**TRANSPUBLIKA INTERNATIONAL RESEARCH IN EXACT SCIENCES (TIRES)**

# THE RELATIONSHIP BETWEEN DIET AND PHYSICAL ACTIVITY IN THE ELDERLY WITH CHOLESTEROL IN INDRA JAYA SUB-DISTRICT, ACEH JAYA DISTRICT IN 2023

**Mhd. Hidayattullah[1], Ulfa Khaira[2*]**
[1,2]Public Health Study Program, Faculty of Health Sciences,
Universitas Abulyatama, Aceh Besar
E-mail: [2)] ulfakhairaabdullah@gmail.com

***Abstract***

*The aging process is a continuous series of bodily modifications that can impair the body's cholesterol-regulating functions. This study aimed to determine if there's a correlation between dietary habits and increasing cholesterol levels among the elderly population in Indra Jaya sub-district. Employing a cross-sectional survey design, researchers collected data from elderly residents in Tengela village through questionnaires. The findings indicate a strong association between consuming fruits and vegetables and maintaining healthy cholesterol levels in the majority (93.5%) of participants. Statistical analysis confirmed a significant relationship between dietary patterns, physical activity, and cholesterol levels in this elderly group. Further analysis delved into the frequency and distribution of these factors. Essentially, this research suggests that dietary choices play a crucial role in cholesterol management for the elderly.*

***Keywords:*** *Diet, Increased Cholesterol Levels, Elderly*

## 1. INTRODUCTION

Every human being will inevitably experience the aging process, but healthy aging is the goal of life for every living being. The aging process is a process that occurs continuously and interrelated, then will cause several changes in the body so that it will affect the function and ability of the body as a whole. The elderly are synonymous with various declines in health status, especially physical health status, including pathological changes in old age in the cardiovascular system. Cardiovascular diseases that often occur include hypertension which is influenced by an increase in cholesterol in the blood (Suarsih, 2020).

The older a person gets, the more the function of the body's organs decreases, as well as the decrease in LDL receptor activity. fatty spots in the body increase and cause higher total cholesterol levels, while HDL cholesterol levels remain relatively unchanged. Old age is a natural process that cannot be avoided. The adult stage is the stage of the body reaching the age point of 35-64 years from European countries, Australia, New Zealand and Canada found as many as 25% in men and 23% in women with a total cholesterol/HDL ratio > 6 in men and > 5 in women (Lestari et al., 2018).

The World Health Organization reports a dramatic increase in the global elderly population. In 2020, over a billion people were aged 60 or older, constituting 13.5% of the world's total. This figure is more than double the number in 1980 and is projected to nearly double again by 2050. High cholesterol levels pose a significant global health threat, contributing to one-third of ischemic heart disease cases. Annually, it is estimated to cause millions of deaths and a substantial burden of disease. This issue is prevalent in

both developed and developing nations, emphasizing the need for effective prevention and management strategies (Kristiana et al., 2021).

Indonesia experienced a significant increase in its elderly population in 2018, with 9.27% of the total population being aged 60 and over. This percentage was even higher in specific regions such as Bali and Badung Regency. As people age, their physiological functions naturally decline. These changes affect various bodily systems, including the senses, digestion, nervous system, respiration, hormone regulation, heart and blood vessels, immunity, and waste elimination. Consequently, the elderly are more susceptible to chronic diseases like stroke, diabetes, hypertension, and heart disease, often linked to elevated cholesterol levels.

Gymnastic activities are one of the indirect factors that can affect nutritional status. In addition, elderly gymnastics which is done regularly can reduce blood cholesterol levels in the elderly. If cholesterol levels decrease, it is very good for the body because it can avoid the risk of cardiovascular disease (Anjani et al., 2021). Cholesterol levels can be influenced by various factors. These include genetic predisposition, aging, gender, and lifestyle choices such as dietary intake of saturated fats, lack of physical activity, and obesity. Additionally, certain medical conditions like nephrotic syndrome can contribute to elevated cholesterol levels (Matfin & Porth, 2009).

If cholesterol is not treated, there is a high risk of coronary heart disease (CHD), stroke, peripheral artery disease (PAP), type 2 diabetes. High blood pressure (hypertension and even death). Cholesterol levels of more than 200 mg/dl use two methods, namely pharmacological and non-pharmacological therapies. Pharmacological therapy that is usually used by hypercholesterolemia patients is nicotinic acid drugs (niacin). Niacin has side effects in some people, namely nausea, and abdominal pain, increasing uric acid levels (hyperuricemia) by inhibiting tubular secretion of uric acid The use of drugs to lower cholesterol for a long time, has serious side effects such as gastric inflammation, irritation and inflammation of the stomach, liver damage, gallstones and kidney damage (Morika et al., 2020).

Cholesterol, a type of lipid, can accumulate in blood vessels and form plaque, a process known as atherosclerosis. This buildup can significantly increase the risk of heart and blood vessel diseases. Elevated cholesterol levels are influenced by several factors, including age, stress, and poor diet (Lasanuddin et al., 2022).

A balanced diet is a way of regulating the amount and type of food in the form of a daily food arrangement that contains nutrients, consisting of six substances namely carbohydrates, proteins, fats, vitamins, minerals, water and food diversity. A balanced menu is a diverse diet that meets the nutritional needs in the General Guidelines for Balanced Nutrition (PUGS). Food sources of building substances come from plant foods such as beans, tempeh, tofu, while from animals such as eggs, fish, chicken, meat, milk and processed products such as cheese. Building substances play a role in the development of the quality of a person's intelligence level. Food sources of regulating substances are all vegetables and fruits that contain many vitamins and minerals that play a role in launching the function of organs (Depkes RI, 2018).

Non-communicable diseases (NCDs) are diseases also known as chronic diseases, non-infectious diseases, new communicable diseases, and degenerative diseases that cannot be transmitted from person to person through any form. Globally, non-communicable diseases have become a serious public health problem, where every year

there are new cases and deaths due to non-communicable diseases. Non-communicable diseases can occur due to interactions between agents (non-living agents) with humans (predisposing factors, infection) and the surrounding environment. Non-communicable diseases will follow people who do not take care of their health and are unable to maintain a healthy lifestyle (Hamzah et al., 2021).

## 2. RESEARCH METHODS

This research design uses quantitative correlation with. cross sectional approach. The population in this study were all elderly people coming to the posyandu. There are no specific criteria in sampling. Samples were taken based on the criteria of all elderly aged 50-65 years totaling 50 elderly. Samples were taken by accidental sampling method, namely the sampling method was carried out suddenly at the time of the study. The research was conducted in December 2023 working area in indra jaya sub-district. Data were collected using instruments in the form of a respondent demographic data questionnaire, and measurement of cholesterol levels using a cholesterol measuring instrument (Easy Touch). The data collected were then presented in tabular form and then analyzed with SPSS Kai Kuadrat with a significant level of a 0.05.

## 3. RESULTS AND DISCUSSION

### 3.1. Research Results

#### 3.1.1. Univariate Analysis

The analysis was carried out to determine the frequency distribution and percentage of the independent variable and the dependent variable.

**Tabel 1. Frequency Distribution of Respondents Based on Age and Gender of the Elderly**

| No | Respondent Characteristics | Frequency | % |
|---|---|---|---|
| 1 | Age | | |
| | 50-55 Years | 16 | 32,0 |
| | 56-60 Years | 18 | 36,0 |
| | 61-65 Years | 16 | 32,0 |
| 2 | Gender | | |
| | Male | 27 | 54,0 |
| | Female | 23 | 46,0 |
| | Total | 50 | 100 |

**Table 2. Frequency Distribution of Dietary Patterns with Cholesterol Levels In the Elderly**

| No | Respondent Characteristics | Frequency | % |
|---|---|---|---|
| 1 | Cholesterol Radar | | |
| | Normal | 32 | 64,0 |
| | High | 18 | 36,0 |

| No | Respondent Characteristics | Frequency | % |
|---|---|---|---|
| | Vegetables | | |
| 2 | Often | 33 | 66,0 |
| | Sometimes | 17 | 34,0 |
| | Fruits | | |
| 3 | Often | 31 | 62,0 |
| | Sometimes | 19 | 38,0 |
| | Total | 50 | 100 |

Table 2 shows that most of the elderly have normal cholesterol levels (64%). In addition, the knowledge of the elderly and the elderly diet is mostly good (66%) and (62%). The analysis was carried out to see the relationship between the independent variable and the dependent variable, using the chi-square statistical test and a computerized system with a meaning limit of α = 0.05 and a 95% confidence level. It is said that there is a significant relationship if the p value ≤ 0.05 and if the p value> 0.05 then the two variables are said to have no significant relationship.

**Tabel 3. Relationship Between Diet and Cholesterol**

| Variable | Cholesterol Levels | | | | Total | | p value |
|---|---|---|---|---|---|---|---|
| | Normal | | Tinggi | | N | % | |
| | n | % | n | % | | | |
| Vegetables | | | | | | | |
| Often | 29 | 93,5 | 4 | 21,1 | 33 | 66 | 0,000 |
| Sometimes | 2 | 6,5 | 15 | 78,9 | 17 | 34 | |
| Fruit | | | | | | | |
| Often | 31 | 100 | 0 | 0 | 31 | 100 | 0,000 |
| Sometimes | 0 | 0 | 19 | 100 | 19 | 100 | |

Based on table 3 shows that there is a relationship between diet and elderly cholesterol levels (p value = 0.000). Of the 33 elderly who often eat vegetables well, there are 29 elderly with normal cholesterol levels (93.5%). In the analysis of the relationship between the level of the elderly diet on cholesterol levels (p value = 0.000), of the 31 elderly all have normal cholesterol levels (100%).

### 3.2. Discussion

The results of the analysis of the relationship between elderly knowledge and elderly cholesterol levels obtained as many as 93.5% of elderly people who consume vegetables and fruits with normal cholesterol levels. Statistical test results p = 0.000, it can be concluded that there is a relationship between diet and physical activity in the elderly with cholesterol. Cholesterol in the body has a role, character and amount, each of which will indicate the state of the body clearly. Cholesterol has properties that cannot dissolve in water so that a tool is needed for the blood circulation process called apoprtotein, one type of protein. Cholesterol is formed in a complex with apoproteins and forms lipoproteins. Hypercholesterolemia is the increase in cholesterol levels in the body beyond the limits required by the body (Adhania et al., 2018).

Cholesterol is a lipophilic molecule of great importance to human life that has many roles that contribute to normal functioning cells. For instance, cholesterol is an essential component of cell membranes that contributes to the structural makeup of the membrane as well as modulating its fluidity (Di Ciaula et al., 2018). Hypercholesterolemia is cholesterol in the blood that is high at 200 mg/dl. Hypercholesterolemia occurs if a person has a food content that does not support health, such as consuming foods that have high fat, not eating vegetables or fruits in a balanced fruit and vegetable (Setiani, 2022).

White laying hens produce eggs that have cholesterol levels of 17.41 mg/100 mg egg or about 316.34mg/yolk with a yolk weight of 18.17 grams. Brown laying hens produce cholesterol levels of 17.08 mg/100 mg egg yolk or 308.29 mg with an egg yolk weight of 18.05 grams. Egg yolk contains approximately 33% solids. More than 95% of the cholesterol from the yolk is incorporated into triglyceride-rich lipoproteins, while the rest surrounds lipovitellin, as a protein or fat complex consisting of 20% fat and + 4% cholesterol. The cholesterol content in egg yolks will increase cholesterol levels in the body if you consume eggs frequently (Nizajuha et al., 2018).

3.2.1. Diet

Excessive food intake, especially high calories and high fat, will result in increased cholesterol in the blood. The number of calories in food is necessary to account for energy balance (Fatmawati, 2020). A calorie is something contained in food and drink. If the number of calories consumed is less than the calories used, weight will be reduced because energy reserves from fat will be used (Ampangallo, 2020). Diet forms a picture of a person's eating habits, in general, eating patterns can be influenced by several factors:

a) Economic factors
b) Socio-cultural factors
c) Education factors
d) Environmental factors
e) Food habit factors

Elderly (Lansia) is someone in the age group who is experiencing the final stage in their life phase. According to Law No. 13 / 1998 concerning Elderly Welfare, it is stated that an elderly person is someone who is more than 60 years old. The aging process is a natural process of life that occurs from the beginning of a person's life and has several phases, namely child, adult, and old. Elderly is the final stage in the life process where there is a decline and changes in physical, psychological, social which are interconnected with each other, so that it has the potential to cause physical and mental health problems in the elderly to experience overall biological decline, from decreased bone, muscle mass which causes the elderly to experience a decrease in balance which is at risk for falls in the elderly (Fatmawati, 2020).

High levels of cholesterol in the blood can cause various negative impacts on health, especially cardiovascular health. Some of the negative impacts that may occur are:

a. Atherosclerosis, High LDL cholesterol can cause cholesterol buildup in the artery walls, leading to atherosclerosis. The cholesterol plaques that form can narrow the lumen of the arteries and impair blood flow, increasing the risk of heart attack and stroke.

b. Heart Attack, A sudden blockade of blood flow to the heart can cause a heart attack. A ruptured cholesterol plaque in the coronary artery can lead to the formation of a blood clot that blocks blood flow to the heart.
c. Stroke, Blockage of arteries that supply blood to the brain can lead to stroke. High cholesterol can contribute to the formation of blood clots that block blood flow to the brain (Yusmaniar et al., 2024).

## 4. CONCLUSION

The results of the study of the description of the prevention behavior of non-communicable diseases (NCDs) of the community in the Indra Jaya puskesmas working area show that more people are doing non-communicable disease prevention behavior. Cholesterol in the body has a role, character and amount, each of which will indicate the state of the body clearly. Cholesterol has properties that cannot dissolve in water so that a tool is needed for the blood circulation process called apoprtotein, one type of protein.

Cholesterol is formed in a complex with apoproteins and forms lipoproteins. A balanced diet is a way of regulating the amount and type of food in the form of a daily food arrangement that contains nutrients, consisting of six substances, namely carbohydrates, proteins, fats, vitamins, minerals, water and food diversity. The main goal of cholesterol treatment is to prevent morbidity and mortality due to cholesterol. So excess cholesterol should be lowered as low as possible according to the patient's condition so as not to cause complications of impaired liver function, brain, heart and quality of life.

## REFERENCES

Adhania, C. C., Wiwaha, G., & Fianza, P. I. (2018). Prevalensi penyakit tidak menular pada fasilitas kesehatan tingkat pertama di kota Bandung tahun 2013-2015. *Jurnal Sistem Kesehatan*, *3*(4).

AMPANGALLO, E. (2020). *Hubungan Pola Makan Dengan Kadar Kolesterol Pada Polisi Yang Mengalami Gizi Lebih Di Polresta Sidenreng Rappang*. Universitas Hasanuddin.

Anjani, N. N. A., Sukraniti, D. P., & Dewantari, N. M. (2021). Hubungan Kegiatan Senam Lansia Dengan Kadar Kolesterol, Tekanan Darah Dan Status Gizi Pada Lansia. *Jurnal Ilmu Gizi: Journal of Nutrition Science*, *10*(4), 215–222.

Di Ciaula, A., Garruti, G., Baccetto, R. L., Molina-Molina, E., Bonfrate, L., Portincasa, P., & Wang, D. Q. H. (2018). Bile acid physiology. *Annals of Hepatology*, *16*(1), 4–14.

Fatmawati, E. (2020). *Hubungan Pola Makan dan Aktivitas Fisik dengan Kadar Kolesterol pada Pra Lansia di Desa Gemaharjo Kecamatan Tegalombo Kabupaten Pacitan*. Stikes Bhakti Husada Mulia Madiun.

Hamzah, B. d, Akbar, H., Rafsanjani, T. M., Sinaga, A. H., Hidayani, W. R., Panma, Y., & Bela, S. R. (2021). *Teori Epidemiologi Penyakit Tidak Menular*. Yayasan Penerbit Muhammad Zaini.

Kristiana, R., Koswara, T., Roslaeni, R., & Iriawan, J. (2021). Penyuluhan Tentang Fatty

Liver Dan Pemeriksaan Profil Lipid Pada Karyawan Universitas Jenderal Achmad Yani. *Jurnal Abdimas Kartika Wijayakusuma*, *2*(1), 58–64.

Lasanuddin, H. V., Ilham, R., & Umani, R. P. (2022). Hubungan Pola Makan Dengan Peningkatan Kadar Kolesterol Lansia Di Desa Tenggela Kecamatan Tilango. *Jurnal Ilmu Kedokteran Dan Kesehatan Indonesia*, *2*(1), 22–34.

Lestari, A., Handini, M. C., & Sinaga, T. R. (2018). Faktor Risiko Kejadian Dislipidemia Pada Lansia (Studi Kasus Kontrol Pada Lansia di Poli Lansia RSUD. Bangkinang Kabupaten Kampar Tahun 2016–2017). *Jurnal Riset Hesti Medan Akper Kesdam I/BB Medan*, *3*(2), 16–26.

Matfin, G., & Porth, C. M. (2009). Structure and Function of the Cardiovascular System. *Pathophysiology Concepts of Aletered Health States Philadelphia: Lippincott Williams and Wilkins*, 482–483.

Morika, H. D., Anggraini, S. S., Fernando, F., & Sandra, R. (2020). Pengaruh pemberian jus tomat terhadap kadar kolesterol. *Jurnal Kesehatan Saintika Meditory*, *2*(2), 113–120.

Nizajuha, H., Fenita, Y., & Badarina, I. (2018). Pengaruh Penggunaan Tepung Daun Senduduk (Melastoma malabathricum) terhadap Kadar Kolesterol Telur Ayam. *Jurnal Sain Peternakan Indonesia*, *13*(1), 76–83.

Setiani, A. (2022). *Gambaran Faktor yang Mempengaruhi Kadar Kolesterol Pada Pasien Hiperkolesterolemia di Rumah Sakit Islam Sultan Agung Semarang*. Universitas Islam Sultan Agung Semarang.

Suarsih, C. (2020). Hubungan pola makan dengan kejadian kolestrol pada lansia di wilayah kerja puskesmas tambaksari. *Jurnal Keperawatan Galuh*, *2*(1), 25–30.

Yusmaniar, F, H., & R, R. (2024). *Buku Referensi Khasiat Jamu Berbasis Tinjauan Komprehensif. CV Budi Utama : Yogyakarta*.

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