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**Original Articles****THE RELATIONSHIP OF DIET WITH INCREASED CHOLESTEROL LEVELS OF ELDERLY IN DILABAN VILLAGE, MENGANTI SUB-DISTRICT, GRESIK REGENCY**Fakhrun Nisa' Fiddaroini <sup>1\*</sup>, Karisma Dwi Ana <sup>1</sup>, Dwi Uswatun Sholikhah <sup>1</sup><sup>1</sup> Nursing Profession Program, College of Health Science of Husada Jombang<sup>2</sup> Bachelor of Nursing Science Program, College of Health Sciences of Husada Jombang**Correspondence:****Fakhrun Nisa' Fiddaroini**

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e-mail: [fiddaroininissa@gmail.com](mailto:fiddaroininissa@gmail.com)**DOI:** <https://doi.org/10.60050/lkh.v8i2.36>**ABSTRACT**

**Background:** One of the factors causing the increase in cholesterol levels in the elderly is an unhealthy diet, namely consuming high-fat foods such as offal, meat, and coconut milk of food. An unhealthy diet for the elderly, namely consuming high-fat foods such as offal, meat, and coconut milk foods can result in increased cholesterol.

**Objectives:** The study aimed to determine the relationship between diet and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency.

**Methods:** The design of this study is a correlational analysis with a cross-sectional approach. The population in this study was all elderly people who suffer from cholesterol at the Posyandu for the Elderly in Dilaban Village, Menganti Sub-district, Gresik Regency in May-August 2023, a total of 63 people. The sample size of this study was 54 respondents. A side technique of this research is using a simple random sampling. Data analysis technique using chi-square test. The instrument used was the Food Frequency Questionnaires (FFQ) questionnaire to measure eating patterns, while the increase in cholesterol levels was measured by observation.

**Results:** The result of this study showed that most respondents' eating patterns were poor as many as 41 respondents (75.9%), most respondents had high cholesterol levels as many as 35 respondents (64.8%). The result of the chi-square test showed that  $p\text{-value} = 0.000 < \alpha = 0.050$  so that H1 was accepted, so there was a relationship between diet and increasing cholesterol levels in the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency.

**Conclusion:** Efforts made by health workers so that the elderly does not experience an increase in cholesterol levels are providing communication, information, and education to the elderly so that they maintain their diet and their cholesterol levels are normal.

**Keywords:** Diet, Cholesterol, Elderly.

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**INTRODUCTION**

High cholesterol is influenced by several factors, especially age, stress, and unhealthy diet (Mamitoho, *et al.*, 2016). Diet is one of the lifestyle indicators that influence nutritional and health status. As for the unhealthy diet of the elderly, namely consuming high-fat foods

such as offal, meat, and coconut milk foods, this can increase cholesterol (Hasibuan *et. al.*, 2020).

According to the World Health Organization (WHO) in 2020, the world's population aged 60 years and over is more than 1 billion people, representing 13.5% of the world's population of 7.8 billion, which is 2.5 times larger than in 1980 (392 million), and is projected to reach nearly 2.1 billion by 2050. Increased cholesterol levels increase the risk of heart disease and stroke. Increased total cholesterol is the main cause of the burden of disease in both developed and developing countries as a risk factor for ischemic heart and stroke.

According to the 2018 Basic Health Research (Riskesmas) data, the percentage of cholesterol sufferers has increased since 2013, namely, above-normal patients in women increased from 39.6% to 9.9%, while in men from 30.0% to 5.5%, and the most cholesterol sufferers occurred at the age of 55-64 years, namely 12.6%, based on residence occurring in urban areas by 8.3% from the rural areas as much as 6.8%. According to provincial data, the percentage of visitors with high cholesterol at posbindu and First Level Health Facilities (FKTP) in Indonesia for the East Java area with a total cholesterol percentage of 36.1% (Ministry of Health of the Republic of Indonesia, 2018). Based on a preliminary study conducted by the researcher, according to the data of the last 3 months of the elderly in 4 posyandu in the working area of the Menganti Health Center, Menganti Sub-district, Gresik Regency, the number of people with the highest cholesterol levels is in Dilaban Village, which is 34 people out of 63 people who participated in the elderly posyandu in Dilaban Village.

Factors that affect total cholesterol levels are a low-fiber diet, a high-fat diet, smoking habits, gender, obesity, and physical activity (Sari, I., 2021). Excessive fat consumption tends to increase the lipid profile in the blood with the risk of cholesterol accumulation or deposition on the walls of arterial blood vessels (Winda, et al. 2017). The treatment of high cholesterol levels according to the Indonesian Endocrinology Association (PERKENI) includes pharmacological and non-pharmacological therapies (PERKENI, 2019). Based on this background, the researcher was interested in conducting a study entitled "The relationship between diet and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency".

## **METHODS**

### ***Study Design***

The research design used was correlational analytic with a cross-sectional approach.

### ***Setting***

The research was conducted in May-August 2023 at the Posyandu for the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency.

### ***Research Subject***

The population in this study is all elderly people who experience cholesterol at the Elderly Posyandu in Dilaban Village, Menganti Sub-district, Gresik Regency in May 2023, as many as 63 people. The sample in this study was some elderly people who experienced cholesterol at the Elderly Posyandu in Dilaban Village, Menganti Sub-district, Gresik Regency in May 2023, with as many as 54 people. Researchers set several criteria in determining research respondents, including 1) Elderly  $\geq$  60 years old, 2) Have a cholesterol level of  $\geq$ 200 mg/dl, 3) Residing and having a population status in Dilaban Village, Menganti Sub-district,

Gresik Regency, 4) Registered in the register book of the posbindu of Dilaban Village, Menganti Sub-district, Gresik Regency, and 5) Willing to be a respondent and sign informed consent. The exclusion criteria in this study are: 1) The subject cancels his or her willingness to be a research respondent, 2) The subject did not follow when the data collection was carried out, 3) Cholesterol sufferers with comorbidities, and 4) Unable to remember well. In this study, the probability sampling technique is used using simple random sampling, that is, each member of the population has the same opportunity to be selected as a sample. Sampling was carried out by drawing population members (lottery technique) or lottery technique (Notoatmodjo S, 2018).

### ***Instrument***

The instrument used was the Food Frequency Questionnaire (FFQ) questionnaire to measure eating patterns, while the increase in cholesterol levels was measured by observation. In this study, the questionnaire is the Food Frequency Questionnaire (FFQ), which is used to find out the description of the frequency and portion of meals from the respondents. Cholesterol levels were measured by observation using GCU (Glucose, Cholesterol, Uric Acid).

### ***Data Collection***

Data collection began by collecting Food Frequency Questionnaire (FFQ), FFQ is semi-cumulative and open, where respondents fill in the frequency of eating habits several times. Respondents filled in by choosing one of the frequency columns for each type of food, whether 1x a day, 2-3x a day, >3x a day, 1-4x a week, 1-3x a month, and never, and filled in the large number of portions eaten in grams. Respondents were asked to give a mark (√) on the food on the FFQ sheet. The calculation of daily consumption is known based on the result of multiplication between the weight of each serving and the frequency of consumption. The results are then divided by the number of days. In this study, a tool to measure cholesterol levels using GCU (Glucose, Cholesterol, Uric Acid) from Easy Touch was used in a new state. Researchers checked cholesterol levels in the same person's blood three times every hour to get accurate results, researchers checked cholesterol levels in the blood of the same person three times every hour. If the results of the cholesterol level measurement are consistent, then it can be concluded that the GCU tool has good accuracy and can be used. Measurement is carried out on respondents who have signed a letter of consent to become a respondent (Informed Consent).

### ***Data Analysis***

Data analysis is processed using data analysis techniques, a side technique of this research is simple random sampling. Data analysis using computer software, namely the Statistical Package for Social Science (SPSS) for Windows. Furthermore, a descriptive analysis is carried out, namely, to describe variables in the form of frequency distribution, percentage, and cross-tabulation between two variables. To determine the relationship between variables, the Chi-Square test was used with a significance level of  $\alpha = 0.05$ .

### ***Ethical Consideration***

This research has received permission for its implementation from the College Health Science Husada Jombang that description of ethical approval No: 1272-KEPKSHJ.

## RESULTS

### *Characteristics of Respondents based on Gender, Age, Educational Level, and Work*

**Table 1.** Frequency Distribution of Respondent Characteristics based on Gender, Age, Educational Level, and Work in Dilaban Village, Menganti Sub-district, Gresik Regency in 2023 (n = 54).

Characteristics of Respondents	Frequency	Percentage
	(f)	(%)
<b>Age</b>		
60-74 years	39	72.2
75-90 years	13	24.1
> 90 years	2	3.7
<b>Total</b>	<b>54</b>	<b>100.0</b>
<b>Gender</b>		
Male	26	48.1
Female	28	51.9
<b>Total</b>	<b>54</b>	<b>100.0</b>
<b>Educational Level</b>		
Basic Educational Level	46	85.2
Secondary Educational Level	6	11.1
Higher Educational Level	2	3.7
<b>Total</b>	<b>54</b>	<b>100.0</b>
<b>Work</b>		
Farmer	36	66.7
Self-Employed	2	3.7
Housewives	16	29.6
<b>Total</b>	<b>54</b>	<b>100.0</b>

Sources: Questionnaire Data, May-August 2023.

Based on the research results in Table 1, it showed that a small number of respondents aged > 90 years were 2 respondents (3.7%) and most respondents were 60-74 years old as many as 39 respondents (72.2%). And also, it showed that a small part of the respondents was male as many as 26 respondents (48.1%) and most of the respondents were female as many as 28 respondents (51.9%). Based on the research results above, it showed that a small number of respondents at the higher education level were 2 people (3.7%) and most of the respondents at the basic education level were 46 respondents (85.2%). Based on the research results in Table 1, showed that a small number of respondents worked as self-employed 2 people (3.7%) and most of the respondents worked as farmers as many as 36 respondents (66.7%).

*Distribution of Dietary Frequency and Cholesterol Levels of The Elderly***Table 2.** Frequency Distribution of Respondent Characteristics based on Dietary Frequency and Cholesterol Levels of the Elderly in Dilaban Village, Menganti Sub-district, Gresik Regency in 2023 (n = 54).

Characteristics of Respondents	Frequency	Percentage
	(f)	(%)
<b>Dietary Frequencies</b>		
Bad	41	75.9
Good	13	24.1
<b>Total</b>	<b>54</b>	<b>100.0</b>
<b>Cholesterol Levels</b>		
Good	13	24.1
Upper Threshold Limit	6	11.1
Height	35	54.8
<b>Total</b>	<b>54</b>	<b>100.0</b>

Sources: Questionnaire Data, May-August 2023.

Based on the research results in Table 2, it showed that a small part of the respondents' diet was good as many as 13 respondents (24.1%) and most of the respondents' diet was bad as many as 41 respondents (75.9%). And also, data in the table above showed that a small number of respondents had cholesterol levels at the upper threshold of 6 respondents (11.1%) and most of the respondents had high cholesterol levels as many as 35 respondents (64.8%).

*Analysis of The Relationship Between Diet and Increased Cholesterol Levels of The Elderly in Dilaban Village, Menganti District, Gresik Regency in 2023***Table 3.** The Relationship Between Diet and Increased Cholesterol Levels of The Elderly in Dilaban Village, Menganti District, Gresik Regency in 2023.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.000 <sup>a</sup>	2	.000
Likelihood Ratio	59.609	2	
Linear-by-Linear Association	46.046	1	.000
N of Valid Cases	54		

Based on the research results in Table 3, it showed that there was a relationship between diet and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency in 2023. Data analysis in the study used a chi-square test with SPSS computer software at an error level of 5%. Based on the chi-square test between dietary variables and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency, in a year where the  $\rho$  value  $< \alpha$  0.05, H1 was accepted, which means that there is a diet with an increase in cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency.

## DISCUSSION

Based on the results of the study, it was shown that a small part of the respondents' diet was good as many as 13 respondents (24.1%) and most of the respondents' diet was bad as many as 41 respondents (75.9%). Some of the factors that can affect diet according to Adriani, M., and Wirjatmadi, B., (2018) are Culture, Religion and Belief, Socioeconomic Status, Personal preference, Hunger, appetite and satiety, and Health. Between the facts and the theory, there is a fit that appetite and health affect diet. The elderly tends to have a decreased appetite and tend to want to eat high-fat foods. In addition, the declining health of the elderly also affects the diet. People who are healthy with any food can enter, while people who are sick with food have difficulty entering.

Based on the results of the study, it was shown that a small number of respondents had cholesterol levels as much as 6 respondents (11.1%), and most of the respondents had high cholesterol levels as many as 35 respondents (64.8%). According to Ariani (2016) in the application of H.L. Blum's theory, several factors can cause cholesterol disease, including age and gender, dietary factors, and activity. This is influenced by estrogen hormones in women which can lower LDL cholesterol levels and increase HDL and triglycerides. Meanwhile, women over 50 years old or have menopause, have the same risk as men (Ariani, 2016). Between the facts and the theory there is a conformity that cholesterol levels are affected by age, gender, diet, and activity. Lack of activity causes fat to accumulate so that cholesterol is high.

Data analysis in the study used a chi-square test with SPSS computer software at an error level of 5%. Based on the chi-square test between dietary variables and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency, in a year where the  $p$  value  $< \alpha$  0.05, H1 was accepted, which means that there is a diet with an increase in cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency. One of the factors that affect cholesterol levels is diet. Cholesterol generally comes from animal fats like meat, although it can also come from vegetable fats like coconut milk and coconut oil. If a person consumes foods that contain fat, then the fat will enter the intestines and when digested will produce fatty acids triglycerides, phospholipids, and cholesterol, and this cholesterol content will increase cholesterol levels in the blood (Ariani, 2016).

Factors that affect total cholesterol levels are a low-fiber diet, a high-fat diet, smoking habits, gender, obesity, and physical activity (Sari, I., 2021). Most of the cholesterol is made by the body itself even as much as 80% and only 20% enters with food. Cholesterol can increase if you frequently consume foods with high animal fat levels (red meat, beef brain, egg yolk, seafood cheese, etc.) or fast food (Winda, et al., 2017). Consumption of high-fat foods, especially saturated fats, will increase cholesterol levels in plasma, it is estimated that every addition of saturated fatty acids of 1% of total calories can increase blood cholesterol levels by 1.9 mg/dl. The National Cholesterol Education Program (NCEP) recommends limiting the consumption of saturated fatty acids to  $<10\%$  of total calories and if cholesterol levels are still high, it is recommended to reduce saturated fat consumption to 7% of total calories. Excessive fat consumption tends to increase the lipid profile in the blood with the risk of cholesterol accumulation or deposition on the walls of arterial blood vessels (Winda, et al. 2017). Between the facts and the theory there is a fit that diet is related to cholesterol levels. The fatter consumption, the higher the cholesterol level will be.

## CONCLUSION

The diet of the elderly is mostly bad as many as 41 respondents (75.9%). Cholesterol levels of the elderly were mostly high as many as 35 respondents (64.8%). There was a relationship between diet and increased cholesterol levels of the elderly in Dilaban Village, Menganti Sub-district, Gresik Regency with  $\rho$  value = 0.000 <  $\alpha$  0.05.

## SUGGESTION

For Research Sites Dilaban Village Elderly Posyandu, it is recommended that health service agencies (Posyandu Elderly Dilaban Village) increase screening and provide more knowledge to the elderly, especially for people with high cholesterol, to better implement a healthy lifestyle. For educational institutions, it is hoped that the results of this study will be an additional insight and reference in studying activity data reporting for further research on the relationship between diet and physical activity and cholesterol levels. This research is expected to be used as one of the references in learning or as study literature for students to conduct further research to achieve better results. For the elderly, it is recommended that respondents (elderly) maintain their diet so that cholesterol levels are normal and for researchers, researchers should make the results of this study an additional knowledge about the importance of maintaining a diet to maintain cholesterol levels.

## LIMITATION

There are no limitations in carrying out this research.

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