

Relationship Between Smoking and Total Cholesterol Level in Cholesterolemia Patients

¹Sherly Evander, ²Ibrahim Baim, ³Siska Sakti Angraini,

^{1,2,3}*Sekolah Tinggi Ilmu Kesehatan Syedza Saintika Padang*

*Corresponding author Email : anggabhaim@gmail.com

ABSTRACT

Indonesia is the largest active smoker in the world, which ranks fifth out of all countries. These active smokers are on average between the ages of 30 to 34 years with a percentage of 33.4 percent. The occupations of these are mostly farmers, laborers, and fishermen as much as 44.5 percent. The impact of smoking can changes in the concentration of lipids in the blood and cause cholesterolemia.

The study was conducted on 7-12 September 2020 in Puskesmas Andalas. Population in this study amounted to 85 people and sampels 50 people. sample collection using porpusive sampling technique. The results of the study were processed using a statistics analysis.

The univariate analysis are obtained 78% patients with high total cholesterol and after being with statistics, obtained the value of $P = 0.001$ means that the p-value is 0.05, is relationship between smoking and total cholesterol level in cholesterolemia patients.

The results of the study, it is hoped the puskesmas can provide education to patients with cholesterolemia to reduce smoking and routinely control the puskesmas.

Keywords: *Smoking, Cholesterol, Cholesterolemia, Blood*

1. PRELIMINARY

Cholesterol is an amphipathic lipid that is essential in the membranes and outer layers of plasma lipoproteins. Cholesterol is found in plasma and tissues in the form of stored or free cholesterol. While in the plasma, both forms are transported in lipoproteins. Cholesterol is highly hydrophobic and its structure consists of four fused hydrocarbon rings (Champeet al., 2010). Normal cholesterol levels are around 140-200 mg/dL. High cholesterol levels 200-400 mg/dL [1].

According to Nurrahman (2012) Cholesterol is a white wax-like substance that is naturally found in the body. Hypercholesterolemia is excessive cholesterol levels in the blood [2]. Several factors that can increase certain fat levels are family history of hyperlipidemia, obesity, fat rich diet, alcohol use, smoking and lack of exercise and activity [3].

The regulation is stated that there can be disturbances in fatty acid which will increase levels of triglycerida and cholesterolemia esters [4].

High levels of triglycerides (up to 800 mg/dl or more) can cause enlargement of the liver and spleen and the development of symptoms of pancreatitis (eg, severe abdominal pain) [5].

To monitor the signs and symptoms that appear, it is necessary to measure cholesterol level in order to control cholesterol levels in atherosclerosis [6].

Based on was Riskesdas in 2016, there were 10,614 people with high cholesterol. Laboratory was from the Puskesmas Andalas February-December 2019 in hypercholesterolemic patients who routinely carried out cholesterol checks every month in 2019 there were 85 people.

Management for cholesterol disease consists of pharmacological and non-pharmacological therapy. Pharmacologi therapy using statin drugs (HMG-CoA reductase inhibitors), cholesterol absorption, bile acid sequestrants, fibrates, nicotinic acid, CETP, LDL cholesterol apheresis, and combination therapy. Non-pharmacological therapy consists of diet, activity, weight loss, quitting smoking, and dietary supplements.

The diet that can be used to reduce LDL cholesterol is a diet of unsaturated fatty acids such as MUFA and PUFA because the most influential dietary factor in increasing the concentration of LDL cholesterol is saturated fatty acids. Quitting smoking can also increase HDL cholesterol by 5-

10%. Smoking is associated with increased triglyceride concentrations.

High cholesterol in the blood can cause blood vessels to harden or narrow (atherosclerosis). If bloods flow to the heart is disturbed, heart disease can occur. If atherosclerosis occurs in the arteries that supply coronary arteries, you may feel chest pain [2].

Plaq rupture and cause blood clots to the heart and deprive the heart muscle of oxygen, and if flow is not restored quickly, part of the heart muscle will die [2].

Smoking behavior is a behavior that is harmful to health. Cigarettes contain 4000 kinds of chemicals and 20 kinds of deadly poisons that can damage health and kill, the three main toxins in cigaret are nicotine, tar, and carbon monoxide.

In cigarettes the content of a psychoactive substance called nicotine can bring a feeling of pleasure, comfort, fit, and increase productivity, but pharmacologically proven active can cause mutations (mutagenic), cancer (carcinogenic) and change fat metabolism so that will decrease [7].

Cigarettes contain 4000 chemicals that are harmful to health, including nicotine which is addictive and tar which is carcinogenic. Smoking can increase LDL levels and reduce HDL levels in the blood so that it can cause an increase in cholesterol in the blood which triggers atherosclerosis and then can cause CHD (Chronic Heart Disease). Cholesterol is actually useful as an energy source, forming the walls of cells in the body, and as a basic material for the formation of steroid hormones.

As good cholesterol, HDL is responsible for taking bad cholesterol and phospholipids from the blood and submitting them to other lipoproteins. which reduce the diameter of bloods vessels.

Plaq a result, the supply of oxygen and nutrients throughout the body is blocked. If left unchecked, it can lead to heart problems, stroke, and other disorders (Ekawati, 2012).

Smoking reduces the number of filial cells (hair vibrating), increases mucus cells, thereby blocking oxygen to the lungs up to eight times risk of developing cancer than those a healthy life without smoking. Cigarettes also cause several diseases such as impotence, osteoporosis, disorders in pregnancy, coronary heart disease, and respiratory system disorders.

Based on research (Rhozaq, et al 2014) with the title "The Relationship of Smoking with Hypercholesterolemia in the Worker Group Bogor in 2012-2014". The results showed that workers with the criteria for light smokers had a 2.32 times chance of suffering from LDL hypercholesterolemia than workers who did not

smoke and that moderate smokers had a 4.37 times greater chance of suffering from LDL hypercholesterolemia than non-smokers. The male group of workers had a 1.48 times chance of suffering from LDL hypercholesterolemia than the female group.

Based on cholesterol laboratory data at the Andalas Public Health Center, Padang City, from the last 6 months, there were 85 people with cholesterolemia who routinely checked their cholesterol every month in 2020. The results of the initial survey, 7 people with high cholesterol (>240) and 3 people with moderate cholesterol (200-239) and 8 of them said they used to smoke, 2 other people said they didn't smoke. 7 out of 8 people who used to smoke said they used to smoke more than 10 cigarettes per day. The average of 10 respondents aged 40 years and over.

Based on the data and background above, researchers conducted research on "relationship of smoking with total cholesterol levels in the cholesterolemic patients"

2. RESEARCH METHODS

This research was conducted in the Puskesmas Andalas Health, On 7-12 September 2020. The targets are patients with hypercholesterolemia in the Puskesmas Andalas Padang. The population was all patients with hypercholesterolemia, amounting to 85 people. The sample is hypercholesterolemic patients aged >40 years, in this study the sample was 50 people. Sampling with purposive sampling technique.

How to collect was using observation, checklist sheets and interviews. The was is process by a computerisasi system.

3. RESEARCH RESULTS

3.1. Univariate

Distribution of total cholesterol frequency cholesterolemic patients, (78%) high total cholesterol levels. Distribution of smoking frequency in cholesterolemic patients, it is seen that more than half of the respondents (74%) consume > 10 cigarettes per day.

3.2 Bivariate

The results hypothesis testing, it can be seen that respondents who experience high total cholesterol levels are mostly found in respondents who smoking more than 10 cigarettes per day, 33 respondents (89.19%). Statistic Analysis, the value of $P = 0.001$ means that the p-value is 0.05, is relationship between smoking and total cholesterol level in cholesterolemia patients.

4. DISCUSSION

4.1. Total cholesterol frequency in cholesterolemia patients

The results of the study, it was seen that more than half of the respondents (78%) had high total cholesterol level, namely >240 mg/dl. This study is in line with Kusumasari's (2015) research on the Relationship Between Smoking and Cholesterol in Tasikmadu Karanganyar, 86.7% of respondents experienced high cholesterol levels.

According to Stoppard (2010) cholesterol is a fatty substance made in the liver and saturated fat in food. If the level of cholesterol in the blood is too high, it will further increase the risk factors for coronary artery disease. Cholesterol itself has several components which are divided into 2 classifications, namely based on the type and level of cholesterol. Substances contained in cigarettes, especially nicotine, can reduce HDL levels and increase LDL levels in the blood which causes high cholesterol levels in the blood. If HDL decreases, bad cholesterol and phospholipids from the blood cannot be taken and handed over to other lipoproteins to be transported back to the liver and recirculated or excreted from the body, this is what causes cholesterol levels in the blood to increase.

According to the researcher's assumptions, high cholesterol levels were also found in respondents who smoked <10 cigarettes per day, this is because apart from smoking there are various other things that can effect the respondents' total cholesterol such as lifestyle. Analysis a significant correlation the very strong relationship between the two and has a positive or unidirectional correlation direction, the greater value of one variable, the greater the other variable values.

4.2. Smoking frequency Colesterolemia patient

It was seen that more than half of the respondents (74%) Smokers >10 cigarettes per day. Adeliانا (2016), the Relationship of Smoking Behavior active in Gudang Taman Glagahwero Kalisat Jember, 60% of respondents consumed cigarettes >10 cigarettes day.

According to the researcher's, the high consumption of cigarettes > 10 per day in cholesterolemia patients one of the causes of high total cholesterol levels in cholesterolemic patients. It is evident from the research results obtained from 50 respondents, 37 respondents (74%) consume cigarettes >10 per day.

4.3. Bivariate Analysis

Indicate experience high total cholesterol are mostly found in respondents who consume more than 10 cigarettes per day, 33 respondents (89.19%), smoking and total cholesterol levels in cholesterolemia patients.

The high consumption of cigarettes can increase the possibility of high total cholesterol. Based on the analysis related the duration of smoking, overall in serum associated with the duration and intensity of smoking [8].

Substances contained in cigarettes, especially nicotine, can reduce HDL levels and increase LDL in the bloods which causes high cholesterol. If HDL decreases, bad cholesterol and phospholipids from the blood cannot be taken and handed over to other lipoproteins to be transported back to the liver and recirculated or excreted from the body, this is what causes cholesterol to increase. Damaging of vessels, which reduce the diameter of vessel [9].

Smoking is a modifiable risk factor for hypercholesterolemia, so the higher the level of cigarette consumption, the higher the likelihood of hypercholesterolemia. [10].

Accord to the researcher's assumption, smoking in cholesterolemia patients, as evidenced by bivariate caused by high consumption of cigarettes >10 stems per day which resulted in high levels of total cholesterol. In addition, unhealthy lifestyles such as eating fatty foods, not exercising or poor activity and obesity also affect high total cholesterol levels. Of the 50 patients with cholesterolemia, 42 male, and 8 female.

5. CONCLUSIONS AND SUGGESTIONS

5.1. Conclusion

The conclusion of this study is that 78% of total cholesterol levels are high, 74% of respondents smokers cigarettes > 10 per day, and between total cholesterol levels in cholesterolemia patients in the Puskesmas Andalas Padang.

5.2. Suggestion

For Puskesmas Andalas, The results of this study can provide input to puskesmas officers to always provide individual education and monitoring the number of cigarettes consumed by cholesterolemia patients during routine control to prevent the risk of disease due to high cigarette consumption. For Educational Institutions, The results of this study can provide useful scientific information and knowledge in the development of knowledge about total cholesterol levels. For Further Researchers, The results of this study can

be used as guidelines related smoking and total cholesterol levels in cholesterolemic patients so that further researchers can examine other factors related to the incidence of cholesterolemia such as gender, age, etc.

REFERENCES

- [1] Adelina, et al. The Relationship of Smoking Behavior with HDL (High Density Lipoprotein) Cholesterol Levels in Active Smokers in Gudang Taman Glagahwero Kalisat Jember, 2016.
- [2] Aurora, Ruth Grace, et al. The Role of Continuing Counseling in the Management of Hypercholesterolemic Patients, 2012.
- [3] Agency for Health Research and Development. Basic Health Research (RISKESDAS) Jakarta: Indonesian Ministry of Health, 2018.
- [4] Brunner & Suddarth. Textbook of Medical Surgical Nursing. Jakarta: EGC, 2014.
- [5] Devaranavadi, B.B., Aski, B.S., Kashinath, R.T., Hundekari, I.A. Effect of Cigarette Smoking on Blood Lipids – A Study in Belgaum, Northern Karnataka, India, 2012, Global Journal of Medical Research. 12(6):1-3.
- [6] Dorland, W.A. Dorland's Pocket Medical Dictionary Ed. 28, 2016, Jakarta: EGC Medical Book Publisher.
- [7] Ekawati, RE.. Relationship of Blood Glucose to Hypertriglycerid in Diabetes Mellitus Patients. Faculty of Science and Technology. Airlangga University, Surabaya, 2012.
- [8] Gayatri A, Agus DS, Arini S. Nicotine Replacement Therapy. Faculty of Medicine, University of Indonesia. 2012;39(1):25-30.
- [9] Gondosari, A.H. Cholesterol, Saturated Fatty Acids, and Unsaturated Fatty Acids. In: Wijdan FR, editor. The Miracle of 5 Elements Energy. Depok: E-tera, 2010; pp. 43-50.
- [10] Kusumasari. The Relationship Between Smoking and Total Cholesterol Levels in Tasikmadu Karanganyar Sugar Factory Employees, 2015.