DESCRIPTION OF TOTAL CHOLESTEROL LEVELS IN ACTIVE SMOKERS USING THE CHOLESTEROL OXIDASE PEROXSIDASE AMINOANTYPIRIN (CHOD-PAP) METHOD IN PUSKESMAS KABILA

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ABSTRACT

Smoking can cause various health problems such as disorders of the blood vessels, deaths caused by vascular system diseases in Indonesia totaling 468,700 people or it is the 6th largest of all WHO group countries. This is because cigarette smoke contained in tobacco is one of the substances that can interfere with the body's work and affect cholesterol metabolism in the body, damaging the walls of blood vessels so that it makes it easier for fats to stick to the walls of the blood vessels.

The purpose of this study was to describe the total cholesterol levels in active smokers using the Cholesterol Oxidase Peroxsidase Aminoantypirin (CHOD-PAP) method.

This research is a quantitative descriptive study using simple random sampling technique. The population in this study were 428 active smokers with a sample of 28. Sampling was carried out at the district health center, bone bolango district, and an examination was carried out at the Regional Health Laboratory Center of Gorontalo Province from 12 to 16 October using a 5010 photometer.

Based on the research results found 18 respondents who who have high total cholesterol levels with a percentage of 64.3% and 10 respondents who have normal total cholesterol levels with a percentage of 35.7% and factors that can affect total cholesterol levels in smokers are genetics, age and habits of consuming high-fat foods. Active smokers are advised to stop consuming cigarettes or reduce the number of cigarettes consumed.

Keywords: total cholesterol levels, active smokers

INTRODUCTION

Cigarettes are cylinders of paper measuring 70 to 120 mm long (varying) with a diameter of about 10 mm. Inside it contains chopped tobacco leaves. To enjoy it, one end of the character is burned and allowed to burn so that the smoke can be inhaled through the mouth at the other end. Cigarettes can be divided into several types. This distinction is based on whether or not cigarette packaging material and cigarette raw materials or contents [1].

More than 1.1 billion people aged ≥15 years' smoke tobacco. ASEAN is a region with 10% of all world smokers, and 20% of the causes of global death due to tobacco. The percentage of smokers in the population in ASEAN countries is spread across Indonesia as much as 46.16%, Philippines 16.62%, Vietnam 14.11%, Myanmar 8, 73%, Thailand 7.74%, Malaysia 2, 90%, Cambodia 2.0 7%, Laos

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1.23%, Singapore 0.39% and Brunei 0.4% [23].

Cigarettes can be interpreted as processed wrapped tobacco, including cigars or other forms produced from the plant Nicotiana tabacum nicotiana rustica and other species or their synthesis containing nicotine and tar with or without additives [20]. Indonesia is in the 3rd position with the largest number of smokers in the world at 4.8% after China 30% and India 11.2% [24]. In 2007, Indonesia was ranked 5th with total tobacco consumption of 239 billion cigarettes / year after China (2.163 billion cigarettes / year), the United States (357 billion cigarettes / year), Russia (331 billion cigarettes / year) and Japan (259 billion cigarettes / year). In the same year, Basic Health Research stated that the population aged over 10 years who smoked was 29.2% and that number increased by 34, 7% in 2010 for the age group over 15 years. The increase in smoking prevalence occurred in the 15-24 year age group, from 17.3% in 2007 to 18.6% or an increase of nearly 10% in 3 years. The increase also occurred in the productive age group, namely 25-34 years from 29.0% in 2007 to 31.1% in 2010 [6].

Indonesia ranks 7th in the number of deaths caused by cancer, namely 188,100 people. The number of deaths caused by vascular system diseases in Indonesia is 468,700 or it is the 6th largest of all WHO group countries [24].

In 2015, Indonesia contributed more than 230,000 deaths due to consumption of tobacco products each year. Globocan 2018 states, of the total cancer deaths in Indonesia, lung cancer ranks first as a cause of death, which is 12.6% [4].

The proportion of the population aged ≥10 years according to the province who has the habit of smoking every day is among 34 provinces. The province with the most daily smoking habits was Lampung Province with a percentage of 27.5% to 28.8% with an average of 28.1%. Then the province with the second highest daily smoking habit was Bengkulu with a percentage of 26.9% to 28.7% with an average of 27.8%, and then the province with the third highest daily smoking habit was Gorontalo with a percentage of 26.3 % to 28.5% with a mean of 27.4 [19].

Based on the Bone Bolango district health office in 2019, the number of residents with smoking factors was recorded at 6,509 people. Based on the data obtained, the health centers with the highest population of smoking were Kabila Bone health centers with a total of 1,595, then the Tapa puskesmas with a total of 634, while the Kabila puskesmas were 428 [3].

The increasing proportion of smokers each year is caused by bad association, stress and curiosity. This often occurs in adolescents who do not know the dangers of smoking. Basically, one puff of a cigarette sends a dose of nicotine which works faster so that after the smoker extinguishes the cigarette the smoker will start to feel addicted [14].

Nicotine contained in tobacco is one of the substances that can interfere with the body's work and affect cholesterol metabolism in the body, damaging the walls of the blood vessels so that it makes it easier for fats to stick to the walls of the blood vessels. those who smoked twenty or more cigarettes per day had decreased HDL. The HDL level is reduced due to smoking, and also reduces the ability of HDL to remove excess blood cholesterol from areas affected by atherosclerosis, resulting in an increase in total cholesterol levels. Many people claim to know the bad effects of smoking on health, but they do not know that cigarette smoke can increase cholesterol levels in their body [12].

Smoking habits are closely related to blood vessel disease. The effects of

smoking can spur an increase in blood viscosity, hardening of the walls of blood vessels, and the growth of plaque on the walls of blood vessels. this growth causes cholesterol levels in a person's blood to increase [16].

Likewise with the previous study of 31 adult cigarette addicts in Amotowo Village, the results obtained were 21 people with high total cholesterol levels and 10 people with normal total cholesterol levels [10]. Likewise with Putri's research of 22 cigarette addicts in the village of Bululowo, Puri Village, it was found that 15 people had high total cholesterol levels and 7 people had normal total cholesterol levels [18].

High levels of cholesterol in the blood increase the risk of heart disease, hypertension and clogged arteries. Smoking a cigarette has a major effect on the increase in cholesterol levels which results in health problems, including: coronary heart disease, coronary thrombosis, cancer, bronchitis or inflammation of the throat branches, and fetal death caused by something in cigarette smoke, chemicals and some which is poisonous, among others, produced by cigarette smoke [11].

Based on the description above, the researchers were interested in conducting scientific research by raising the title description of total cholesterol levels in active smokers using the cholesterol oxidase peroxsidase aminoantypirin (CHOD-PAP) method at Kabila Health Center.

RESEARCH METHODS

This type of research is a quantitative descriptive study where this study aims to determine the description of total cholesterol levels in smokers at Kabila Health Center, then the examination results obtained are described.

The design of this study used a cross sectional research design, namely the research process that was carried out one time at the same time where after taking the blood sample of active smokers, the sample was immediately carried out by the process of checking total cholesterol levels.

The sampling location in this study was carried out at the Kabila Health Center, Bone Bolango Regency, where the sample was examined at the UPTD Regional Health Laboratory Center of the Gorontal Province, and the time of the study was in October 2020.

The research variable is something that becomes the object of observation in a study [21]. The variable in this study is an independent variable, namely total cholesterol levels in active smokers.

Population is the whole object to be studied. The study population in this study were 428 active smoking patients at the Kabila Public Health Center, Bone Bolango Regency.

The sample is an object to be measured so that it can represent the population. The sample in this study were active smoking patients at Kabila Health Center with a total sample size of 28 samples from the calculation of the sample size. While the sample for the examination was serum from active smokers.

The sampling technique was carried out by simple random sampling, where simple random sampling was a technique of taking samples from members of the population which was carried out randomly without paying attention to the strata in the population.

The sample criteria are male patients, patients over 20 years old, patients who have smoked for more than 5 years, patients who do not take cholesterol-lowering drugs, patients are willing to have their blood drawn for the benefit of cholesterol level research at Kabila Health Center, Bone Regency. Bolango. While the exclusion criteria were female

patients, patients under 20 years old, patients taking cholesterol-lowering drugs, patients who were not willing to have their blood drawn for the purpose of researching cholesterol levels at Kabila Health Center, Bone Bolango Regency.

The technique of collecting data on factors that can affect total cholesterol levels in active smokers, namely genetic / hereditary factors, age factors and habitual factors of consuming high-fat foods were obtained through interviews using a questionnaire. The questionnaire is a data collection technique used in this study which contains a list of questions that will be used by the researcher to obtain data directly from the source so that the objectives of the study can be achieved.

Measurement of total cholesterol levels in the blood using blood samples taken from veins with a disposable plebotomy procedure. The blood was taken as much as 3 ml and put into a red tube then centrifuged and the serum sample was taken and then checked using a 5010 photometer at the Gorontalo Province Regional Health Laboratory Center.

The cholesterol examination method used is the CHOD-PAP method, which is one of the methods used to check cholesterol on automatic devices in a large laboratory, a laboratory in a hospital or a health center laboratory. Every day, daily maintenance is carried out and Quality Control (QC) is carried out to find out that the tools and reagents are in working condition. Another use of QC is to know good precision and accuracy. The cholesterol oxidase peroxidase aminoanthypirin (CHOD-PAP) method is a method required according to the standards of the World Health Organization (WHO) and the International Federation of Clinical Chemistry (IFCC) [9].

Method CHOD PAP (Cholesterol Oxidase Para Amino Phenazone), cholesterol ester by cholesterol esterase is converted into cholesterol and free fatty acids. Cholesterol that is formed is oxidized with the help of cholesterol oxidase to form cholesterol and hydrogen peroxide. The hydrogen peroxide formed reacts with phenol and 4-amino phenazon with the help of peroxidase enzymes to form quininimin which is pink, then measured with a photometer in the wavelength range 480-550 nm. The intensity of the color formed is equivalent to the cholesterol levels contained in the sample [5].

Data analysis is the data processing stage after the data is collected from the results of data collection [2]. tThe data analysis technique used in this research is univariate descriptive with the results obtained from laboratory tests which will then be processed using the SPSS (Statistical Packege for Social Science) program.

The data in this study will be presented in the form of a table presenting total cholesterol levels so as to illustrate the objectives of this study, using the following formula:

$$P = \frac{f}{n} x100\%$$

Information:
P : Percentage.
F : The frequency of the results of the examination of high total cholesterol levels.
N : The total number of samples.
100%: Fixed number.

RESEARCH RESULT

Table 1. *Distribution of the Frequency of Active Smokers Based on the Results of Total Cholesterol Level Examination*

No.	Check up result	Frequency (f)	Percentage (%)
1.	Normal	10	35.7
2.	To increase	18	64.3

total	**28**	**100**

Source: Primary data, 2020

Based on the table above, it can be seen that the results of the examination with normal total cholesterol levels were 10 respondents with a percentage of 35.7% and the results of the examination whose total cholesterol levels increased were 18 respondents with a percentage of 64.3%.

Table 2. Cholesterol increase factors in active smokers based on genetics / heredity

No.	Genetics / Heredity	Results of cholesterol levels			
		High		Normal	
		N	%	N	%
1	There is	13	72.2	0	0
2	Nothing	5	27.8	10	100
Total		18	100	10	100

Source: Primary data, 2020

In the table above, it can be seen that respondents who have high cholesterol and there are offspring of high cholesterol sufferers are 13 people with a percentage of 72.2%, respondents who have high cholesterol and no offspring of high cholesterol sufferers are 5 people with a percentage of 27.8%. Meanwhile, 10 respondents who have normal cholesterol and no offspring of high cholesterol sufferers with a percentage of 100%.

Table 3. Cholesterol increase factors in active smokers by age

No.	Respondent Age	Results of cholesterol levels			
		High		Normal	
		N	%	N	%
1	**21-30**	5	27.8	8	80
2	31-40	3	16.7	1	10
3	41-50	5	27.8	1	10
4	51-60	5	27.8	0	0
Total		18	100	10	100

Source: Primary data, 2020

In the table of factors for increasing cholesterol in active smokers based on age above, it can be seen that respondents who have an age range of 21-30 and have high cholesterol levels are 5 respondents with a percentage of 46.4%, at the age of 31-40 as many as 3 respondents with a percentage of 16, 7%, age 41-50 as many as 5 respondents with a percentage of 27.8%, aged 51-60 as many as 5 respondents with a percentage of 27.8%. Whereas respondents who have an age range of 21-30 and have normal cholesterol levels are 8 respondents with a percentage of 80%, at the age of 31-40 as many as 1 respondent with a percentage of 10%, aged 41-50 as many as 1 respondent with a percentage of 10%, aged 51- 60 were not found to have normal cholesterol levels.

Table 4. *Cholesterol increasing factors in active smokers based on their consumption habits*

No.	Consuming Habits	Results of cholesterol levels			
		High		Normal	
		N	%	N	%
1	**Often**	17	94.4	0	0
2	**Rarely**	1	5,6	10	100
Total		18	100	10	100

Source: Primary data, 202

In the table above, it can be seen that respondents who often consume foods high in fat and have high cholesterol levels are 17 respondents with a percentage of 94.4%, respondents who rarely consume foods high in fat and have high cholesterol levels are 1 respondent with a percentage of 5.6% . While respondents who have normal cholesterol levels and rarely consume high-fat foods are 10 respondents with a percentage of 100%.

DISCUSSION

This research was conducted at the Kabila Health Center, Bone Bolango

Regency and sample examination was carried out at the UPTD Regional Health Laboratory Center. This study entitled the description of total cholesterol levels in active smokers using the cholesterol axidase peroxidase aminoantypirin (CHOD-PAP) method and the samples in this study were 28 samples.

Cholesterol is one of the fraction of fat derived from food and endogenous synthesis in the body. Sources of cholesterol in food include egg yolks, meat, lard (fat), milk, etc. The flow of cholesterol in the blood is not a simple matter. The basic ingredient of cholesterol is oil and the basic ingredient of blood is water, so we know that the two cannot mix. If cholesterol is just dumped into the bloodstream, it will clot and become useless.

Cigarette smoke contained in tobacco is one of the substances that can interfere with the body's work and affect cholesterol metabolism in the body, damaging the walls of the blood vessels so that it makes it easier for fats to stick to the walls of the blood vessels. Smoking habits are closely related to blood vessel disease. The effects of smoking can spur an increase in blood viscosity, hardening of the walls of blood vessels, and the growth of plaque on the walls of blood vessels. This growth causes cholesterol levels in a person's blood to increase.

Active smokers taken for this study were male active smokers, aged over 20 years, and had been consuming cigarettes for more than 5 years. The reason why taking samples of male sex, aged over 20 years is because male smokers are more than female smokers [7]. And gender factors affect blood cholesterol levels. In childhood, women have higher cholesterol values than men. Men show a significant reduction in cholesterol during adolescence, due to the influence of the hormone testosterone, which has increased at that time. But adult men over 20 years generally have higher cholesterol levels than women. So this is the reason the researchers took male respondents [22]. And the reason researchers took smokers who have been consuming cigarettes for more than 5 years is because according to researchers the increase in cholesterol levels can be influenced by the length of smoking and also the number of cigarettes consumed each day. This is caused by the longer it is inhaled carbon monoxide. Nicotine also stimulates an increase in blood pressure and the chemicals in cigarettes can increase cholesterol levels [11].

Total Cholesterol Level Check Results

Consuming cigarettes for a long time can cause an increase in total cholesterol levels in the body, nicotine in cigarettes can accelerate the process of constriction and blockage of the coronary arteries which carry oxygen to the heart and also occurs as a result of the absorption of nicotine contained in cigarettes, which triggers the release of catecholamines causing an increase. release of insulin in the blood, so that the activity of lipoprotein lipase (LPL) will decrease. This results in changes in the serum lipid profile, including an increase in total cholesterol levels [10].

Based on table 1.The frequency distribution of active smokers based on the results of the examination of total cholesterol levels can be grouped into 2 categories, namely normal total cholesterol levels, increased total cholesterol levels. The results of the examination of total cholesterol levels are said to be normal if the value is 150-200 mg / dl and the results of the examination of total cholesterol levels are said to be high if the value is> 200 mg / dl. Based on the results of the examination of 28 respondents whose total cholesterol levels were normal as many as 10 respondents with a percentage of 35.7% and the results of the examination whose total cholesterol

levels increased were 18 respondents with a percentage of 64.3%.

This is in line with the previous research of 31 adult cigarette addicts in Amotowo Village. The results showed that 21 people had high total cholesterol levels and 10 people had normal total cholesterol levels [10]. Likewise with Putri's research of 22 cigarette addicts in the village of Bululowo, Puri Village, it was found that 15 people had high total cholesterol levels and 7 people had normal total cholesterol levels [18].

Genetic/Hereditary factors for increasing cholesterol in Active Smokers

Genetic factors are decreasing factors that usually occur and also affect the concentration of cholesterol in a person's blood. If the family has high cholesterol levels, it is likely that someone has high cholesterol levels can occur. The increase in cholesterol at a young age becomes faster can also be caused by genetic factors. That is, someone who has a history of high cholesterol will quickly experience an increase in cholesterol in his blood after consuming foods and drinks that can increase cholesterol levels [8].

Based on table 2. Cholesterol increase factors in active smokers based on genetics / heredity who suffer from high cholesterol can be grouped into 2 categories, namely presence and absence. From the results of research conducted on 28 respondents, it was found that respondents who had high cholesterol and there were 13 people with high cholesterol sufferers with a percentage of 72.2%, respondents who had high cholesterol and no offspring of high cholesterol sufferers were 5 people with a percentage of 27, 8%. Meanwhile, 10 respondents who have normal cholesterol and no offspring of high cholesterol sufferers with a percentage of 100%. this is because most of them do not know whether their parents or family suffer from high cholesterol or not.

Factors for increasing cholesterol in Active Smokers by Age

The older a person can increase the total cholesterol level of that person. Total cholesterol levels increase gradually with age. Age factors are associated with changes in lipoprotein metabolism. 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 [17].

Based on table 3. The factors of increasing cholesterol in active smokers by age can be grouped into 4 categories, namely the age range 21-30 years, 31-40 years, 41-50 years, 51-60 years. From the results of research conducted on 28 respondents, it was found that respondents who had an age range of 21-30 and had high cholesterol levels were 5 respondents with a percentage of 46.4%, at the age of 31-40 as many as 3 respondents with a percentage of 16.7%, age 41-50 as many as 5 respondents with a percentage of 27.8%, aged 51-60 as many as 5 respondents with a percentage of 27.8%. Whereas respondents who have an age range of 21-30 and have normal cholesterol levels are 8 respondents with a percentage of 80%, at the age of 31-40 as many as 1 respondent with a percentage of 10%, aged 41-50 as many as 1 respondent with a percentage of 10%, ages 51-60 are not found to have normal cholesterol levels. This also happened with previous studies, namely an increase in total cholesterol levels in respondents aged 41-60 years, namely 69 respondents from a total of 90 respondents [22]. And also in Yoeantafara's study, there was an increase in total cholesterol levels in respondents aged 45-70 years, namely 21 respondents with the highest percentage, namely 75% [25].

Cholesterol increasing factors in active smokers based on the habit of consuming high-fat foods

Consuming foods that are high in fat and cholesterol (found in offal (liver), eggs, coconut milk, butter and cheese) will increase total cholesterol and LDL levels, the liver will have sufficient cholesterol levels and will stop taking LDL which can increase total cholesterol levels . People who are at risk of having high cholesterol levels are those who adopt a diet that contains high levels of saturated fat. Increased blood LDL cholesterol levels at a young age can occur due to various factors, including lifestyle such as lack of physical activity and consumption of foods high in fat or carbohydrates [15].

Based on table 4. The factors of increasing cholesterol in active smokers based on their habit of consuming high-fat foods are grouped into 2 categories, namely consuming frequently and rarely consuming. From the results of research conducted on 28 respondents, it was found that respondents who often consumed foods high in fat and had high cholesterol levels were 17 respondents with a percentage of 94.4%, respondents who rarely consumed foods high in fat and had high cholesterol levels were 1 respondent with a percentage of 5 , 6%. While respondents who have normal cholesterol levels and rarely consume high-fat foods are 10 respondents with a percentage of 100%.

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