



The Relationship Between Dietary Patterns and Total Blood Cholesterol Levels at Lecturers Muhammadiyah University of Parepare

Nur Rahmadhani B. Bambona^{a,1*}, Haniarti^{a,2}, Nurlinda^{a,3}

^aUniversitas Muhammadiyah Parepare, Indonesia

¹123nurrahmadhani080199@gmail.com, ²haniarti@gmail.com, ³nurlinda@gmail.com

Received: 20-10-2022

Accepted: 30-11-2022

Published: 27-12-2022

ABSTRACT

Today's lifestyle has changed very significantly. This is due to the low balance between activity and exercise in the diet, so health problems often arise. One of the lifestyle changes that have occurred is a change in diet which should be maintained by consuming healthy foods. However, nowadays, many prefer to consume ready-to-eat food (fast food), which contains much-saturated fat, especially for office workers. This study aims to determine the relationship between diet and total blood cholesterol levels in Muhammadiyah Parepare University lecturers. This study used an analytic observational research method with an accidental sampling technique using the solving formula. A sample of 67 people was obtained. This study's results indicated a relationship between diet and total blood cholesterol levels in Muhammadiyah Parepare University lecturers using the Chi-Square test and obtained $p = 0.001 < \alpha = 0.005$. Based on the research that has been done, the results show a relationship between diet and total cholesterol levels in Muhammadiyah Parepare University lecturers using the Chi-Square test and the value of $p = 0.001 < \alpha = 0.005$. It is recommended to regulate diet and the amount of food that contains fat and carry out periodic checks such as nutritional status, hypertension, blood sugar levels, uric acid and cholesterol regularly at least once every six months to reduce consumption of cholesterol-producing fats

Keywords: dietary habits, total blood cholesterol level, saturated fat.

*Corresponding Author



INTRODUCTION

The current economic development and industrialization greatly influence people's diets (Rosyanti et al., 2017). The balance of the diet is very influential on the health of the body, so it is not recommended to eat fast food or often referred to as *fast food*. According to Sunita (Lim, 2016), *Fast food* is processed quickly. It is ready to eat, for example, *french fries*, *hamburgers*, *fried chicken*, *sandwiches* and *pizza*. *Fast food* is easy to obtain in the market, especially in big cities, so variations on the menu are easily available according to taste and purchasing power (Lim, 2016).

A diet that consumes fast food will result in non-communicable diseases (Tobelo et al., 2021). Non-Communicable Diseases (PTM) are a health problem that has become a national and global concern (Konkor et al., 2023). PTM Morbidity and Mortality are increasing in Indonesia (Yoeantafara & Martini, 2017).

According to the World Health Organization (WHO, 2011), death data shows that of the 57 million deaths in the world in 2008, as many as 36 million were caused by PTM (Yoeantafara & Martini, 2017). Cardiovascular disease PTM is the biggest cause of death, equal to 39%. Deaths from PTM will continue to increase worldwide. The largest increase will occur in middle and developing countries. As much as 70% of the global population will die from PTM, such as heart disease, stroke, diabetes mellitus, and cancer (Yoon et al., 2019).

One of them is PTM. What will happen is classified as high total blood cholesterol levels in the blood, which is a serious problem because it is a risk factor for various non-communicable diseases (Schwingshackl et al., 2022). Based on studies that have been carried out, the risk of atherosclerosis

which is a cause of coronary heart disease (CHD), will increase if the total blood cholesterol level in the blood exceeds normal limits (Yoeantafara & Martini, 2017).

Excess total blood cholesterol levels in the blood will easily stick to the inner walls of the blood vessels. Excess LDL through the oxidation process will form a clot which, if the clot gets bigger, will form a lump, resulting in a narrowing of the blood vessels. This process is usually called atherosclerosis (Yoeantafara & Martini, 2017).

The prevalence of hypercholesterolemia in the world is around 45%; in Southeast Asia, it is around 30%, and in Indonesia, it is 35% (Subandrate, nd). Hypertension and hypercholesterolemia are also causes of coronary heart disease (CHD), so the presence of hypercholesterolemia in hypertensive patients will increase the risk of coronary heart disease. Controlling blood lipids in hypertensive patients through medication can significantly reduce the risk of stroke and myocardial infarction (Hana & Sartika, 2019).

Data for the end of 2018 show that 1.5% or 1,017,290 Indonesians suffer from heart disease based on Basic Health Research (RISKESDAS). The prevalence in North Maluku in 2018 showed that around 1.1% or 4,723 people had heart disease, while from RISKESDAS data for 2013, around 0.2% or 1,436 people had CHD at the age of ≥ 15 years. This prevalence data shows an increase in CHD sufferers in 2018 in North Maluku (Utami et al., 2017).

Data from the Makassar City Health Office states that hypertension ranks second in the ten most common diseases. The prevalence of hypertension in Makassar City in 2016 reached 27.61%, while the mortality rate reached 18.6%. One of the health centers with a high prevalence of hypertension is the Ballaparang Health Center. During the last 3 (three) years, cases of hypertension have always increased, and the latest data obtained is that the number of people with hypertension has reached 35.7% of the total morbidity due to non-communicable diseases (Ansar J, Dwinata I, 2019)

High cholesterol is associated with heart disease in men but not always in women (Schaefer et al., 2023). It is not even a big deal. Many doctors then recommend a low-fat diet for women with high cholesterol and a tendency to have other cardiovascular disease disorders. Sleep, the balance of food and exercise. It is the root of other health problems (Suarsih, 2020).

The current lifestyle has changed significantly. This is due to the lower balance between activity and exercise on a diet, so health problems often arise (Speakman et al., 2022). One of the lifestyle changes that have occurred is a change in diet that should be maintained by consuming healthy foods, but nowadays many prefer to consume fast food (*fast food*) which is a lot contain fat bored especially office workers. People with the knowledge and behavior of healthy living with a balanced diet, clean hands before eating, and brush their teeth regularly. So it is likely that you will also have strong physical health (Suarsih, 2020).

Frequent consumption of high-fat foods is also the main cause of increased total cholesterol levels in the blood (Lasanuddin, Ilham, & Umani, 2022). The study's results (Lestari, Harna, & Novianti, 2020) show that cholesterol levels decrease along with a low intake of fatty foods. A cholesterol level _ that exceeds the normal limit will trigger the process of atherosclerosis. Atherosclerosis is the process of narrowing blood vessels by fat. Atherosclerosis is a clinical manifestation of heart disease (Yoeantafara & Martini, 2017).

Office workers often consume fast food (*fast food*), which is not good for their health (LUBIS, 2019). In this study, researchers wanted to conduct research at Muhammadiyah Parepare University by looking at the relationship between diet and total blood cholesterol levels. Seeing the frequent occurrence of Parepare Muhammadiyah University lecturers consuming fast food, researchers are interested in doing this research.

High levels of total blood cholesterol can cause plaque formation, clogging blood vessels and increasing the risk of stroke or heart disease (Hanum, 2016). Therefore, high total blood cholesterol

levels must be reduced and maintained within normal limits. Some consumption patterns that affect total blood cholesterol include green vegetables, fish and seafood, whole grains, nuts, soybeans and processed products, fruits, and foods enriched with stanols and sterols (Ardiana & Widjaja, 2022). In addition to consuming food for total blood cholesterol sufferers, as mentioned above, you should also adopt other healthy lifestyles, starting by exercising regularly, limiting your consumption of alcoholic beverages, and not smoking (Emilia & Prabandari, 2019) .

Based on the results of initial observations made by researchers, some lecturers still consume food that needs to follow the actual diet. In contrast, lecturers consume food regardless of the amount that should be consumed.

Based on the description above, the researcher is interested in researching the relationship between dietary patterns and total blood cholesterol in lecturers at Parepare Muhammadiyah University.

METHOD

The study used the *Analytical Observational* research method to link between variables or to look for a relationship between diet and total blood cholesterol levels at Muhammadiyah Parepare University lecturers. The study this conducted on campus University Muhammadiyah Parepare. With time the research will be conducted from June to July 2021. The population in this study were all lecturers at Muhammadiyah Parepare University, namely, 207 people. The sampling technique in this study is to use the *Accidental Sampling technique*. The number of samples was calculated using the solving formula, totaling 67 samples.

The research instruments used by the author are Questionnaire, 24 Hour Food Recall Form, Food Frequency Form and Benechede Monitoring (*Brand Nesco*) for measuring cholesterol in the total direction. The data used are primary data, including respondent data obtained directly at Muhammadiyah Parepare University, including Questionnaire; dietary data is based on the 24-hour food recall method while food frequency and type of food are obtained using the food frequency form, Cholesterol data is obtained through measurement directly using *Benechede Monitoring*. Secondary data includes the number of lecturers obtained from the Parepare Muhammadiyah University Campus.

Analysis of the data used by the author to process the data obtained: Univariate analysis is used to see, present, and describe the characteristics of each research variable. This analysis produces the distribution and percentage of the variables studied. Bivariate analysis was used to determine the relationship between diet and total blood cholesterol levels among lecturers at Muhammadiyah Parepare University.

RESULTS AND DISCUSSION

In the table of respondents' characteristics based on gender, there were 34 men (50.7%) and 33 women (49.3%). The characteristics of respondents based on age were more in the 25-30 year age group of 23 people (34%) and the least in the 51 years and over the age group of 10 people (15%). Characteristics of respondents based on height, namely respondents who have a height of 151-160 as many as 23 people (34%) and so do respondents who have a height of 161-170 as many as 23 people (34%) and respondents who have a height of 171 and above at least five people (7%). Characteristics of respondents based on body weight, namely more weight 41-60, as many as 37 people (55%) and the least, namely weight 81 and over, as many as five people (7%). Based on BMI, the normal nutritional status was more with 36 people (54%), and the least was the thin nutritional status of 1 person (1%).

Based on the table above from the 24-hour food recall form, which was distributed to 67 respondents, then the respondent's data was processed using the nutrisurvey application, resulting in a good diet of 39 people (58%) and a bad eating pattern of 28 people (42%). Based on the cholesterol distribution table shows that the total blood cholesterol level in Muhammadiyah Parepare University

lecturers who have normal blood cholesterol levels is 38 people (57%). In comparison, those who have high blood cholesterol levels are 29 people (43%).

The frequency distribution table for types of food shows that the frequency of ready-to-eat food that respondents often consume is fried foods (score 138.7), palekko chicken and duck (score 105.2), seafood such as squid, shrimp and crab (score 97.3), coto (score 48.8), and konro (score 4.0).

The results of the SPSS test showed that 29 lecturers (43%) applied a good diet with a normal total blood cholesterol level. Nine lecturers adopt a bad diet with normal total blood cholesterol (13%). From these data, it can be concluded that lecturers with a normal total blood cholesterol level adopt a good diet more than lecturers who adopt a bad diet. Then the results of testing high total blood cholesterol levels with a good diet were ten people (15%), and lecturers with high total blood cholesterol levels implementing bad eating patterns were 19 people (28%). So lecturers with high total blood cholesterol levels apply more unhealthy eating patterns. Of the 67 respondents studied, it was found that 38 respondents (57%) had normal total blood cholesterol, whereas 29 people (43%) had high total blood cholesterol levels.

Based on the results of statistical analysis using the *Chi-Square test*, it was found that the value of $p = 0.001 < 0.05$, which means that there is a relationship between diet and total blood cholesterol levels at Muhammadiyah Parepare University lecturers.

1. Diet for Lecturers at Muhammadiyah Parepare University

Based on the results of research on 67 respondents, namely Lecturers at Muhammadiyah Parepare University, it can be seen that the 67 respondents had a bad diet. There were 28 people (42%) and those who had a good diet; there were 39 people (58%). From the results of this percentage, it can be seen that more lecturers adopt a good diet compared to lecturers who adopt a bad diet, where this criterion in determining a good diet is like eating three times a day, namely breakfast, lunch, dinner and other complementary foods that include healthy food. However, from some of the respondent data studied, quite several respondents implemented food three times a day. However, the food consumed could trigger high levels of total blood cholesterol, such as oily foods, coconut milk, etc.

In addition, some respondents also answered that they often skip breakfast for being busy or on a diet program. However, several studies have shown that breakfast is important to start a busy day. So, many lecturers at Muhammadiyah Parepare University have adopted a good diet compared to lecturers who have not adopted a poor diet.

This research follows WHO recommendations, which recommend a fat intake of no more than 30% of total energy per day, equivalent to 67 grams per day. If the total energy requirement per day is 2000 calories, it is equivalent to 5-6 tablespoons of oil per day. According to the fatty acid content, oil is divided into two groups: saturated fat and unsaturated fat. Foods containing unsaturated fats generally come from plant foods, except coconut oil. Meanwhile, saturated fatty acids generally come from animal foods (Denni, 2019).

2. Total Blood Cholesterol Levels in Muhammadiyah Parepare University Lecturers

Based on the study's results, it was found that of the total sample of 67 people, 38 people (57%) had normal blood cholesterol levels. In comparison, 29 people (43%) had high blood cholesterol levels. From these data, it can be seen that of the 67 respondents who had normal blood cholesterol levels, more than the respondents who had high blood cholesterol levels.

From the study results, several respondents indicated that almost every day, they consumed fried foods, such as fried tempeh, fried fish, stuffed tofu and fried foods. The other. However, this needs to be balanced with green vegetables or healthy food. However, from this, the average respondent answered those who consumed the most fried foods 3-6x/week and the least consumed fried foods 1-2x/week. So the level of total blood cholesterol levels of a person can not only be seen

from several foods as contained in the food frequency form distributed to respondents but can also be seen from the diet or food intake eaten in a day.

According to (Fatmawati, 2020), in her book entitled *Stop High Cholesterol*, cholesterol is a component of fat. Fat is one source of energy that provides the highest calories. (13) Apart from being a source of energy, fat or especially cholesterol, is a substance needed by the body, especially to form the walls of cells in the body. A person's cholesterol level is said to be in the normal category if the cholesterol level is ≤ 200 mg/dl, the high threshold category is 200-239 mg/dl, and the high cholesterol category is ≥ 239 mg/dl.

Based on the measurement results, it can be seen that the total blood cholesterol level of lecturers at the Muhammadiyah University of Parepare has the lowest cholesterol level of respondents, namely 109 mg/dl, while the highest cholesterol level value is 282 mg/dl.

3. The Relationship between Diet and Total Blood Cholesterol Levels in Muhammadiyah Parepare University Lecturers

Based on observations, many of the respondents who experienced high blood cholesterol levels were caused by bad eating patterns, such as often consuming excessive amounts of fatty foods. From the results of research data, the types of food sources of cholesterol that respondents often consume come from animal fats, coconut milk, and also fried foods that are fried using oil that has been used repeatedly, which can increase levels of Low-Density Lipoprotein (LDL) in the blood, namely harmful bad fats. For health.

This study showed that 29 lecturers adopted a good diet with normal total blood cholesterol levels (43%). In comparison, nine lecturers implemented a bad diet with normal cholesterol levels (13%). This is supported by using the *Chi-Square test*. It is found that the value of $p = 0.001 < \alpha = 0.005$, which means that there is a relationship between diet and total blood cholesterol levels at Muhammadiyah Parepare University lecturers.

From this, it can be concluded that lecturers with normal blood cholesterol levels adopt a good diet more than lecturers who adopt a bad diet. With high total blood cholesterol with a good diet, ten people (15%) and lecturers with a high total blood cholesterol level apply a bad diet as many as 19 people (28%). Of the 67 respondents studied, it was found that 38 respondents (57%) had normal total blood cholesterol, whereas 29 people (43%) had high total blood cholesterol levels.

Based on the results of statistical analysis using the *Chi-Square test*, it was found that the value of $p = 0.001 < \alpha = 0.005$, which means that there is a relationship between diet and total blood cholesterol levels in lecturers at Muhammadiyah Parepare University.

The results of this study are in line with research conducted by (Fatmawati, 2020), which showed that there is a relationship between diet and total blood cholesterol levels in the elderly in the village of Gemaharjo with a value of $p = 0.017 < \alpha = 0.05$

CONCLUSION

Diet is a method or effort in regulating the amount and type of food with descriptive information, which includes maintaining health, nutritional status, and preventing or helping to cure disease. The definition of the Handajani diet (Karinda Heryuditasari, 2018) is human behavior or a group of people in fulfilling food, including attitudes, beliefs, and food choices. According to Sulistyoningasih (2011), eating patterns are defined as the characteristics of the activities that individuals eat repeatedly or the attitude of people eating to meet food needs. A balanced diet is a way of regulating the amount and type of food in the form of a daily meal plan that contains nutrients consisting of six substances, namely carbohydrates, protein, fat, vitamins, minerals and water, and a variety of foods. A balanced diet is an arrangement of the amount of food consumed that contains balanced nutrition in the body. It contains two substances, namely: building blocks and regulatory substances.

The recommended Nutrition Adequacy Rate (RDA) is the amount of each essential nutrient that must be met from food, covering almost all healthy people to prevent nutrient deficiencies. The value of the nutritional adequacy rate for all nutrients except energy is set to always be higher than the average adequacy to guarantee that the adequacy of almost the entire population is met. Therefore intake below the nutritional adequacy value sometimes means insufficient. However, the further below that value, the risk of being less or more than the use value will impact health disturbance. The recommended Nutrition Adequacy Rate is based on the standard weight for each age group, gender, and physical activity. The recommended average nutritional adequacy rate (energy) for adults in the age group of 30-64 years

Based on the research that has been done, the results show a relationship between diet and total blood cholesterol levels at Muhammadiyah Parepare University lecturers using the *Chi-Square test* to find that the value of $p = 0.001 < \alpha = 0.005$.

REFERENCE

- Ansar J, Dwinata I, M. A. (2019). Determinan Kejadian Hipertensi Pada Pengunjung Posbindu Di Wilayah Kerja Puskesmas Ballaparang Kota Makassar. *Jurnal Nasional Ilmu Kesehatan*, 1(3), 28–35. Google Scholar
- Ardiana, M., & Widjaja, N. A. (2022). *Panduan Pola Diet Sehat Untuk Pasien Dengan Gangguan Kardiovaskular*. Airlangga University Press. Google Scholar
- Denni, N. I. P. R. (2019). *Mutu Minyak Goreng pada Pedagang Gorengan di Kecamatan Denpasar Utara*. Poltekkes Denpasar. Google Scholar
- Emilia, O., & Prabandari, Y. S. (2019). *Promosi kesehatan dalam lingkup kesehatan reproduksi*. Ugm Press. Google Scholar
- 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. Google Scholar
- Hana, S., & Sartika, R. A. D. (2019). Hubungan Lingkar Pinggang Dengan Kejadian Hiperkolesterolemia Pada Penderita Hipertensi Di Puskesmas Tegal Gundil Kota Bogor. *Relationship Of Waist Circumference And Hypercholesterolemia Incidence In Patient With Hypertension in Tegal Gundil Public Health Center at Bogor City*, 5(1), 34–43. <https://doi.org/10.25311/keskom.Vol5.Iss1.335> Google Scholar
- Hanum, Y. (2016). Dampak bahaya makanan gorengan bagi jantung. *Jurnal Keluarga Sehat Sejahtera*, 14(2). Google Scholar
- Konkor, I., Kuuire, V., & Bisung, E. (2023). Understanding perceptions of neighborhood health and non-communicable disease risk in urban contexts in Ghana. *Social Science & Medicine*, 317, 115574. <https://doi.org/https://doi.org/10.1016/j.socscimed.2022.115574> Scopus
- Lasanuddin, H. V., Ilham, R., & Umani, R. P. (2022). Hubungan Pola Makan Dengan Peningkatan Kadar Kolesterol Lansia Di Desa Tenggele Kecamatan Tilango. *Jurnal Ilmu Kedokteran Dan Kesehatan Indonesia*, 2(1), 22–34. Google Scholar
- Lestari, R. P. I., Harna, H., & Novianti, A. (2020). Hubungan pola konsumsi dan tingkat kecukupan serat dengan kadar kolesterol total pasien poliklinik jantung. *Jurnal Gizi Dan Kuliner*, 1(1), 39–46. Google Scholar
- Lim, F. (2016). *Hubungan Konsumsi Fast Food dengan Kadar Kolesterol pada Mahasiswa di Fakultas Kedokteran USU Tahun 2016*. Google Scholar
- LUBIS, L. R. (2019). *Hubungan Konsumsi Makanan Siap Saji (Fast Food) Dengan Siklus Menstruasi Siswi Kelas Ix Di Smp Yayasan Perguruan Panca Budi Medan Tahun 2018*. Institut Kesehatan Helvetia. Google Scholar
- Rosyanti, N. M., Kuswana, D., & Dewi, R. (2017). Dampak Industrialisasi Terhadap Kehidupan Masyarakat. *Tamkin: Jurnal Pengembangan Masyarakat Islam*, 2(1), 20–40. Google Scholar
- Schaefer, E. J., Ikezaki, H., Diffenderfer, M. R., Lim, E., Liu, C.-T., Hoogetveen, R. C., Guan, W., Tsai, M. Y., & Ballantyne, C. M. (2023). Atherosclerotic cardiovascular disease risk and small dense low-density lipoprotein cholesterol in men, women, African Americans and non-African Americans: The pooling project. *Atherosclerosis*, 367, 15–23. <https://doi.org/https://doi.org/10.1016/j.atherosclerosis.2023.01.015> Scopus
- Schwingshackl, L., Hesecker, H., Kiesswetter, E., & Koletzko, B. (2022). Dietary fat and fatty foods in the prevention of non-communicable diseases: A review of the evidence. *Trends in Food Science & Technology*, 128, 173–184. <https://doi.org/https://doi.org/10.1016/j.tifs.2022.08.002> Scopus
- Speakman, J., Johnstone, A., Moholdt, T., Panda, S., Klein, S., Parker, B. L., & Goodyear, L. (2022). Focus on diet and exercise. *Cell Metabolism*, 34(10), 1416–1419. <https://doi.org/https://doi.org/10.1016/j.cmet.2022.09.011> Scopus
- Suarsih, C. (2020). Hubungan pola makan dengan kejadian kolestrol pada lansia di wilayah kerja puskesmas tambaksari. *Jurnal Keperawatan Galuh*, 2(1), 25–30. Google Scholar
- Subandrate, S. (n.d.). Safyudin.(2019). Pendampingan Usaha Pencegahan dan Penanganan Hiperkolesterolemia Pada pelajar. *Jurnal Arsip Pengabdian Masyarakat*, 1(1), 1–7. Google Scholar
-

- Tobelo, C. D., Malonda, N. S. H., & Amisi, M. D. (2021). Gambaran pola makan pada mahasiswa semester vi fakultas kesehatan masyarakat Universitas Sam Ratulangi Selama Masa Pandemi Covid-19. *KESMAS*, *10*(2). Google Scholar
- Utami, R. W., Sofia, S. N., & Murbawani, E. A. (2017). Hubungan antara asupan karbohidrat dengan profil lipid pada pasien penyakit jantung koroner. *Diponegoro Medical Journal (Jurnal Kedokteran Diponegoro)*, *6*(2), 1143–1155. Google Scholar
- Yoeantafara, A., & Martini, S. (2017). Pengaruh Pola Makan Terhadap Kadar Kolesteroltotal. *Jurnal Mkmi*, *13*(4), 304–309. Google Scholar
- Yoon, D. W., Shin, D. W., Cho, J. H., Yang, J. H., Jeong, S.-M., Han, K., & Park, S. H. (2019). Increased risk of coronary heart disease and stroke in lung cancer survivors: A Korean nationwide study of 20,458 patients. *Lung Cancer*, *136*, 115–121. <https://doi.org/https://doi.org/10.1016/j.lungcan.2019.08.025> Scopus