and needs. In doing the physical exercise, it is of paramount importance to pay attention to the training quality, such as the goals, the model options, the facilities, and the essential one is the dosage of training that is illustrated in the concept of FIT (Frequency, Intensity, and Time). Fitness training is defined as a systematic process of movement to improve or to maintain the quality of body function, including the quality of heart-lung endurance, the muscles' strength and endurance, flexibility, and body composition. The suggested movement or physical activities to keep physical fitness is at least three times a week, with 60-90 minutes of medium intensity. These measured physical activities can help in maintaining physical fitness and distributing energy and fat burning. Thus the obesity is possible to prevent (Irianto, 2004).

There is no significant relationship between mild to moderate physical activity and obesity in 20-35 years-old women of childbearing age (Novitasary, 2013). Moderate-aerobic exercise will decrease the body fat optimally compared to high-aerobic exercise because the source of energy used is different. Moderate intensity uses carbohydrate and fat in balance while high intensity uses carbohydrate dominantly thus makes enzymes for lipid oxidation is less stimulated and body fat burning will not be optimum (Priyonoadi, and Sukamti, 2001; Nurhadi, 2012).

According to Menke G Frank, gymnastics consists of broad and thorough movements of exercises that can build and form muscles (*body sculpting*) such as the wrist, back, and arms (Restianti, 2010). Etty Budi (*Head Program of Reebok University Indonesia*) in the workshop of Core Pilates asserted that as time goes by, modern humans do not have much time to exercises so as they prefer choosing exercises that are short, fun, easy, cheap and have many benefits. Body sculpting is a fitness program combining cardio element and body shaping at once. There are some exercises of body sculpting in society: *Pilates, strong by Zumba, Zumba toning, piloxing, kegel, body pump, cardio sculpt, and barre.*

Piloxing SSP (Sleek, Sexy, Powerful) is a medium to a high-intensity fitness program. What makes it is interesting is that it combines the movement of Pilates, boxing, and dancing in the high interval. It is an effective program to balance the modern people's lifestyle. The primary principle of this exercise is to maximize cardiovascular performance, body strength, speed, agility, and flexibility (Piloxing Academy, 2013).

Zumba toning is an advanced development of Zumba fitness that maximizing the combination of cardio and dynamic resistive fitness movement using toning stick to maximize the muscle work and body shaping (Zumba LCC, 2013).

Those afore explanations are the research framework used by the researcher, that is, two types of workout of body shaping or body sculpting; *Zumba toning* and *piloxing SSP* to reduce the fat level and waist circumference in early and late adulthood women.

METHODS

This study used a quasi-experimental method with a 2x2 factorial research design. The independent variable of this study is body sculpting exercise consisting of *Zumba toning* and *piloxing SSP*. The attribute variable in this study is the age consisting of early and late adulthoods. The dependent variables in this study are body fat and waist circumference. The purposive sampling technique was used as the sampling technique, and it was obtained a sample of 24 people from a total population of 31 people. The treatment was carried out 12 times in a month with the frequency of exercise 3 times a week, with the duration of each exercise is 60-75 minutes, and the intensity of 60-75%. The data analysis techniques used was a two-way ANOVA test with SPSS 20 and a significance level of 5%.

The prerequisite test carried out in this study is the normality test and homogeneity test. The normality test was used as a prerequisite test in the parametric test, and the Kolmogorov-

Smirnov test was used in this study. This test is used to check whether the data come from the population with normal distribution at the significance level of $\alpha > 0.05$.

The homogeneity test in this study is the *Levene test* using SPSS 20. The *Levene test* is used to find out whether the data have the same (homogeneous) or different (not homogeneous) variance at the significance level of $\alpha > 0.05$.

The hypothesis test used a 2-way ANOVA test. The alternative hypotheses are approved if the ANOVA test has a significance value lower than α (sig < 0.05). If the count-significance value is higher than α (sig > 0.05), the alternative hypothesis is not approved (Candiasa, 2010).

RESULTS AND DISCUSSION

The research process, the comparison of pre-test, and post-test data are obtained to answer the hypotheses. Based on the result of pre-test and post-test, it shows that the body sculpting exercises 12 times in a month with a frequency of 3 times a week, each session is 60-75 minutes with an intensity of 60-75% can decrease the body fat level and waist circumference. Then, the data obtained is subject to prerequisite testing.

The normality test uses Kolmogorov-Smirnov at a significance level of 5% (a = 0.05) The results of the prerequisite test in table 1.

Table 1. One-Sample Kolmogorov-Smirnov Test

		Body fat (pre-test)	Body fat (post-test)	Waist circumference	Waist circumference
N		24	24	24	24
Normal paramater[a,b]	Mean	33.687	32.600	83.63	78.75
	Std. deviation	5.7669	5.5801	7.739	8.945
Most extreme differences	Absolute	0.145	0.138	0.139	0.139
	Positive	0.120	0.138	0.139	0.073
	Negative	-0.145	-0.118	-0.131	-1.139
Kolmogorov-smirnov		0.712	0.675	0.679	0.680
Asymp. sig. (2-tailed)		0.690	0.753	0.746	0.743

[a]Test distribution is Normal
[b]Calculated from data

Based on the One-Sample Kolmogorov-Smirnov Test table above, it can be seen that $Sig.$ produced for body fat variables (pre-test), body fat (post-test), waist circumference (pre-test), and waist circumference (post-test) are 0.690, 0.753, 0.746, and 0.743 respectively. It shows that the value of sig > 0.05 or sig > α. Thus, it can be deduced that the data used come from normal data. The homogeneity test uses Levene's test at a significance level of 5% (a = 0.05). The results of the prerequisite test are mentioned in table 2.

Based on the output of Levene's Test of Equality of Error Variances, it is noticed that significance produced for body fat variable is significance = 0.496 and waist circumference variable significance = 0.329. It demonstrates that the value of sig > 0.05 or the value of sig > α. Thus, it can be inferred that the data used has the same variance or it is homogeneous so that the Two-Way ANOVA assumption is fulfilled.

Table 2. Levene's Test of Body Fat and Waist Circumference

	F	df_1	df_2	Sig.
Body fat	2.019	3	20	0.496
Waist circumference	1.218	3	20	0.329

The hypothesis test results are accepted if the significance value is < α and the information of $F_{value} > F_{table.}$ The value of $F_{table.}$ in this study is 3.94. The results of the pre-requisite test in table 3.

The first hypothesis, states that there is no difference in the impact of *Zumba toning* and *piloxing SSP* on body fat, with the information on the value of $F_{value} = 0.001 > F_{table} = 3.94$ and the significance value of 0.977 > 0.05. These results are in the same vein with the study postulating that eight weeks of diet and exercise interventions can decrease the body mass index, increase the physical fitness, but there is no significant effect on body fat (Anam, Mexitalia, Widjanarko, Pramono, Susanto, and Subagio, 2010). There is no relationship between dietary intake of both

carbohydrates and fats on body composition (Atkin, and Davies, 2000). There is a decrease in body fat of 3% with dietary interventions for 20 weeks (Collins, Warren, Neve, McCoy, and Stokes, 2007).

Table 3. The Result of Data Hypothesis Test Based on Body Fat

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	364.650[a]	3	121.550	6.916	0.002
Intercept	25,506.240	1	25,506.240	1,451.238	0.000
BS	0.015	1	0.015	0.001	0.977
Age	91.26	1	91.260	5.192	0.034
BS * Age	273.375	1	273.375	0.350	0.561
Error	351.510	20	17.575		
Total	26,222.400	24			
Corrected total	716.160	23			

[a] R square = 0.254 (Ajusted R Squared = 0.143)

Table 4. The Result of Data Hypothesis Test Based on Waist Circumference

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	468.167[a]	3	156.056	2.274	0.111
Intercept	148,837.500	1	148,837.500	2,169.116	0.000
BS	384.000	1	384.000	5.596	0.028
Age	60.167	1	60.167	0.877	0.360
BS * Age	24.000	1	24.000	15.554	0.001
Error	1,372.333	20	68.617		
Total	150,678.000	24			
Corrected total	1,840.500	23			

[a] R square = 0.509 (Ajusted R Squared = 0.436)

The second hypothesis, there is a difference in the impact of *Zumba toning* and *piloxing SSP* on waist circumference, with the information of F_{value} = 5.596 > F_{table} = 3.94 and the significance value of 0.028 < 0.5. *Piloxing SSP* exercises provide better results. One of the principles of *piloxing SSP* exercises focuses energy on the lower abdomen (*transverses abdominus*). The principle of this exercise makes the fibers of each muscle in the *transverse abdominal* area or lower abdomen more optimal. When muscle performance is more optimal, the energy in the abdominal area will be used more. As a result, the body fat in the waist area will decrease so that the waist circumference becomes more ideal,

The third hypothesis, there is a difference in the impact of early adulthood and late adulthood on body fat, with the information of F_{value} = 5.192 > F_{table} = 3.94 and the significance value is 0.034 < 0.05. When humans have passed early adulthood, the physiological performance of the body will decline. Thereby, the metabolism of fat decomposition into energy will also decrease. It makes that the body fat will rise if it is not offset by physical activity.

The fourth hypothesis, there is no difference in the impact of early adulthood and late adulthood on waist circumference, with the information on the value of F_{value} = 0.877 > F_{table} = 3.94 and the significance value of 0.360 > 0.05. Energy intake has a significant positive correlation with the body fat percentage (Amelia, and Syauqy, 2014). Lifestyle influences waist circumference. If the culture lacks movement and having unbalanced nutrition, then in any age, the waist circumference possibly exceed the ideal one.

The fifth hypothesis, there is no interaction between the type of body sculpting exercise and age on body fat, with information on the value of F_{value} = 0.350 > F_{table} = 3.94 and the significance value of 0.561 > 0.05. There are many factors affecting body fat, including age, lifestyle, and nutritional intake.

The sixth hypothesis, there is an interaction between the type of body sculpting exercise and age on waist circumference, with the information on the value of F_{value} = 15.554 > F_{table} = 3.94 and the significance value of 0.001 < 0.05. Early adulthood provides better interaction. At this age, the physiology of the human body is

at the optimal time so that it can change the fat into more optimal energy compared to late adulthood.

CONCLUSION

The conclusions in this study can be drawn as follows: there is no difference in the impact of *Zumba toning* and *piloxing SSP* on body fat, there are differences in the impact of *Zumba toning* and *piloxing SSP* on waist circumference, *piloxing SSP* exercises reduce waist circumference better, there are differences in the impact of early adulthood and late adulthood on body fat, there is no difference in the impact of early adulthood and late adulthood on waist circumference, there is no interaction between the type of body sculpting exercise and age on body fat, there is an interaction between the type of body sculpting exercise and age on waist circumference. It is recommended for the club members and the society to perform the physical activity by taking body sculpting exercise as one of the physical activities to reduce body fat level and waist circumference.

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