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IMAGES OF UREUM SERUM LEVELS IN TYPE II MELLITUS DIABETES AT TOTO KABILA HOSPITAL

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ABSTRACT

Diabetes mellitus is a carbohydrate metabolism disorder characterized by an increase in glucose levels in the blood or hyperglycemia. Where the prankreas organ is unable to produce the hormone insulin as needed and the body so that the body is unable to convert glucose into glycogen. The urea relationship among respondents with Diabetes Mellitus occurs because glucose in the blood cannot be converted into glycogen, in this case it will cause microvascular complications in the kidneys, if hyperglycemia occurs, the kidneys cannot filter and absorb a certain amount of glucose in the blood. The purpose of this study was to determine serum urea levels in people with Diabetes Mellitus Type II.

This research method is descriptive, namely research with a quantitative approach. The research design used a descriptive cross-sectional study which aims to determine serum urea levels in people with Diabetes Mellitus Type II at Toto Kabila Hospital.

The research sample consisted of 30 samples of Type II Diabetes Mellitus sufferers using the Automatic method with a Mindray BS-120 device at the Toto Kabila Hospital Laboratory. The results of the research on the examination of serum urea levels in patients with Type II Diabetes Mellitus at Toto Kabila Hospital, from 30 samples, obtained that the urea serum levels increased by 17 (56.7%) and normal urea serum levels were 13 (43.3%).

Keywords: *Diabetes Mellitus Type II, Ureum*

INTRODUCTION

Changes in lifestyle have an impact on diseases that occur in society. Health problems related to lifestyle and is a serious problem in developed countries. The habit of consuming fast food, such as foods and drinks with high sugar content has become a lifestyle for modern society, which then triggers diseases due to unhealthy eating and drinking patterns. This disease does not only affect individuals, but the health system of a country, although there is no national survey yet, in line with changes in lifestyle including people's diets [18].

The phenomenon in today's life Diabetes Mellitus is one of the non-communicable diseases that has become a serious public health problem. Indonesia is the fourth country with the most Diabetes Mellitus in the world after India (31.7%), China (20.8%), and the United States (17.7%). Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, abnormalities in insulin action or both. The pathological features of Diabetes Mellitus can largely be attributed to one of the main effects due to a lack of

insulin, namely reduced use of glucose by body cells and increased fat metabolism and reduced protein in body tissues [6].

The report on the results of Basic Health Research (Riskesdas) in 2018 shows that the prevalence of Diabetes Mellitus in Indonesia for all ages is 1.5%. The highest prevalence of Diabetes Mellitus diagnosed by doctors in 2018 was in the special area of DKI Jakarta (2.6%), then in Yogyakarta (2.4%), East Kalimantan (2.3%), Bangka Belitung (1.8%), Gorontalo and Aceh (1.7%), Central Java, Banten and North Kalimantan (1.6%), Central Sulawesi (1.5%) and North Sumatra (1.4%) Sumatra West (1.2%) and the lowest prevalence is in East Nusa Tenggara (0.6%) [8].

Diabetes Mellitus is a chronic disease group due to a disruption of the metabolic system in the body, where the pancreas is unable to produce the hormone insulin as needed. Insulin is a hormone produced by the pancreas which is responsible for controlling the amount / sugar in the blood. Insulin is needed to convert carbohydrates, fats and proteins into energy that is beneficial for the body [2].

Ureum is the end product of protein and amino acid catabolism which is produced by the liver and distributed through intracellular and extracellular fluids into the blood to be filtered by the glomerulus and partly reabsorbed in a state where urine is disturbed [7].

The relationship between urea and diabetes mellitus sufferers is closely related where diabetes mellitus includes metabolic disorders of the distribution of sugar by the body. People with diabetes mellitus are not able to produce enough insulin, or the body cannot use it effectively, causing excess sugar in the blood. Chronic excess sugar in the blood (hyperglycemia) actually becomes toxic in the body[12].

This event can disrupt the osmotic pressure, which eventually leaves glucose through the kidneys. Hyperglycemic in diabetes mellitus contributes to the appearance of various complications, long-term damage, dysfunction and failure of various organs such as eyes, kidneys, nerves, heart and blood vessels. Diabetics compared to non-diabetics were 2 times more likely to experience cereblal thrombosis, 25 times to be blind, 2 times coronary heart disease, 17 times chronic kidney failure, and 50 times diabetic ulcers.[12].

The method used in urea examination using the Mindray BS-120 automatic clinical chemical analyzer. Where the working principle of the tool is that urea is hydrolyzed by urease to form ammonium and carbonate. In a second reaction of 2-oxoglutarate reacts with ammonium in the presence of glutamate dehydrogenase (GLDH) and coenzyme NADH to produce L-glutamate. In this reaction two moles of NADH are oxidized to NAD for every mole of urea hydrolysis [11].

Thus, from the previous research results of Anisa Ayu Laksmi (2019), obtained from the results of examining 33 samples of type II diabetes mellitus patients, there were 20 (60.6%) patients with increased urea levels and 13 (39.4%) patients with urea levels within normal limits. Based on the results of the study, the increase in number of patients was not influenced by gender and age, but the level of urea increased because the patient had kidney failure.

Based on the above problems, the authors are interested in conducting a study to see the high and low levels of serum urea in Type II Diabetes Mellitus sufferers, for this reason, on this occasion the author takes the title of research: Description of serum urea levels in Type II Diabetes Mellitus patients at Toto Kabila Hospital .

RESEARCH METHODS

This type of research used in this research is descriptive, namely research with a quantitative approach that aims to describe, explain, find and explain something being studied in the form of numerical numbers [4]. This study was to describe serum urinary levels in Type II Diabetes Mellitus Patients at Toto Kabila Hospital.

This research is a descriptive cross-sectional study. Cross sectional is a study by studying the correlation between risk factors and effects, carried out in situations where the researcher intends to collect data from a sample or population [15].

The location of the research was carried out in the Laboratory of Toto Kabila Hospital, Bone Bolango Regency, Gorontalo Province. And when this research was conducted on September 25, 2020.

Data analysis is an activity to process data after data is collected. This study uses univariate data analysis techniques, univariate analysis is a technique of analyzing data on one variable independently, each variable is analyzed without being associated with other variables [3].

RESEARCH RESULT

1. Results of Ureum Serum Level Examination in Patients with Type II Diabetes Mellitus Hospitalized at Toto Kabila Hospital

Table 4.1 Distribution of Ureum Serum Levels in Patients with Diabetes Mellitu Type II Hospitalization at Toto Kabila Hospital

No	Kadar Ureum	Jumlah	Presentase
1	Normal	13	43,3%
2	Abnormal	17	56,7%

From table 4.1 it can be seen that those who had more serum urea levels were increased (abnormal), namely 56.7%. Compared with the level of serum urea that did not increase (Normal) as much as 43.3%.

2. Respondent Characteristics Distribution Table
   a. Distribution of Respondents by Age

Table 4.2 Distribution of Respondents Characteristics by Age

No	Umur	Kadar Ureum			
		Normal		Abnormal	
1	30-50	2	15,4%	6	35,3%
2	51-70	10	76,9%	7	41,2%
3	71-90	1	7,7%	4	2,5%

From table 4.2 above, based on the characteristics of age, it shows that the abnormal urea serum levels were more at the age of 51-70 years as much as 56.7% of respondents, compared to 30-50 years of 26.7% of respondents, and aged 71-90 years 16.7% of respondents.

   b. Distribution of Respondents by Gender

Table 4.3 Distribution of Characteristics of Respondents by Gender

No	Jenis Kelamin	Kadar Ureum			
		Abnormal		Normal	
1	Laki-laki	4	30,8%	10	58,8%
2	Perempuan	9	69,2%	7	41,2%

From table 4.3 above, based on the characteristics of gender, it shows that the serum levels of urea are abnormal for 14 men (46.7%) and 16 for women (53.3%).

3. Distributed of Respondents According to High Blood Pressure

Table 4.4 Distribution of Respondents Based on High Blood Pressure

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No	Tekanan darah tinggi	Kadar Ureum			
		Abnormal		Normal	
1	Ya	10	58.8%	7	53.8%
2	Tidak	7	41.2%	6	46.2%

From table 4.4 above, based on respondents who have high blood pressure are 17 respondents (56.7%), while those who do not have high blood pressure are 13 respondents (43.3%).

DISCUSSION

1. Results of Ureum Serum Level Examination in Patients with Type II Diabetes Mellitus

Diabetes Mellitus is classified as a non-communicable disease in which the sufferer cannot automatically control the level of sugar in their blood. In a healthy body, the pancreas releases the hormone insulin, which transports sugar through the blood to muscles and other tissues to supply energy [13].

Ureum is the end product of protein and amino acid catabolism that is produced by the liver and distributed through intracellular and extracellular fluids into the blood to be filtered by the glomerulus. Examination of urea is helpful in diagnosing acute renal failure [17].

The urea relationship among respondents with Diabetes Mellitus occurs because glucose in the blood cannot be converted into glycogen, in this case it will cause microvascular complications in the kidneys, if hyperglycemia occurs, the kidneys cannot filter and absorb a certain amount of glucose in the blood. This hyperglycemia condition also plays a role in the formation of atherosclerosis, the presence of atherosclerosis is a narrowing of the lumen of blood vessels and a decrease in the speed of blood flow which causes reduced blood supply to the kidneys. This can cause disruption of the filtration process in the glomerulus and decreased kidney function [9].

The research was conducted at Toto Kabila Hospital, Bone Bolango Regency, Gorontalo Province, namely 30 respondents consisting of people with Type II Diabetes Mellitus in September 2020. The results of the study were obtained from 30 respondents with Type II Diabetes Mellitus, namely (56.7%) respondents with levels increased urea and (43.3%) respondents with urea levels within normal limits. The results showed that most of the respondents had increased urea serum levels.

The results of research conducted by Wulandari and Martini in 2013 showed that 78.7% of people with Diabetes Mellitus had increased serum urea levels (abnormal). Whereas there is Diabetes Mellitus in a person's body, then each Diabetes Mellitus patient has different complications depending on the patient's body response to the disease.

The difference in complications experienced also depends on the subjective complaints that the patient feels. Complications in Diabetes Mellitus are strongly influenced by the factor of the severity of Diabetes Mellitus. Consistently high blood sugar levels in Diabetes Mellitus patients can affect new diseases that arise.

2. Distribution of Respondents by Age

As a person gets older, it will also be followed by a decrease in kidney function. This happens because at the age of more than 40 years, some nephrons will be lost, causing incomplete urea filtration so that urea levels in the blood increase. With increasing age coupled with chronic diseases such as Diabetes Mellitus, the kidneys tend to become damaged as a result of high blood sugar levels and kidney function cannot be restored so that many people with Diabetes Mellitus experience complications of kidney failure.

Age with the incidence of Diabetes Mellitus shows a significant relationship. The increase in diabetes risk of diabetes with age, especially at the age of more than 40 years, is due to the increase in glucose at that age. The aging process reduces the ability of pancreatic B cells to produce insulin. In addition, in older individuals, there is a decrease in mitochondrial activity in muscle cells. This is associated with increased levels of fat in muscle and lead to insulin resistance [10].

Based on the distribution of Diabetes Mellitus Type II respondents based on age, the results showed that high serum urea levels in people with Type II Diabetes Mellitus at the age of 51-70 years were (56.7%) of respondents, aged 30-50 years (26.7%) of respondents , and at the age of 71-90 years (16.7%) of respondents. From these results, it shows that aged 51-70 years, the results of the examination of serum urea levels in people with Diabetes Mellitus Type II. This data is in line with data published by WHO 2016 which shows that Diabetes Mellitus patients in Indonesia are mostly affected at the age of 51-70 years.

This research is in accordance with the research conducted by Valentina, Alfi and Hartini (2019). That 99.99% experienced by people with Type II Diabetes Mellitus over the age of 40 years have a higher risk than those who are younger. One of the causes of increasing insulin resistance is the aging process that changes the body's anatomy, physiology and biochemistry.

3. Distribution of Respondents by Gender

Physically, women are more at risk because of differences in body fat composition and hormone levels. This can be caused by diet, lack of physical activity and body fat deposits. Physical activity of women is also not as heavy as men, as well as more fat deposits in women than men, which is related to the effect of fatty acid levels on insulin resistance. And the factor decreasing the hormone estrogen in women, especially during menopause will also result in decreased insulin response due to the hormones estrogen and progesterone [5].

Based on the results of the distribution of Diabetes Mellitus Type II respondents based on the sex characteristics of the respondents, it shows that the gender of the respondents was male (46.7%) and female (53.3%) respondents. This data is in line with data published by WHO 2016 which shows that in Indonesia 1.8% affects women more than 1.2% men. There are differences in body fat composition and levels of the hormone estrogen.

The results of the research obtained from examining serum urea levels in patients with Diabetes Mellitus Type II were increased (Abnormal), which was carried out by Laksmi (2019) that people with Type II Diabetes mellitus were found to be 30.3% female sex, equal to male 30, 3%. However, women are more at risk of developing Diabetes Mellitus so that the accumulation of fat and low activity can lead to impaired kidney function.

4. Distribution of respondents according to high blood pressure

Hypertension or high blood pressure can occur due to complications of chronic diabetes. So it is not surprising that people with diabetes have about a 40% rate of loss of life in a person due to coronary heart disease associated with increased fat in the blood that causes plaque plaques [14].

Hypertension itself also affects insulin secretion in the pancreas, which increases blood sugar levels. With this ability, the combination of diabetes pressure or hypertension is a system that can aggravate the condition itself which causes these two diseases to tend to get worse over time.

Based on the distribution of respondents according to high blood pressure, it shows that respondents who have high blood pressure are 56.7%, while those who do not have high blood pressure are 43.3%. These results indicate that more respondents have high blood pressure in people with Diabetes Mellitus Type II.

The relationship between diabetes and hypertension occurs simultaneously, because both diseases have the same physiological characteristics. Diabetes will increase the total amount of fluid in the body, which tends to increase blood pressure. Diabetes can also decrease the ability of your blood vessels to stretch, and can increase your average blood pressure. And impaired insulin handling changes in how the body produces and handles insulin can directly lead to an increase in blood pressure [14].

Based on the results of research by Asriani BK (2012) states that hypertension (68.9%) and diabetes mellitus (33.3%) have risk factors for kidney disorders. Excess sugar can have many consequences, including the slow breakdown of sensitive blood vessels called capillaries. Damage to certain capillaries in the kidneys, can impair the ability of blood pressure to flow into the kidneys and this can lead to high blood pressure.

CONCLUSION

1. Based on the results of research examining serum urea levels in patients with Type II Diabetes Mellitus at Toto Kabila Hospital, from 30 samples, it was found that the urea serum levels increased by 17 (56.7%) and normal urea serum levels were 13 (43.3%).
2. Where the factors causing the increase in serum urea levels in people with Diabetes Mellitus Type II are age, gender and high blood pressure.

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