

# OVERVIEW OF EXAMINATION RESULTS OF SERUM GLUTAMIC OXALOACETIC TRANSAMINASE LEVELS OF PROLANIS PARTICIPANTS SUFFERED FROM HYPERTENSION AT KABILA HEALTH CENTER

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## ABSTRACT

This research aimed to give an overview of the examination results of the serum glutamic oxaloacetic transaminase (SGOT) levels of the participants of Indonesian Chronic Disease Management Program (PROLANIS) who suffered from hypertension at Kabila Health Center, District of Bone Bolango, Gorontalo.

This research used a quantitative approach with a descriptive type of research. The research design used a cross sectional research design. The type of data used were primary data in the form of SGOT examination results on PROLANIS participants conducted at the Gorontalo Regional Health Laboratory and secondary data in the form of interviews using questionnaires obtained directly at the research location. The sampling technique used in this study was purposive sampling with a total sample of 23 participants of PROLANIS.

The results showed that all samples of PROLANIS participants with hypertension at the Kabila Health Center in 2021 had normal or no increase in serum glutamic oxaloacetic transaminase levels.

**Keywords:** PROLANIS, Hypertension, SGOT level

## INTRODUCTION

Currently, Indonesia is facing a disease change from a disease that cannot be prevented to a disease that cannot be transmitted. The increase in disease is caused by the encouragement of urbanization, modernization, and globalization. Increased life expectancy is associated with socio-economic improvements and the quality of health services that lead to an increase in degenerative diseases. One of the current non-communicable diseases that many face in the health sector is high blood pressure [12].

According to WHO (2015) there are around 1.13 billion people in the world who suffer from side effects of

hypertension. Based on the increase in high blood pressure worldwide, it is estimated that 1.5 billion people have developed high blood pressure and 9.4 million will die from high blood pressure by 2025 [28].

Hypertension is a condition in which the systolic circulation pressure is more than 140 mmHg and the diastolic pressure is more than 90 mmHg. There are two types of hypertension, namely essential hypertension where the cause of hypertension is not known, and optional hypertension caused by kidney disease, endocrine disease, and coronary heart disease. Uncontrolled circulation strains in hypertensive patients cause cardiovascular

complications, and kidney infections so that the risk of threatening the health of the sufferer increases along with the development of hypertensive conditions [3].

High blood pressure can lead to cardiovascular complications, coronary heart disease, stroke, and kidney infection. The most prominent absorption capacity was found in Bangka Belitung (30.9%), followed by West Java (29.4%), and the least was found in West Papua (16.8%) [3].

Based on data from the Gorontalo Provincial Health Office, in 2018 there were 1,627 people with high blood pressure in Pohuwato District, as many as 1,754 people in Boalemo District, as many as 1,134 people in North Gorontalo District, as many as 7,276 people in Gorontalo District, as many as 3,326 people in Gorontalo City, as many as 3,326 people in Gorontalo District, and from Bone Bolango District as many as 4,053 people. Therefore, it can be seen that Bone Bolango District ranks second with the most hypertension cases in Gorontalo Province [6].

Based on the Regional Basic Health Research, the prevalence of Bone Bolango District in January-December 2020 was 28.9%. The prevalence of high blood pressure in Gorontalo Province measured by measurement at the age of 18 years was highest in the Gorontalo region (41.0%) with 29.0%, followed by Bone Bolango District (28.9%), Gorontalo City (22%), and North Gorontalo District (22.1%) [20].

Based on data regarding hypertension at health centers in Bone Bolango District in 2020, there were 1,357 hypertension sufferers. In the working area of the Kabila Health Center there are 12 villages that are included in the Indonesian Chronic Disease Management Program (PROLANIS). In April 2021, there were 1,067 PROLANIS participants from 12

villages who were actively registered to take part in the program with the diseases of hypertension and diabetes mellitus at the Kabila Health Center. There were 93 participants with hypertension who actively participated in PROLANIS at the Kabila Health Center.

The Indonesian chronic disease management program (PROLANIS) is a framework that combines welfare administration and correspondence that brings them together with participants with specific disease states in an effort to achieve disease freeness. The basic objective of the PROLANIS program in health centers is to empower the members with ongoing illnesses to achieve ideal personal satisfaction with a marker of 75% of participants registered and visiting the first-level health care facilities with good results in explicit assessments for type II DM and hypertension to prevent disease complications [3].

Hypertension is a disease in which systolic blood pressure is 140 mmHg and diastolic blood pressure is 90 mmHg. High blood pressure is a major risk factor for various cardiovascular diseases including coronary artery disease, stroke, kidney disease, and retinopathy [18].

The causes of hypertension are divided into two groups, namely primary blood pressure with unknown causes and secondary blood pressure with known causes. Hypertension is divided into four levels, namely normal level (PAS = systolic blood pressure < 120 mmHg and diastolic pressure = PAD or DBP < 80 mmHg); prehypertension; PAS level of 120-139 mmHg, and PAD level of 80-89 mmHg [18].

The heart works to pump blood and distribute it to all parts of the body by returning it through the lungs after cleaning. If there is a decrease in the work of the heart, for example due to constriction of the heart muscle, it will affect the amount of oxygen and its

distribution throughout the body. In cardiovascular muscle decay, intracellular proteins enter the interstitial spaces and ground pathways via adjacent microvascular and lymphatic outflows. The level marker profile of biochemical uptake in peripheral distribution depends on their subatomic weight, distribution such as vascular or lymphatic flow, and so on. Intracellular proteins, including aspartate aminotransferase (AST) or called Serum Glutamic oxaloacetic transaminase (SGOT) are presented as one of the biochemical markers of heart muscle damage [23].

Blockages in blood vessels make the heart work harder and if it lasts for a long time, the heart muscle will be damaged. In people with hypertension, the heart muscle must work hard to push blood from the blood vessels to all body tissues which lasts for a long time. This causes damage to the blood vessels in the heart. The performance of the liver will also be disturbed because of this. The heart is one of the main organs of the body. The size of a heart is about the size of an adult's fist. The heart functions to pump and distribute blood containing oxygen throughout the body [14].

The symptoms that can describe hypertension include headaches, palpitations, neck pain, fatigue, blurred vision, and nosebleeds. This situation can cause stress so that it affects the quality of life of the sufferer [11].

The higher the systolic (TDS) and diastolic (TDD) blood pressure, the bigger the cardiovascular system. Deaths from ischemic heart disease (IC) per decade increase as TDS and TDD increase. The same thing happened to 4444 deaths from stroke. In addition, cardiovascular, cerebrovascular, and vascular complications can also occur [18].

When treating patients with high blood pressure, it is important to keep in mind that the pathophysiology of high

blood pressure is different for each patient. The factors in the form of sympathetic and sodium throughout the body only play a small role.

Knowledge about the pathophysiology of high blood pressure that needs to be known is insulin resistance, which is caused by the following:

1. Production of angiotensinogen in insulin-safe adipose tissue is instinctive.
2. Decreased levels of NO caused by insulin resistance which can cause endothelial damage.
3. Enhanced articulation and expanded articulation of AT1 receptors.
4. Greater absorption of sodium in the proximal tubule.
5. Increase in sympathetic activity [18].

Risk factors for hypertension are divided into two groups, namely:

#### **Primary Hypertension**

- a. The risk factor that cannot be changed is age which affects the incidence of hypertension because age continues to increase thereby increasing the risk of hypertension. In the age group >55 years, the incidence of hypertension is >55%. In the elderly, hypertension is more likely to be systolic hypertension. This is caused by structural changes in the major blood vessels. Therefore, men have a risk of systolic hypertension 2.3 times higher than women, because men are suspected of having hypertension. However, after menopause, the prevalence of hypertension in women will increase drastically than in men. Hypertension can be inherited on to the next generation which tends to lead to the type of primary hypertension. Environmental factors also contribute to the development of hypertension.

#### **b. Secondary Hypertension**

Modifiable risk factors include obesity, active smoking, passive

smoking, excessive salt intake, dyslipidemia, alcohol consumption, stress, and psychosocial [4].

SGOT is an enzyme in the cytoplasm and the mitochondria of the body cells. SGOT is widely distributed in the body's organs, and in large quantities in the liver, in the heart muscle, and can also be found in the kidneys, brain, spleen, lungs, pancreas, and red blood cells. SGOT or also known as aspartate aminotransaminase (AST) is an enzyme that is found in the cardiac muscle. To see the function of the cardiac muscle in patients with high blood pressure, the SGOT test can be done. Cardiac muscle can be damaged by persistently high blood pressure. SGOT is produced primarily in the heart, liver, skeletal muscles, kidneys, pancreas, spleen, brain and lungs. SGOT is mostly bound in organelles and only a small part is found in the cytoplasm. Elevated levels of SGOT have been found in acute myocardial infarction, cirrhosis, liver cancer, chronic hepatitis, liver cognition, hemolytic anemia, acute pancreatitis and acute kidney disease. A decrease in SGOT was found in uncontrolled diabetes [14].

SGOT (Serum Glutamic Oxaloacetic Transaminase) examination includes:

1. IFCC method that measures enzyme activity through light absorbance with a wavelength of 340 nm.
2. Principle: Aspartate aminotransferase catalyzes aspartate transaminase to L-glutamate and oxaloacetate. Oxaloacetate is reduced to Malate by protein malate dehydrogenase (MDH) and nicotinamide adenine dinucleotide (NADH) is oxidized to NAD photometrically in a spectrophotometer with a frequency of 340 nm [8].
3. Interpretation of the results:  
Women :< 31 U/L  
Men :< 35 U/L  
Children: 3 years :< 50 U/L

7 – 9 years :< 40 U/L

10 – 12 years :< 40 U/L

13 – 15 years :< 35 U/L

16– 18 years :< 35 U/L.

#### 4. Photometer riele 5010 kit

- a. Photometers are basic instruments in clinical laboratories for measuring the light output of solutions. Many clinical laboratories use this tool to determine the level of a substance in body fluids such as serum or plasma.
- b. The rule of the photometer function is an estimate of the light consumption of a certain frequency against the setting or color it passes through. Most photometers identify with a photoresist, diode, or photo duplicator. To check the light, the photometer can measure the light through the monochromator channel to confirm a predetermined frequency or to check the circulation of the light range. Photometers have basically the same thing as spectrophotometers. The main difference lies in the use of the channel as a monochromator. Channels are only used to communicate light but can also sustain different wave radiation sources. The use of photometers is increasingly being used for clinical research purposes (blood tests).

To analyze hypertension, doctors sometimes ask to do a liver catalase test or a cardiac test. Cardiovascular capacity test consists of examination of SGOT (Serum Glutamic Oxaloacetic Transaminase), LDH (Lactate Dehydrogenase), Creatinine Kinase, Creatine Kinase-Myocardial Band).

Blood is a liquid made up of blood plasma and blood cells. Blood is used to transport oxygen from the lungs to the tissues and vice versa, the blood transports carbon dioxide from the tissues to the lungs to be excreted and transports nutrients from the

digestive tract to the tissues and then the remnants of metabolism through secretory organs such as the kidneys will release hormones and blood clotting material [14].

Serum is the liquid part that consists of blood plasma and blood cells. Blood plasma is a liquid that does not contain blood cells, but contains platelets. Plasma is obtained from blood mixed with anticoagulants and centrifuged at a certain time and speed so that it can be divided into several parts that have different compositions depending on the type of anticoagulant added to it [9].

Stress is an excessive burden due to thoughts that are not solidly controlled. The source of stress can sometimes come from within (internal) usually represented by feelings of suffering. The level of stress depends on the circumstances and the age of the person. Stress can also arise as a result of interactions with others in conflict [7].

Treatment in hypertensive patients is done to improve the quality of life of the individual. However, many patients stop treatment when they feel their health is improving. Therefore, it is important to give consent to patients who will undergo hypertension treatment to obtain superior personal satisfaction for patients. People who take medication regularly and persevere in doing that are less likely to develop hypertension than people who take medication sporadically. This is consistent with the hypothesis that adherence to medication used to treat high blood pressure is very important.

Consuming healthy and nutritious foods as well as regulating diet are things that must be considered by the elderly who suffer from high blood pressure, including doing a low salt diet or a hypertension diet. High blood pressure in the elderly must be controlled by diet or proper dietary regulations to control high blood pressure and limit its effects. Using salt

close to 100 mEq/L (2.4 grams of sodium salt or 6 grams of table salt) per day can lower systolic blood pressure by 28 mmHg [7].

To calibrate the photometer, the frequency accuracy is adjusted clockwise, for example by using white paper that is faced towards the light and observing the shadows that appear at a certain frequency which can be slightly blue green at 500 nm, blinding green at 525 nm, and yellow green at 585 nm [8].

## RESEARCH METHODS

This type of research is descriptive with a quantitative approach in the form of numbers obtained from the results of examination of SGOT (serum glutamic oxaloacetic transaminase) levels in PROLANIS participants who suffer from hypertension at the Kabila Health Center. The population used in this study were PROLANIS participants who were actively participating in the program at the Kabila Health Center. There are 1,067 registered participants in PROLANOIS with a diagnosis of hypertension and diabetes mellitus. The population of PROLANIS participants with a diagnosis of hypertension at the Kabila Health Center were 93 participants. The sampling technique used was purposive sampling technique. The number of samples used was as many as 23 samples. Data was collected through interviews using a questionnaire.

The types of data used in this research are primary data and secondary data. The primary data used in the study were the results of the examination of SGOT levels carried out at the Regional Health Laboratory, while the secondary data came from the results of observations in the form of medical records of patients with hypertension.

Sources of data obtained from interviews with respondents/participants with hypertension through a questionnaire

at the research site. The data from this study consisted of data on the number of hypertension sufferers in Gorontalo Province, Bone Bolango District, Kabila Health Center, Provincial Health Office of Gorontalo, Bone Bolango District Health Office, and the PROLANIS program.

The sample size in this study was calculated using the Stanley Lemeshow formula.

$$n = \frac{N Z_{1-\alpha/2}^2 P(1-P)}{(N-1) d^2 + Z_{1-\alpha/2}^2 P(1-P)}$$

The data obtained were analyzed using Microsoft Excel then presented in the form of a percentage using the following formula [26].

$$P = \frac{f}{N} \times 100 \%$$

The data was then analyzed using univariate analysis with expressive tests to describe the SGOT levels in hypertensive patients at the Kabila Public Health Center. Univariate analysis is an analysis on a single variable to be processed into useful data.

Data collection in this study went through several stages including:

1. Informed consent

Respondents completed a consent structure for the study. In case the respondent refuses, the research is not continued.

2. Questionnaire

In this study, the method of collecting information was in the form of a questionnaire.

3. Laboratory examination in which the material or sample taken from the patient can be in the form of blood, sputum, urine, skin scrapings, and other body fluids.

The results of the research conducted to describe the results of the examination of SGOT levels in PROLANIS participants who suffer from hypertension at the Kabila Health Center with a total sample of 23 blood samples are described in tabular form along with narrative. This study was conducted with the aim of knowing the characteristics that affect normal and abnormal SGOT levels in PROLANIS participants who suffered from hypertension.

**Table 1.** Results of examination of SGOT levels for PROLANIS participants with hypertension

No	Sample Code	Gender	Age (Year)	Results	Description
1.	FU	F	42	26 U/L	Normal
2.	SR	F	46	26 U/L	Normal
3.	HM	F	49	25 U/L	Normal
4.	MH	F	49	25U/L	Normal
5.	GH	F	49	27U/L	Normal
6.	SI	F	51	26 U/L	Normal
7.	OI	F	52	27 U/L	Normal
8.	YR	F	54	29 U/L	Normal
9.	TE	F	55	25 U/L	Normal
10.	RU	F	55	25U/L	Normal
11.	RP	F	60	30 U/L	Normal
12.	HH	F	61	28 U/L	Normal
13.	NH	F	62	25 U/L	Normal
14.	SH	F	62	30U/L	Normal
15.	FM	F	63	29 U/L	Normal
16.	MA	F	63	26U/L	Normal
17.	RL	F	63	25U/L	Normal
18.	WM	F	63	29 U/L	Normal
19.	DS	F	64	28U/L	Normal
20.	EH	F	64	31 U/L	Normal
21.	ST	F	65	29 U/L	Normal
22.	HD	F	65	30 U/L	Normal
23.	AM	F	65	27 U/L	Normal

Source: Primary Data, July 2021

The data in Table 1 shows that all 23 female PROLANIS participants who suffer from hypertension have normal SGOT levels with a percentage of 100% at the Kabila Health Center in 2021.

## RESULTS

*Overview of Examination Results of Serum Glutamic Oxaloacetic Transaminase Levels of Prolanis Participants Suffered from Hypertension at Kabila Health Center*

**Table 2.** Frequency distribution of PROLANIS participants with hypertension based on lifestyle

Lifestyle	Frequency	
	N (Total)	%
Stress	3	13.0
Not Stress	8	34.8
Consume healthy food	8	34.8
Not consume healthy food	4	17.4

Source: Primary Data, July 2021

The data in Table 2 shows that as many as 3 PROLANIS participants who suffer from hypertension with a healthy lifestyle continue to experience stress with a percentage of 13.0%, while 8 participants with hypertension and healthy lifestyle are not stressed with a percentage of 34.8%. There were 8 people with hypertension who ate healthy food with a presentation of 34.8% while those with hypertension who did not eat unhealthy food were 4 people with a percentage of 17.4%.

## DISCUSSION

In Indonesia, women aged 45 years are at high risk of experiencing hypertension, while a small proportion of men experience it with side effects. This can happen because the body of a woman who has not experienced menopause contains the chemical estrogen, high-density lipoprotein (HDL). HDL cholesterol levels affect the course of arteriosclerosis and can cause an increase in circulatory pressure if levels are abnormal. A person can be said to have hypertension if on two different days experiencing a systolic blood pressure higher than 140 mmHg and a diastolic blood pressure higher than 90 mmHg.

The sample used in this study was blood without anticoagulant which was allowed to stand for a while and was centrifuged at 3000 rpm for 10 minutes to form serum. The working reagent was first made by mixing the reagents before conducting the study with 1 SGOT and 2 SGOT reagents in a ratio of 4:1 (2000 µl + 500 µl).

The population used in this review was 1,067 active PROLANIS participants who suffer from hypertension and diabetes mellitus at the Kabila Public Health Center in 2021. The research was conducted using the purposive testing method by determining the standard of merging and avoidance. There are 93 PROLANIS participants who actively participate in PROLANIS. As many as 23 participants of PROLANIS suffer from hypertension. Based on the side effects of this review, it is known that the SGOT level of PROLANIS patients with hypertension can have a characteristic increase or vice versa.

According to research by Gede Wahyu (2014), normalization of SGOT levels can occur due to the use of more than one type of antihypertensive drug if a person does not achieve objective circulatory pressure using only one type of drug. The use of more than one drug is started if the patient's circulatory strain is delegated stage 2 hypertension.

SGOT levels did not increase or were declared normal because the development of hypertension had been constrained by the persistent disease program held by the Health Center and most of the hypertensive patients consistently took antihypertensive drugs and adopted a healthy lifestyle. However, there is still a small proportion of PROLANIS participants with hypertension who have high blood pressure, namely 3 participants with a percentage of 13.0% and not eating healthy food sources as many as 4 participants with a percentage of 17.4%.

Health coaching is one of the mandatory exercises in the elderly program. To develop further welfare training, hypertension treatment should be made possible with materials that are also adapted to the treatment and carried out in all cities so that it is evenly distributed. In addition, coaching must also be carried out by providing a correct understanding of hypertension in order to awaken inspiration for the elderly to seek treatment. Coaching must also be carried out in the region and not limited to the elderly, but also to family members who suffer from hypertension and provide assistance

Elevated levels of SGOT generally indicate damage to the liver, blood cells, heart cells, and muscle cells and other organs. In addition to the liver, organs such as the heart, brain, and muscles can also be checked for damage using the SGOT blood test. Increased SGOT values indicate muscle disease, mushroom poisoning, kidney failure, hepatitis A, hepatitis B, hepatitis C, heart failure, and fatty liver. High blood pressure is a common health problem in society that is associated with other diseases.

According to research Setiawati, et al., (2021), SGOT is a chemical found in the heart and liver muscles and as well as in skeletal muscles, kidneys and pancreas with moderate fixation. SGOT with a level of 740 IU/L has normal quality. In dead cardiovascular tissue, the level of SGOT increased after 10 hours and reached its maximum point at 2448 hours later causing local necrosis. SGOT will be normal after 46 days if no additional local necrosis occurs. In general, the level of SGOT/AST is often associated with other cardiac enzyme levels such as creatin kinase (CK) and lactate dehydrogenase (LDH) levels.

Factors that cause hypertension are age, sexual orientation, family ancestry, heredity (danger factors that cannot be

changed/controlled), smoking habits, excess weight, erratic work, stress, and excessive salt use. The cause of hypertension is also due to the consumption of spicy food, caffeine, or monosodium glutamate. Increasing age causes blood pressure to increase and blood vessels to thicken.

There are more than 4 participants of the PROLANIS who stated that they did not consume healthy and quality food, so that food intake in the body was not fulfilled to the maximum which could actually worsen the patient's condition. Improvements in nutritional status in elders must be sought in order to survive in ideal conditions with acceptable personal satisfaction.

Welfare status, conditions and climate in the environment, as well as health problems affect the development of hypertension. Dietary requirements in the elderly must be fulfilled appropriately in order to help the healing process, including giving attention and affection during treatment. Low welfare status with Body Mass Index (BMI) <20 will result in very low glutathione so the factors that cause this must be avoided.

Excess nutrition can have a bad influence on the carrying capacity of the body, especially in people with diabetes mellitus, hypertension, heart disease, malignant growth and can shorten the future. At the time of the study, there were three respondents who experienced stress which increased pulse rate. Stress can also cause people to act seriously (mental health-related) so that it can cause hypertension. Stress creates a feeling of urgency and increased tension which the body converts into a significant immediate response from the circulatory system. As a result, this stress affects the pulse and blood flow. The relationship between stress and hypertension is thought to start with serious nerve movement because the increase in nerves can increase the pulse



rate which then beats irregularly (sporadic). Delayed pressure can lead to persistent hypertension.

There are challenges in carrying out this research, namely two hypertensive patients from PROLANIS participants refused to participate as research respondents so that researchers had to explain carefully, briefly and precisely to both of them until they were willing to be used as research samples. Another challenge is that this research is only limited and devoted to people with hypertension, but people with diabetes mellitus also ask to be respondents.

## CONCLUSION

Based on the results of the research, it can be concluded that:

1. From 23 participants of the PROLANIS with hypertension at the Kabila Health Center in 2021 who became respondents in the study, it was found that the levels of SGOT (Serum Glutamic Oxaloacetic Transaminase) of all respondents were normal.
2. Based on the characteristics of the lifestyle of the Hypertensive patients in the Health Center, it is known that the percentage of respondents who experienced stress was 13.0%, did not focus was 34.8%, unhealthy food quality was 34.8%, and the loss of appetite was 17.4%.

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