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INCREASED SERUM AMINOTRANSFERASE LEVELS FOR ACTIVE SMOKERS EFFECT TO DEGREE OF SMOKING *(A LIBRARY RESEARCH)*

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ABSTRACT

Smoking has a negative impact on the health of the body, one of which causes damage to the structure of liver cells, marked by the release of the best enzyme in assessing liver function, namely the serum aminotransferase group which includes AST and ALT, and the levels are increased in blood circulation. Smoking activity can be seen from the age of the smoker, the type of cigarette, the number of cigarettes in a day, the duration of smoking, and the degree of smoking. The purpose of this study was to determine the relationship between degree of smoking and increased serum aminotransferase levels in active smokers. The research method uses the library research method. The data used is secondary data from research that has been published in scientific journals. The results showed highest smoking degree is in the light-medium group. Most of the serum aminotransferase levels have increased, both AST and ALT levels. The conclusion there is a the degree of smoking with serum aminotransferase levels. Meanwhile, there was relationship between degree of smoking with the serum aminotransferase levels. In various studies, there is a relationship between AST and ALT levels in smokers. The increase in serum aminotransferase levels in smokers occurs <2x the normal value, an increase that occurs only within 2-70% of normal.
Keywords : Serum Aminotransferases, Degree of Smoking , AST, ALT

INTRODUCTION

Smoking can have a bad impact so that it can cause a burden on the health, social, economy, and environment of smokers. Smoke from burning cigarettes contains substances that are harmful to the body such as nicotine and tar, with or without additives and produce free radicals (prooxidants) Khairunnisa (2016)In addition to free radicals, smoke produced from a cigarette can contain toxic gas, namely Carbon Monoxide (CO), which can cause a decrease in oxygen levels in the body, causing tissue hypoxia. Septia, et.al (2016). Nicotine is easily absorbed and enters the bloodstream regarding various organs in the body, one of which is the liver, which causes inflammation of the liver, Nadia.L (2016).

At this time, smoking is still an unsolved problem for Indonesia, because it has become a common activity for the public and the number of cigarette consumption continues to increase by the Ministry of Health of the Republic of Indonesia 2017. The prevalence of smoking in Indonesia is very high in various levels of society, especially in men 13 times higher (62.9%) compared to women (4.8%). The prevalence of smoking at the age of 10-18 years has increased data from the National Health Research (Riskesnas) in 2016. This shows smoking behavior in Indonesia in addition to adults, as well as in adolescents and children Basic Health Research (RISKESDAS) 2018.

Smokers in Indonesia consume many types of white cigarettes made of clove-free tobacco wrapped in paper. Types of kretek cigarettes contain more chemical substances than non-kretek cigarettes. In addition, some cigarettes can contain nicotine, tar, and tobacco levels which are lighter than other cigarettes so that they feel lighter when consumed, this type of cigarette is known as mild cigarettes. Some types of cigarettes can come with a filter or filter made of cork and attached to one side of

the cigarette. This *filter* functions to reduce nicotine levels which can have an effect on users of Sukmana T (2011).

The number and duration of smoking is one of the risk factors for abnormalities in the liver, marked by increased levels of the aminotransferase enzyme, Roza et.al (2017). The more and longer smoking will worsen the health condition of smokers because it increases free radicals in the body and is at great risk of causing abnormalities in the body Tanoeisan, A.P, et.al (2016). The result of multiplying the number of cigarettes with the duration of smoking can produce the *Brinkman Index* value to determine the degree of smoking. Amelia R, , et.al (2016).

In the metabolic process in the cell, a protein is needed which functions as a catalyst for biochemical reactions in increasing the rate of the reaction, namely enzymes. Enzymes will be in the blood circulation within normal limits, but when there is tissue damage, an increased level will be found as a *marker* of tissue damage Susantiningsih, , T (2014). Increased levels of aminotransferases due to increased free radicals due to smoking activity may reflect liver tissue damage. For this reason, this study was conducted through literature studies from published research results regarding the increase in serum aminotransferase levels in active smokers due to smoking activity.

METHOD

This research uses the library research method (Library Research). Sources of data used in this research come from journals, textbooks and other scientific works related to the research topic. The data sources used were 19 literature, with details of the use of journals as many as 12 types of journals (5 national journals and 7 international journals) and 7 other scientific works.

This research data collection technique was taken from data sources by exploring looking for information or variables related to the study using literature references from early 2020 to literature at least 10 years before. The information that has been obtained is evaluated to ensure that the data obtained is accurate, objective, up to date, and in accordance with the criteria set in the study. After being evaluated, a summary of the data was made to make it easier to compile and combine it into a complete scientific paper. As a comparison in determining AST and ALT levels, guidelines from the Indonesian Ministry of Health (2011) are used with normal values of 5-35 IU / L for AST and ALT.

RESULT

Table Relationship of Degree of Smoking to Serum Aminotransferase Levels

No.	Literature Resources	Degree of Smoking	Serum *Aminotransferase* Level	
1.	Roza, Oenzil and Pertiwi, 2017 in the Relationship between Smoking and Serum Aminotransferase Activity Levels in Office Employees		*Mean* AST	*Mean* ALT
		Light	28,24	30,76
		Moderate	34,48	30,96
		Severe	49,26	45,45
	P Value		0,010	0,435
2.	Abdul-razaq and Ahmed, 2013 in *Effect of Cigarette Smoking on Liver Function Test and some other Related Parameters*		*Mean* AST	*Mean* ALT
		Moderate	23	19,53
		Severe	28,53	28,65
	P Value	Moderate	0,86	0,57
		Severe	0,001	0,0001
3.	Jabbar and Abdul-Hassan, 2017 in *Cigarette Smoking and Serum Liver Enzymes*	Severe	The degree of weight group had a significant association with the increase in AST	

			and ALT levels compared to the nonsmokers group
	P Value		P<0,01 P<0,01
4.	Tanoeisan, Mewo and Kaligis, 2016 Overview of Serum Glutamic Pyruvic Transaminase (SGPT) levels in active smokers aged> 40 years	Mild-medium	ALT levels are normal
		Severe	ALT levels increased in all weight groups
5.	Wati, 2018 in Overview of Serum Glutamic Pyruvate Transaminase (SGPT) Levels in Active Smokers	Mild-medium	ALT levels in 28 respondents had normal levels
		Severe	ALT levels in 2 respondents increased
6.	Yulihardiyanti, 2016 in Examination of ALT Enzyme Levels in Active Smokers at the Kharisma Medical Center Clinic in 2016		Number of respondents with ALT increases
		Normal- Light	26
		Moderate	49
		Severe	8
			Number of respondents with ALT increases
		Increase- Light	14
		Moderate	20
		Severe	0

That Table of several studies on the relationship between smoking degree and serum *aminotransferase* levels, shows that smokers with heavy smoking levels can cause an increase in AST levels, other studies show an increase in ALT levels in heavy smokers. On research Yulihardiyanti (2016) there was the greatest increase in ALT levels in the moderate smoking group. Analytical research conducted by Roza, Oenzil and Pertiwi (2017) showed that there was a significant difference between heavy smokers with other degrees of AST levels, and there was no significant difference between heavy smokers and other degrees in ALT levels.

DISCUSSION

Methodologically, research conducted by oleh Roza, Oenzil and Pertiwi (2017) has a good literature because it discusses the completeness of all variables compared to other literature. In research with the literature study method, it has several limitations and shortcomings. A library with complete variables and commensurate with this research is difficult to find. So that researchers need to find and combine several other literature, one of which is by expanding the demographics of the literature. In addition, researchers must also have more accuracy and persistence in sorting and evaluating journals. This deficiency can be a recommendation in future studies where complete information is needed related to the smoking activity variable.

That several studies stated that there was a relationship between the degree of smoking in heavy groups with increased levels of AST and ALT. The greater the degree of smoking or the more number of cigarettes consumed, the more chemicals from cigarettes enter the body resulting in permanent liver dysfunction, marked by an increase in liver enzymes. (Jabbar, D.K. and Abdul Hasan, H.K 2017). According to Roza, Oenzil and Pertiwi (2017), there are 3 mechanisms that cause disorders

due to smoking, cytotoxic substances, oncogenic substances, and iron accumulation. Intoxication of CO in the blood can cause hypoxia and affect the levels of oxygen saturation and hemoglobin, so that the body will produce more erythropoietin hormone. If this hormone is produced too much, it will cause secondary polycythemia and iron accumulation (Tanoeisan, A.P., Mewo, Y.M, Kaligis, S.H.M 2016., Amelia, R., Nasrul, E, Basyar, M 2016., Sudaryanto, W.T. 2016., Adrian, K. 2020).

Table on the study of Yulihardiyanti (2016) obtained different results there is an increase in ALT levels in smokers with the moderate degree group. This can occur due to various factors including good body metabolism in neutralizing toxic substances, endurance and lifestyle. The results of other studies also show that smoking accompanied by alcohol consumption can also increase serum aminotransferase levels (Breitling, L.P.et.al 2011, Park, E.Y.et.al 2013 and Priya, N & Venkatalaksmi,P.2013). So that smokers with a moderate degree with a bad lifestyle will increase serum aminotransferase levels.

Table 13 shows an increase in AST levels accompanied by an increase in ALT because ALT is a specific enzyme found in the liver and can be found slightly in other organs. Meanwhile, AST is an enzyme that can be used to assess liver and heart abnormalities. If there is an increase in both, it can be interpreted that there is an abnormality in the liver (Fischbach, F, et.al 2015) and Pagama, K. D. et.al 2018).

CONCLUSION

The highest degree of smoker shows the mild-moderate group. There is a relationship between the degree of smoking with serum aminotransferase levels.The increase in serum aminotransferase levels in smokers occurs < 2x the normal value, an increase that occurs only within 2-70 % of the normal limit.

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