Ruhardi Rudi, Sugiyanto, Hidayatullah M. Furqon. The Differences on the Effect of Low Impact and High Impact Aerobic Exercise Against The Decreasing of Total Cholesterol Levels on Women. Journal of Education, Health and Sport. 2018;8(9):285-293. eISNN 2391-8306. DOI http://dx.doi.org/10.6084/m9.figshare.6983204
http://ojs.ukw.edu.pl/index.php/johs/article/view/5837

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eissn 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 01.08.2018. Revised: 17.08.2018. Accepted: 19.08.2018.

The Differences on the Effect of Low Impact and High Impact Aerobic Exercise Against The Decreasing of Total Cholesterol Levels on Women

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ABSTRACT

Background: The purpose of this research was to know and to analyze (1) the differences of intensity effect between low impact aerobic and high impact aerobic on the decreasing of total blood cholesterol levels, (2) the decreasing differences of total blood cholesterol levels between early adult women and middle adult women, (3) the interaction effects between the intensity of aerobic exercise and adulthood women on the decrease of total blood cholesterol levels.

Subject and Method: This research employed an experimental method consisting of independent variables and dependen variable. The research used experimental method with 2x2 factorial design. The population was all of members of Community Healthy Ambassador of Nursing Center Budinersalindo Wonogiri.

Result: The results of two ways anava test obtained F count value calculated on aerobic exercise intensity group amount 23.88 , F count value > F table (23.88 > 3.39), it means that there was a difference of total cholesterol level in intensity group of low impact and high impact aerobic exercise. The results of the test in the age group of adult women obtained the F count value amount 10.45, the F count value > F table (10.45 > 3.39), it means that there was a difference in total cholesterol levels in the age group of early adult women and middle adult women. The result of interaction test (A X B) obtained F count value amount 1.86, F count < F table (1.86 < 3.39), it means that there was no interaction effect between aerobic exercise and age group.

Conclution: The conclusions of this research were (1) there were differences effects between intensity of low impact and high impact aerobic exercise toward the decrease of total blood cholesterol level; the low impact aerobic had better decrease than the high impact aerobic had, (2) there were differences of the decrease of total blood cholesterol levels between early adult women and middle adult women; the middle adult women had better decrease than the early adult women had (3) there was no interaction effect between aerobic exercise and adult women toward the decrease of total blood cholesterol levels.

Keywords: Low Impact, High Impact, Aerobic, Cholesterol, Adult Women.

INTRODUCTION

In general, the definition of exercise is as one of the physical and psychological activities of someone who is useful to maintain and improve the quality of health. There are many benefits for our health. Simply spending 5% of the time we have in every day to do exercise, it can make the mental healthier, reduce stress, the mind becomes clear, and trigger a feeling of happiness. In addition, the benefits of exercise for us are to make blood circulation becomes faster, burn fat and calories, lower cholesterol, build muscle, and reduce the risk of high blood pressure and obesity. The intensity of sports has an effect on changes in blood lipid profile. The greater intensity of exercise that is performed, the possibility to lower cholesterol levels will increase, so the risk of coronary heart disease will decrease (Okura, 2003) .Medium intensity exercise that is done in a relatively long time cause the fatty acids which are used as energy that will minimize the chance of synthesis of the sterol core, so that cholesterol is not formed excessively. In this process, the degradation of active influence fat occurs in moderate intensity exercise with duration of exercise over an hour continuously. This condition is largely due to the release of epinephrine and norepinephrine by the adrenal medulla during the activity (Guyton, 2007).

Physical exercise has a clear effect on decreasing levels of fat and cholesterol in the blood. Without doing physical exercise, it is possible to get more disease on heart attacks (Margono, 2009). To reduce the risk of hypertension and heart attack as well as to increase work capacity, the American College of Sport Medicine recommend to participate in aerobic exercise activities at least 3 times a week for 20 to 60 minutes. Sports intensity should be based on the percentage of the maximum capacity from a relevant individual to make it work.

Gymnastics is a body exercise that is selected and created with a plan, organized systematically with the aim of forming and developing a person in harmony (Margono, 2009). Gymnastics can be interpreted as any form of physical exercise that is organized systematically by involving movements that are selected and planned to achieve certain goals (Khafadi, 2010). Some of the benefits of aerobic exercise are: improving the function of the heart, improving lung performance and increasing stamina

and strength, improving body coordination, especially those who have entered the old age, increasing immunity, preventing various diseases, include diabetes, cholesterol, blood pressure and others, against depression, because exercise is able to increase a sense of joy in a person, help lose weight, aerobic helps to make the body more perfect (Notoatmodjo S, 2008).

According to (Dinata, 2007), aerobic exercise is a series of motions that are chosen deliberately by following the rhythm of the chosen music, so it can utter certain rhythmic, continuity and certain duration. Aerobic exercise is a composite arrangement between series of motion and music that deliberately created so that there is a harmony between the movement and music to achieve a certain goal (health and fit body). Meanwhile, this research will discuss about low impact and high impact aerobic exercise. Low impact aerobic exercise (a mild collision) is an aerobic exercise that is done with a mild collision, where one foot still rests on the floor at all times and without high level pressure on the muscles and joints. Low impact aerobic is an aerobic movement using all the muscles, especially large muscles that spur the heart-lung work and body movement on a continuous body part. The core movement of the low impact aerobics does not use a leap.

The purpose of this movement is to increase durability or endurance. Low impact is suitable for beginners as well as all ages. The movement of low impact aerobics can be known from the attitude of one foot that is always on the floor every time. While high impact aerobics is a movement of aerobics with a hard movement and it can use different varied movements, such as jumping, spinning, dragging, and etc. This type of aerobic exercise can train some desired muscle parts such as abdominal muscles, chest muscles, calf muscles, and waist muscles. It also can train the area of the cardiovascular system. High impact aerobic exercise is suitable for people who have fulfilled the requirements of aerobic that are quite adequate, both quality and technique. In this aerobic, there are jumps, because the goal is to increase power and cardiovascular. In other words, this exercise is done with high intensity and accompanied by fast music.

The terms adult or early adult are derived from the ancient form of the word *adultus* which means it has grown into perfect strength or measure or has become mature. (Hurlock, 2002)says that early adulthood begins at age 20 until the age of 40 years when physical and psychological changes accompany diminished reproductive capacity. Adult women, according to (Hurlock, 1991) is a span of human life that is divided into two parts, including: early age from ages 41 to 50 years and advanced adult age ranging from 50 up to 60 years. In adulthood, there will be physical and psychological changes that appear at the beginning of the age of 41 years. Thus, it can be concluded that the so-called early adult women are women in the range of age 20 to 40 years, while middle-aged women ranged from 41 to 60 years.

Based on the problems that have been mentioned above, the researcher will review and examine the differences of intensity effect of low impact and high impact aerobic exercises on cholesterol in early adult women and middle adult women in the Health Community Ambassadors at the Nursing Care Center Budinersalindo Wonogiri. The arising problems from that matter are, is there any difference in the influence of low impact aerobic exercise and high impact aerobics intensity towards the decreased of total blood cholesterol levels?, is there any difference in the decrease of total blood cholesterol between the age group of early adult women and middle adult women?, is there any influence of interaction between intensity of aerobic exercise and age group of adult woman toward the decrease of total blood cholesterol level?

MATERIAL AND METHODS

1. Study Design

This research used an experimental method and a 2x2 factorial design (Sudjana, 1992). The study was conducted at the Nursing Care Center of Budinersalindo Wonogiri, Central Java, from March 4th, 2018 to April 12 th ,2018.

2. Population and Sample

The population was all members of the Health Community Ambassadors at the Nursing Care Center of Budinersalindo Wonogiri. The samples of the research amounted to 28 people that were obtained by using purposive sampling (Suroto, 2004).

3. Study Variables

This research was consist independen variables and dependent variable. The independent variables namely manipulative independent variable (low impact aerobic and high impact aerobic) and attribute independent variables (early adult women and middle adult women). While the dependent variable is total cholesterol.

4. Operational Definition of Variables

Aerobic exercise is a series of movements that are chosen intentionally by following the rhythm of the chosen music so that it produces a rhythmic, continuity and duration. Aerobic exercise is a composite arrangement between a series of movements and music that is intentionally created so that the harmony between the movement and the music appears to achieve certain goals. (healthy and fitness).

Low impact aerobic are aerobic gymnastic that are carried out with a slight impact, where one leg still rests on the floor at all times and without high pressure on the muscles and joints. Low impact aerobic is a gymnastics whose movements use all the muscles, especially the large muscles so that it stimulates the work of the heart and the body's continuous movement in the body parts.

High impact aerobic training is a gymnastic movement with hard movements and can use a variety of movements, such as jumping, circling, dragging, and so on. This type of aerobic exercise can train several parts of the desired muscles such as abdominal muscles, chest muscles, calf muscles, and waist muscles and train the area of the cardiovascular system.

The age group of early adult women is a comparison with the age group of middle adult women. Whereas the initial early adult women period starts at the age of 18 years to 40 years old while middle adult women start from the age of 41 years to 60 years.

Cholesterol is needed for the body and is used to form cell membranes, produce sex hormones and form bile acids, which are needed to digest fat. Cholesterol is needed to obtain optimal health. If cholesterol levels in the blood are too high there will be deposition of the blood vessel wall, and this can lead to a high risk of heart disease. Normal cholesterol levels in the blood <200 mg / dl and if cholesterol levels in the blood have reached> 240 mg / dl can be said to be high cholesterol levels.

5. Data Analysis

Data analysis technique was divided into two namely prerequisite test and hypothesis test. The prerequisite test was divided into two, namely normality test and homogeneity test, while hypothesis test using two ways anava.

RESULTS AND DISCUSION

The following is a description of data on total blood cholesterol levels, treatment group I (low impact aerobic exercise against early adult women), treatment group II (low impact aerobic exercise against middle adult women), treatment group III (high impact aerobic exercise against early adult women), treatment IV group (high impact aerobic exercise against middle adult women).

Table 1 The Descriptive Statistics Data of Pre-test and Post-test Total Cholesterol Levels

Groups	PRE-TEST			POST-TEST		
	N	Mean	STDEV	N	Mean	STDEV
Low impact aerobic exercise against early adult women	7	155.29	14.85	7	124.43	11.84
Low impact aerobic exercise against middle adult women	7	179.71	14.74	7	144.57	11.39
High impact aerobic exercise against early adult women	7	162.14	22.16	7	154.00	21.13
High impact aerobic exercise against middle adult women	7	177.00	22.95	7	168.00	21.84

Source : Primary data that is processed, 2018

An analysis requirement test is needed to determine whether the data analysis for hypothesis testing can be preceded or not. In this research, there are two prerequisite analysis tests namely normality test and homogeneity test.

Normality test uses liliefors test. The results of normality data test that were performed on each group were as follows:

Table 2 Normality Test Data

Groups	Liliefors				
	N	L_{count}	L_{table}	A	Category
Low impact aerobic exercise against early adult women	7	-0,12	3,39	0,05	Normal
Low impact aerobic exercise against middle adult women	7	-0,06	3,39	0,05	Normal
High impact aerobic exercise against early adult women	7	0,10	3,39	0,05	Normal
High impact aerobic exercise against middle adult women	7	0,19	3,39	0,05	Normal

Source : Primary data that is processed, 2018

In $\alpha = 0.05$ indicates that the value of test statistic $L_{count} < L_{table}$ thus, the above data is normally distributed.

Homogeneity test was conducted to obtain the information from the four groups of samples that have a homogeneous variant or not. Homogeneity test in this research was conducted by using Bartlet test. The description of the results is presented in the following table:

Table 3 Homogeneity Test Data

Group	Bartlett			
	N	χ^2_{count}	χ^2_{table}	Category
4	7	5,74	7,81	Homogeny

Source : Primary data that is processed, 2018

From homogeneity test results obtained χ^2_{count} was 5.74. While the result for χ^2_{tabel} was 7.81. So, it can be concluded that between the groups in this study has a homogeneous variance.

Table 4 The Results of Two Ways Anava Test of A and B Factors.

Variant Sources	F_{count}	F_{table}	*P*	*Conclusion*
Intensity of Aerobics Exercise (A)	23.88	*3.39*	0.000	Ho rejected
Age Group of Adult Women (B)	10.45	*3.39*	0.000	Ho rejected
Interaction (AB)	1.86	*3.39*	0.149	Ho accepted

Source : Primary data that is processed, 2018

The test results on two ways anava obtained F count value on aerobic exercise intensity group in the amount 23.88, with F table value was 3.39. F count value > F table, it means there is a difference in total cholesterol levels in the intensity groups of low impact and high impact aerobic exercise.

Test results on two ways anava obtained F count value on age group of adult women in the amount 10.45, with F table value equal to 3.39. F count value > F table, it means there is a difference in total cholesterol levels in the age group of early adult women and middle adult women.

Test results on two ways anava as it was summarized in anava table in table 3.39 obtained F_{count} from source variance interaction (A X B) in the amount 1.86 with F_{table} value equal to 3.39. $F_{count} < F_{table}$. This means that there is no interaction effect between aerobic exercise type and age group.

1. Comparison of decreased total blood cholesterol levels between low impact aerobic exercise group and high impact aerobic exercise group.

The decrease of total blood cholesterol levels by the intensity training method of low impact aerobic exercise is better than the intensity training method of high impact aerobic exercise.

Aerobic exercise is an exercise that requires oxygen to form its energy that is done continuously, rhythmical, involving large muscle groups especially leg muscles at intensity exercises 60-90% of Maximal Heart Rate (MHR) and 50-85% of maximal use oxygen for 20-50 minutes with exercise frequency three times per week. Sports intensity is also influential in changing of blood lipid profile. The greater the intensity of exercise that is performed, the possibility to lower cholesterol levels increase. Low intensity exercise that was done in a certain time can cause fatty acids which are used as energy that will minimize the chance of synthesis of the sterol core, so that cholesterol is not formed excessively. In this process, the degradation of active influence fat occurs in low and moderate intensity exercises that are done continuously at least 3 times a week. This condition is largely due to the release of epinephrine and norepinephrine by the adrenal medulla during activity.

2. Comparison of decreased total blood cholesterol levels between the early adult women and middle adult women.

The condition of decreased total cholesterol level of middle adult women is greater than the decrease in total cholesterol level of early adult women. In this case, the condition of total cholesterol level of early adult women is more stable than middle adult woman. Meanwhile, the decrease of total cholesterol level of adult woman through intensity of low impact and high impact aerobic exercises is bigger than early adult woman, it is influenced by high cholesterol of middle adult woman which in average are close to upper limit of normal, so when it was given low impact or high impact aerobic exercises treatments, the cholesterol will decrease in ideal normal number.

3. The interaction between aerobic exercise type and age group toward the decrease of total blood cholesterol levels.

The results indicate whether or not an interaction between low impact and high impact intensity aerobic exercise methods. With the obtained results, there is no interaction between the two. The intensity of low impact and high impact aerobic exercises, both can be given in decreasing of total blood cholesterol levels, with none predominantly between early adult women and middle adult women.

CONCLUSION

Based on data analysis and test which have been mentioned above, this it can be drawn conclusions of the research results, those are (1) there was a difference influence between intensity of low impact and high impact aerobic exercise toward the decrease of total blood cholesterol levels. The decrease of total blood cholesterol levels by the intensity training method of low impact aerobic exercise is better than the intensity training method of high impact aerobic exercise. (2) There was a difference in the decrease of blood cholesterol levels between the adult female adult age group and the middle adult woman. The decrease of total cholesterol level condition of adult women was greater than the decrease in total cholesterol level of early adult women. (3) There was no interaction effect between aerobic exercise and age group on the decrease of blood cholesterol level.

CONFORMITY TO ETHICAL STANDARDS

The research ethics included informed concent, anonymity, confidentiality and ethical clearance. The ethical clearance in this study was conducted at Dr. Moewardi hospital, Surakarta, Central Java, and was declared as worthy of ethics based on decision letter number : 1.155 /XII/HREC/2017.

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