



## THE EFFECT OF ELDERLY FITNESS ON CHOLESTEROL LEVELS

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### ABSTRACT

Hypercholesterolemia is a disease that often attacks the elderly due to plaques sticking to the walls of blood vessels, resulting in blockage of blood vessels (atherosclerosis). One of the non-pharmacological treatments to treat hypercholesterolemia is fitness exercise. This study aims to determine the effect of fitness exercise on changes in cholesterol levels in the elderly at the Apel Posyandu in the Work Area of the Sobo Banyuwangi Public Health Center in 2019. This research method is quasi-experimental and uses a pre-experimental research design in the form of a "one-group pre-test-post-test" design. The population in the study were 15 respondents, with a total sample of 15 respondents. The sampling technique used was Total Sampling and tested with the Wilcoxon match pair test. The results of the research before it was carried out were high cholesterol levels  $> 240$  mg/dl as many as 8 respondents. And after the intervention normal cholesterol levels  $< 200$  mg/dl were 12 respondents. The results of the calculation of the Wilcoxon test statistical test using SPSS showed the results =  $0.000 < = 0.05$ , which means that there is a significant influence between fitness exercise on changes in cholesterol levels in the elderly at the Apple Posyandu in the Work Area of the Sobo Banyuwangi Public Health Center in 2019. The results of research that have been conducted The results showed that fitness exercise can reduce cholesterol levels in hypercholesterolemic elderly, so it is hoped that health workers can socialize the use of fitness exercise as a non-pharmacological therapy for elderly people with hypercholesterolemia.

Keywords: elderly; fitness; hypercholesterolemia

### INTRODUCTION

The aging process is the process of slowly disappearing the ability of tissues to repair themselves or replace themselves, and maintain their normal structure and function so that they cannot survive various diseases and repair the damage that occurs (Puspitaningsih, D.H., Prasetyo, 2014). Complex changes in the elderly often cause health problems, one of which is an increase in blood cholesterol levels (Rando F.M, Ivonny M. S, 2016). Regarding the handling of cholesterol levels in the blood, it can be done through non-pharmacological treatment with elderly fitness gymnastics (Setiawan, 2013).

The number of elderly people is estimated to grow by around 56 percent, from 901 million to 1.4 billion, and by 2050 the elderly population is estimated to more than double in 2015, reaching 2.1 billion (Division, 2015). According to the results of the 2015 Susenas, the number of elderly people in East Java has reached 4.45 million people or about 11.46% of the East Java population (Badan Pusat Statistik Provinsi Jawa Timur, 2018). The prevalence of pre-elderly and elderly people in Banyuwangi Regency in 2016 was 309,286 (Banyuwangi Health Office, 2017). High cholesterol is a condition where the total cholesterol level is 190 mg/dL or more. According to gender, in men it was 48% while in women it was 54.3% in 2016 the prevalence of increased cholesterol levels in the elderly in Indonesia was 58.7%. The prevalence in East Java in 2016 was 36.1% (Kemenkes RI, 2013).

A preliminary study on March 4, 2019 using an interview technique in the working area of the Sobo Health Center, it was found that the number of elderly people in the Apple Posyandu in 2018 - 2019 was 70 elderly. Meanwhile, from 70 elderly people who suffer from hypercholesterolemia as many as 15 people. Health in the elderly can be caused by a decline in organ function that causes this group to be prone to degenerative diseases in addition to infectious diseases which are also still a problem in this age group (Kemenkes RI, 2017). According to WHO (2014), the most common causes of death in the world in 2012 were non-communicable diseases such as cardiovascular disease, cancer, and diabetes mellitus.

Cardiovascular disease is included in the category of non-communicable diseases caused by abnormalities in blood vessels, especially blood vessels that supply several important organs such as the heart, brain and other body tissues. Generally, this event is caused by atherosclerosis (Desi Handayani et al., 2020). Another cause of various diseases is an increase in cholesterol levels in the blood. Total cholesterol in the blood increases in line with the aging process (Rando F.M, Ivonny M. S, 2016). Cholesterol levels are one of the lipid groups, cholesterol is atherogenic or very easy to stick which then forms plaque on the walls of blood vessels. Cholesterol levels that are too high and excessive in the blood will be very dangerous for the health of the heart and blood vessels. The accumulation of fat deposits on the walls of blood vessels can cause a blockage in the blood vessels, known as atherosclerosis. with increased cholesterol increases the risk of recurrence of myocardial infarction or death (Taqwin, Maidisya, Sutrisna, Rosyidah, 2013).

One of the efforts to maintain, improve health and physical fitness for the elderly is by providing non-pharmacological therapy, one of which is exercise. Exercise is beneficial for physical and spiritual health. The benefits of exercise include improving blood circulation, strengthening muscles, preventing bone loss, lowering blood pressure, lowering low-density lipoprotein (LDL) cholesterol, and increasing high-density lipoprotein (HDL) cholesterol. This exercise is also useful for burning calories, improving balance and muscle coordination, increasing immunity (wahid triwahyudi, tugini, 2020). One type of exercise that can be done by the elderly is fitness for the elderly. This sports activity will help the body stay fit and fresh because it trains bones to stay strong, encourages the heart to work optimally, and helps eliminate free radicals in the body. Besides having a positive impact on improving the function of organs, fitness for the elderly also increases immunity in the human body after regular exercise (Sondakh et al., 2013).

## **METHOD**

This type of research is experimental research and uses a pre-experimental research design in the form of pre-test and post-test designs in one group "one-group pre-test-post-test". The characteristic of this research is to reveal a causal relationship by involving a group of subjects. The subject group was observed before the intervention, then observed again after the intervention (Nursalam, 2013). The population in this study were all elderly people with hypercholesterolemia who did not experience complications from other diseases and did not follow pharmacological therapy as many as 15 elderly people at the Apple Posyandu in the Work Area of the Sobo Banyuwangi Public Health Center. The sampling technique used in this study is total sampling.

This research was conducted from July 25 to August 25, 2019. The instruments used in this study were the Cholesterol Check Tool (GCU), observation sheets and SOP. Researchers conducted a pre-test to respondents by knowing cholesterol levels, then gave treatment to the elderly who had become respondents by doing fitness exercises which were carried out 3 times

a week for 3 weeks with a duration of 30 minutes in accordance with the standard operating procedures that had been made previously. After the intervention is given, then do a post test on the respondent and record it in the observation sheet. The data collected was analyzed through the IBM SPSS version 24.0 program and continued with the Wilcoxon match pair test. The data that has been processed is used to discuss statements, which are then presented in tabular form.

**RESULTS And DISCUSSION**

**Demographic Characteristics of Respondents**

Table 1.

Frequency distribution of respondents by age, gender, occupation and education (n=15)

Variable	f	%
<b>Gender</b>		
Males	2	13
Females	13	87
<b>Age</b>		
45-59 years old	6	40
60-74 years old	9	60
75-90 years old	0	0
>90 years old	0	0
<b>Education</b>		
SD	2	13
junior high school	4	27
senior High School	4	27
College	5	33
<b>Work</b>		
Does not work	7	47
entrepreneur	2	13
Private	0	0
Retired	6	40

Table 1, it can be seen that almost all 13 respondents (87%) are female. Most of the 9 respondents (60%) were aged 60 - 74 years. a small proportion of 4 respondents (27%) have a junior and senior high school education. And almost half of 7 respondents (47%) are in the category of not working.

Table 2.

Cholesterol Levels Before Doing Fit exercise (n=15)

Cholesterol levels	f	%
Normal <200 mg/dl	0	0
Bodereline >200-239 mg/dl	7	47
Height >240 mg/dl	8	53

Table 2, it is known that most of the 8 respondents (53%) before doing fitness exercises were in the category of High cholesterol (> 240 mg/dL). Cholesterol is found in almost all cells in humans. In the human body, cholesterol is found in the blood, bile, liver, adrenal glands, the outside (adrenal cortex) and nervous tissue. One example of cholesterol in bile. If there is a high concentration of cholesterol in bile, cholesterol will crystallize in the form of cristae (wahid triwahyudi, tugini, 2020).

While cholesterol deposits that occur in blood vessels, it can cause narrowing of blood vessels because the walls of blood vessels become thicker and result in reduced elasticity and cause atherosclerosis. The factors that influence the increase in cholesterol levels include age, gender, occupation, and education (Waloya Tunggul, Rimbawan, 2013). One of the factors that affect cholesterol levels in the blood is disturbed, namely age. Age is a trigger factor that can increase cholesterol levels in the blood. Based on table 1, it is known that most of the respondents are in the range of elderly (elderly) aged 60 - 74 years as many as 9 respondents (60%) of the 9 respondents, 7 of them experienced an increase in cholesterol levels. The 7 respondents are in the age category (elderly 60 – 74 years) where the overall condition is experiencing a decline in organ function, which is characterized by an increasingly vulnerable body to various attacks of disease that can cause death for example in the cardiovascular, respiratory, digestive, and endocrine systems. Another factor that affects blood cholesterol levels, namely gender, the gender difference is very significant. Based on diagram 5.1, it is known that almost all respondents are female as many as 13 respondents (87%). Research shows that women will lose 30 to 50% of their total muscle mass by the age of 45 years. Due to the aging process, the body's metabolism naturally slows down and low mobility speeds up the process of replacing muscle mass with body fat. The reduction in muscle mass helps to reduce calorie consumption and almost every food is converted to fat. As a result, women gain 2 times the extra size with every 10 years of age (Ujjani, 2015).

Table 3.  
Cholesterol Levels After Doing Fit exercise (n=15)

Cholesterol levels	f	%
Normal <200 mg/dl	12	80
Bodereline >200-239 mg/dl	3	20
Height >240 mg/dl	0	0

Table 3, it is known that almost all 12 respondents (80%) after doing fitness exercises are in the normal category (< 200 mg/dL). The Indonesian Elderly Fitness Gymnastics consists of four parts, namely preliminary exercises (warming up), core exercises, transitional movements and cooling exercises. The Indonesian Elderly Fitness Gymnastics Movement trains all aspects from the upper body to the lower body, starting with movements to improve respiratory function and circulatory function that can burn fat in the blood vessels as well as train the neck muscles. , shoulders, upper body with rotating movements that involve the abdomen, back, pelvis, thighs and leg muscles, besides that there are also movements to improve skills using body parts such as practicing balance, honing coordination and strengthening body muscles (Setiawan, 2013).

This has an effect on the body's metabolism and will burn more calories. Thus, LDL in body fat will be burned into energy and LDL in blood vessels will indirectly be lifted to the liver which will be broken down through bile and then excreted through body excretion (Azmi, Erizal., Riki Sukiandra, 2016). Based on the results of measurements made by researchers, respondents after doing fitness exercise can control blood cholesterol levels so that there is a change in blood cholesterol levels after doing fit exercise which is carried out 3 times a week with a duration of 30 minutes which is carried out for 3 weeks. Gymnastics has a major role in regulating blood cholesterol levels. Fitness exercise can lower blood cholesterol levels because doing exercise will burn calories and reduce fat in the body. This is in accordance with Russell's (2011) theory that exercise will cause metabolic changes, which are influenced by the length of exercise and fitness level. After doing fitness exercises, 3 respondents still showed the category of bodereline cholesterol levels (200-239 mg/dL). This could be because there are risk factors that influence. These factors include the inadequacy of the fitness exercise movement carried

out by the respondent which can increase blood cholesterol levels before the post test is carried out.

Table 4 The Effect of Fitness Exercise on Changes in Cholesterol Levels in the Elderly  
Fit Exercise

levels of Cholesterol	Fit Exercise				P.Value
	Before	%	After	%	
Normal	0	0	12	80	0,000
Bodereline	7	47	3	20	
High	8	53	0	0	

After performing statistical tests using the Wilcoxon Sign Rank Test SPSS version 17, the value of  $= 0.000$  was obtained and compared to  $= 0.05$ .  $P <$  this means that  $H_0$  is rejected and  $H_a$  is accepted which means that there is a significant effect of fitness exercise on changes in cholesterol levels in the elderly. The influence of fitness exercise on changes in cholesterol levels is due to fitness exercise is a systematic process by using motion stimulation that aims to improve or maintain the functional quality of the body. In this change, sports activities are very beneficial for human health, including improving the work and function of the heart, lungs and blood vessels (Ikhtiyarotul 'Arofah, Bejo Raharjo, 2015).

In the Indonesian Elderly Fitness Gymnastics there is an element of aerobic movement where aerobic movements are carried out for a relatively long time so that the heart works stronger and faster. This has an effect on the body's metabolism and will burn more calories. Thus, LDL in body fat will be burned into energy and LDL in blood vessels will indirectly be lifted to the liver which will be broken down through bile and then excreted through body excretion (Azmi, Erizal., Riki Sukiandra, 2016). This research is in line with research conducted by Arofah, 2015 which states that exercising regularly will increase the activity of various enzymes responsible for fat oxidation so that more fat is used as an energy source (burning fat and cholesterol) (Ikhtiyarotul 'Arofah, Bejo Raharjo, 2015). Regular exercise induced positive changes in the lipid profile in elderly women (Prusik et al., 2018).

Regular exercise will use energy obtained from carbohydrate and body fat reserves so that the amount of free fat in the body will decrease. Exercise breaks down triglycerides and releases fatty acids (also known as free fatty acids) and glycerol into the blood. These free fatty acids become very important as a source of fuel for the muscles, especially if the exercise is done long enough. If the exercise continues, the use of free fatty acids by muscle tissue will increase. After 40 minutes of exercise, free fatty acids supply 40% of the required fuel. Exercise between 1-2 hours can increase the supply of free fatty acids to  $\pm 65\%$  while the rest is supplied by glucose. A trained person can do the same intensity of exercise using less oxygen, less blood sugar, but more free fatty acids (50-85% of energy used). Therefore, exercise can reduce cholesterol in the blood if it is done more than 30-60 minutes with sufficient intensity (Ikhtiyarotul 'Arofah, Bejo Raharjo, 2015).

## CONCLUSION

Cholesterol Levels in the Elderly before being given the intervention of Fitness Gymnastics at the Apple Posyandu in the Working Area of the Sobo Health Center, Banyuwangi Regency, most of them experienced cholesterol in the High category ( $> 240$  mg/dl) as many as 8 respondents (53%). Cholesterol Levels in the Elderly after being given the intervention of Fitness Exercise at the Apple Posyandu in the Work Area of the Sobo Health Center,

Banyuwangi Regency, almost all respondents experienced cholesterol in the normal category (< 200 mg/dl) as many as 12 respondents (80%). After statistical testing using the Wilcoxon Sign Rank Test SPSS version 17 obtained the value of = 0.000 and compared < = 0.05, this means that Ho is rejected and Ha is accepted which means that there is a significant effect of fitness exercise on changes in cholesterol levels in the elderly at the Apple Posyandu in the working area of the Sobo Public Health Center, Banyuwangi Regency in 2019.

#### DAFTAR PUSTAKA

- Azmi, Erizal., Riki Sukiandra, F. (2016). *Gambaran Kadar Kolesterol HDL Dan Tekanan Darah Pasien Stroke Yang Dirawat di Bagian Saraf RSUD Arifin Achmad Provinsi Riau*. Universitas Riau.
- Badan Pusat Statistik Provinsi Jawa Timur. (2018). *Jumlah Penduduk menurut Kabupaten/Kota di Surabaya, 2010-2015*. <https://jatim.bps.go.id/statictable/2016/04/29/330/jumlah-penduduk-danlaju-pertumbuhan-penduduk-menurut-kabupaten-kota-diprovinci-jawatimur-2010-2014-dan-2015>
- Desi Handayani, E., Herliawati, & Rizona, F. (2020). *Pengaruh senam ergonomis terhadap kadar kolesterol darah pada lanjut usia di panti sosial tresna werdha teratai Palembang*. 000, 8–13.
- Division, U. N. P. (2015). *World Population Prospects*.
- Ikhtiyarotul ‘Arofah, Bejo Raharjo, F. S. N. (2015). Hubungan Olahraga dengan Kejadian Diaetes Melitus Tipe II di Wilayah Kerja Puskesmas Purwosari Surakarta. *Fakultas Ilmu Kesehatan, Universitas Muhammadiyah Surakarta*. [http://eprints.ums.ac.id/37860/1/Naskah Publikasi.pdf](http://eprints.ums.ac.id/37860/1/Naskah%20Publikasi.pdf)
- Kemenkes RI. (2013). *Riset Kesehatan Dasar; RISKESDAS*.
- Kemenkes RI. (2017). *Profil Kesehatan Indonesia 2016*.
- Nursalam. (2013). Metodologi Penelitian Ilmu Keperawatan. In *Salemba medika*.
- Prusik, K., Kortas, J., Prusik, K., Mieszkowski, J., Jaworska, J., Skrobot, W., Lipinski, M., Ziemann, E., & Antosiewicz, J. (2018). Nordic walking training causes a decrease in blood cholesterol in elderly women supplemented with vitamin D. *Frontiers in Endocrinology*, 9(FEB), 1–6. <https://doi.org/10.3389/fendo.2018.00042>
- Puspitaningsih, D.H., Prasetyo, D. A. (2014). Adaptasi Diri pada Lansia di Panti Werdha Mojopahit Mojokerto. *Jurnal Ilmiah Kesehatan Politeknik Kesehatan Majapahit*, 6(2).
- Rando F.M, Ivonny M. S, D. H. C. . (2016). *Pengaruh Senam Lansia Terhadap Kadar Kolesterol Total Pada Lansia Di BPLU Senja Manado*. Fakultas Kedokteran Universitas Sam Ratulangi Manado.
- Setiawan, G. W. (2013). Pengaruh Senam Bugar Lanjut Usia (Lansia) Terhadap Kualitas Hidup Penderita Hipertensi. *Jurnal E-Biomedik*, 1(2), 760–764. <https://doi.org/10.35790/ebm.1.2.2013.3632>
- Sondakh, R., Pangemanan, D., & Marunduh, S. (2013). Pengaruh Senam Bugar Lansia Terhadap Kadar Trigliserida. *Jurnal E-Biomedik*, 1(1), 755–759. <https://doi.org/10.35790/ebm.1.1.2013.4631>

- Taqwin, Rizky Maidisya and , Dr. dr. EM Sutrisna, M. Kes and , dr. Devi Usdiana Rosyidah, M. S. (2013). *ji Efek Ekstrak Etanol 70% Daging Buah Asam Jawa (Tamarindus indica L) Terhadap Penurunan Kadar Kolesterol Total dan Trigliserida pada Tikus Putih Jantan(Rattus norvegicus) Galur Wistar dengan Dislipidemia*. Universitas Muhammadiyah Surakarta.
- Ujiani, S. (2015). Hubungan antara Usia dan Jenis Kelamin dengan Kadar Kolesterol Penderita Obesitas RSUD Abdul Moeloek Provinsi Lampung. *Jurnal Kesehatan*, 6(1), 43–48.
- wahid triwahyudi, tugini, umi romayanti. (2020). Sosialisasi Senam Ergonomik Terhadap Penurunan Kadar Kolestrol Pada Pasien. *Senam Ergonomik Terhadap Penurunan Kadar Kolestrol*, 2(2), 59–65.
- Waloya Tunggul, Rimbawan, dan A. N. (2013). Hubungan Antara Konsumsi Pangan dan Aktivitas Fisik Dengan Kadar Kolesterol Darah Pria dan Wanita Dewasa di Bogor. *Jurnal Gizi Dan Pangan*, 8(1), 9–16.

