IMAGES OF LEUCOCITE LEVELS IN MELLITUS DIABETES PATIENTS AT TOTO KABILA HOSPITAL

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ABSTRACT

In 2019 Bone Bolango Regency was ranked fourth in cases of Diabetes Mellitus. The results of data at the Regional General Hospital of Toto Kabila, Bone Bolango Regency, found that there were 265 Diabetes Mellitus patients in 2020 from January to March 2020. One part of the body's defense system that can fight infection is white blood cells or leukocytes, so that an increase in the number of leukocytes indicates a complication process of Diabetes Mellitus in the form of infection. The purpose of this study was to determine the description of leukocyte levels in Diabetes Mellitus patients at Toto Kabila Hospital.

This type of research is a descriptive study with a quantitative approach. The population in this study is an unknown population using the proportion study formula (one group) and obtained a sample of 21 samples with the sampling technique by accidental sampling, using data analysis techniques obtained using the SPSS program.

The results obtained from this study were 16 patients had leukocyte levels above normal or abnormal with a percentage of 76.2%, while those with normal leukocyte levels were 5 patients with a percentage of 23.8%.

Keywords : diabetes mellitus, leukocytes, infections, complications

INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disease characterized by an increase in a person's blood sugar (glucose) levels in the body that are high above normal limits (hyperglycemia). High sugar levels are excreted through urine (urine), so that the urine contains sugar or is sweet so it is called diabetes. Diabetes Mellitus can eventually cause both acute and chronic complications [9].

Diabetes Mellitus is one of the most common non-communicable diseases globally. This disease ranks as the fourth cause of death in most developing countries. Diabetes Mellitus is known as a heterogeneous disease which is usually characterized by high blood sugar levels and impaired glucose tolerance, as well as insufficient insulin, weakness in the role of insulin, or for both reasons [2].

The global diabetes prevalence in 2019 is estimated at 9.3% (463 million people), rising to 10.2% (578 million) in 2030 and 10.9% (700 million) in 2045. The prevalence is higher in cities (10, 8) than rural areas (7,2), and the prevalence is also higher in high-income countries (10.4) than countries with poor population (4.0). One in two (50.1%) people living with diabetes do not know they have diabetes [8].

2018 shows that nationally, the prevalence of Diabetes Mellitus is based on doctor's diagnosis in people aged> 15 years by province. Indonesia experienced an increase from 2013 to 2018, increasing to 2%. The prevalence of Diabetes

Mellitus of all ages in Indonesia is slightly low compared to the prevalence of Diabetes Mellitus at age> 15 years, which is 1.5%, and Gorontalo province has a prevalence of Diabetes Mellitus above the national prevalence where the prevalence is 2.4% in 2018 [12] .

In 2018, there were 563 people with Diabetes Mellitus in Pohuwato Regency, 186 people in Boalemo Regency, 115 people in North Gorontalo Regency, 1,781 people in Gorontalo City, 302 in Gorontalo City and 1,372 in Bone Bolango Regency, then in 2019, the number of sufferers was recorded. Diabetes Mellitus in Pohuwato Regency 4,069 people, Boalemo Regency 407 people, North Gorontalo District 115 people, Gorontalo District 1,883 people, Gorontalo City 102 people and Bone Bolango Regency totaling 209 people [6].

Bone Bolango Regency was ranked second in 2018 and experienced a decline in 2019 to become fourth in the case of Diabetes Mellitus. Bone Bolango Regency found that Diabetes Mellitus patients from 2018 to 2019 tended to increase, from 1,208 cases to 1,683 cases, while for 2020 the data obtained from January to March 2020 were 265 cases [14].

The increasing number of Diabetes Mellitus patients cannot be separated from the ability of the patient's body to handle complications that occur. The complications that are often experienced by Diabetes Mellitus patients so that they decide to come to the hospital for treatment, namely infection and often with severe infection or sepsis. One part of the body's defense system that can fight infection is white blood cells or leukocytes [1].

Objectively, the description of Diabetes Mellitus patients can be done by supporting examination in the form of laboratory examination. Laboratory results will show the condition of complications that occur in patients, so that an increase in the number of leukocytes indicates a complication process of Diabetes Mellitus in the form of infection [1]. Diabetes Mellitus patients also experience an increase in proinflammatory cytokines, such as interleukin 6 (IL-6) and interleukin 8 (IL-8) which will then stimulate the production of white blood cells [15].

Several studies on the relationship of white blood cells in Diabetes Mellitus patients have been carried out, such as previous studies [10] saying that there was an increase in the white blood cell count even though it was still on a normal scale in patients with Diabetes Mellitus type 2 with complications (albuminuria and retinopathy) so that blood cell counts white can be considered as an early diagnosis and prevention of microvascular and macrovascular complications to reduce Diabetes Mellitus morbidity and mortality. Previous research [4] stated that there is a relationship between the number of leukocytes, neutrophils and lymphocytes to the risk of developing Diabetes Mellitus.

Based on the background described above, the researcher is interested in conducting research on the description of leukocyte levels in Diabetes Mellitus Patients which will be carried out at the Toto Kabila Regional General Hospital, Bonebolango Regency, Gorontalo Province.

RESEARCH METHODS

This type of research is a descriptive type of research with a quantitative approach which aims to explain the existing phenomena by using numbers to determine the characteristics of an individual or group that is carried out to determine the value of the independent variable, either one or more (independent) variables without making comparisons, or connecting with Another variable (17). The reason for doing this research is that

the researcher wants to see and know the results of the examination of leukocyte levels in Diabetes Mellitus patients at Toto Kabila Hospital.

The design of this study is a descriptive cross-sectional study. Descriptive cross-sectional study is a study that is carried out in a cross-sectional manner (one specific point in time) on a population or a study on a sample that is part of the population [19].

The location chosen as the research site was RSUD Toto Kabila, Bone Bolango Regency, Gorontalo Province. The reason the researchers chose this location as the research site was that Diabetes Mellitus patients at Toto Kabila Hospital from 2018 to 2019 tended to increase, from 1,208 cases to 1,683 cases. This research was conducted on September 25, 2020.

The sampling technique used in this study was accidental sampling. Accidental sampling is accidental sampling by taking cases or respondents who are found and willing to be investigated [18].So that in this accidental sampling technique the researchers took respondents who were met at that time and were willing to be the research subjects.

Data analysis is also called data processing activity from the results of data collection [3]. The data is the level of leukocytes in inpatients of Diabetes Mellitus who are in RSUD Toto Kabila.

This research is processed through the SPPS (Statistical Package for Social Science) program then the data is presented in tabular form and reported as a percentage using a formula as stated [18]:

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

Information :

P = Percentage number
f = Measured frequency
N = The total number of respondents
100% = Fixed number

RESEARCH RESULT

This research was conducted at Toto Kabila Hospital on September 25, 2020, with the aim of knowing the levels of leukocytes in Diabetes Mellitus inpatients at Toto Kabila Hospital in 2020. The respondents used for this study were 21 patients.

Table 1. *Frequency Distribution of Leukocyte Levels in Diabetes Mellitus Patients*

Leukocyte Levels	N	%
Normal	5	23.8
Abnormal	16	76.2
Total	21	100.0

Source: Primary data, (2020)

Based on Table 1, it shows that the levels of leukocytes above normal or abnormal were greater, namely 23.8% compared to normal, namely 76.2%.

Table 2. *Frequency Distribution of Leukocyte Levels in Patients with Diabetes Mellitus by Age*

Age	Results of Leukocyte Levels				Total	
	Normal		Abnormal			
	N	%	N	%	N	%
30-45	3	42.9 %	4	57.1 %	7	100. 0%
46-60	1	12.5 %	7	87.5 %	8	100. 0%
61-75	1	16.7 %	5	83.3 %	6	100. 0%
Total	5	23.8 %	16	76.2 %	21	100. 0%

Source: Primary data, (2020)

Based on Table 4.2, it shows that the leucocyte levels above normal or abnormal were more at the age of 46-60 years as much as 87.5% compared to 30-45 years as much as 57.1% and aged 61-75 years as much as 83.3%.

Table 3. *Frequency Distribution of Leukocyte Levels in Patients with Diabetes Mellitus Based on Gender*

Gender	Results of Leukocyte Levels				Total	
	Normal		Abnormal			
	N	%	N	%	N	%
Male	2	22.2	7	77.8	9	100
Women	3	25	9	75.	12	100

Source: Primary data, (2020)

Based on Table 3, it shows that the level of leukocytes above normal or abnormal was more in women as much as 75.0% compared to men as much as 77.8%.

DISCUSSION

Results of Examination of Leukocyte Levels in Diabetes Mellitus Patients

The cause of increasing leukocyte levels in Diabetes Mellitus patients can occur because uncontrolled blood glucose levels cause immunity to decline, making it susceptible to infection. Hospital [11]. Diabetes Mellitus patients also experience an increase in proinflammatory cytokines, such as interleukin 6 (IL-6) and interleukin 8 (IL-8) which then stimulate the production of white blood cells or leukocytes [15]

This hyperglycemia condition causes the formation of free radicals through the non-enzymatic glycation process of protein, glucose oxidation and increases lipid oxidation which triggers the destruction of enzymes, thus making the tissue susceptible to oxidative stress and increasing insulin resistance due to oxidative stress [15].

Diabetes Mellitus contributes to the emergence of various complications, one of which is infection [16]. The uncontrolled hyperglycemia condition makes the tissue susceptible to inflammation due to an increase in inflammatory cytokines. Inflammation can be measured by counting the levels of white blood cells or leukocytes. The leukocyte count plays an important role in the body's defense system so that the leukocyte count can be considered as an early diagnosis and prevention of complications in order to maintain immunity [15].

Supportive examination is needed in analyzing the emergence of complications, one of which is infection in Diabetes Mellitus patients. Increased or abnormal leukocyte levels in this study occurred in 16 patients with a percentage of 76.2%. This condition indicates an infection in Diabetes Mellitus patients.

This study is in line with previous studies, that the increase in leukocyte levels in the blood in this study occurred by 78.8% of respondents. This condition indicates an infection in Diabetes Mellitus patients. The picture of leukocytes in Diabetes Mellitus patients at Puskesmas Bareng, Jombang Regency, shows that 70% of respondents have normal levels of leukocytes in blood. The difference in the results of this study was due to different research locations, studies conducted by previous researchers used outpatient populations, where patients did not have complications of Diabetes Mellitus, so there was no increase in leukocytes as an indicator of infection [11]. However, the study reported by the current investigators

used a population of inpatient Diabetes Mellitus patients,

Results of Examination of Leukocyte Levels in Diabetes Mellitus Patients Based on Age

The immune system in the elderly has decreased so that the body is susceptible to infection and inflammation which can increase the number of leukocytes [7]. Increased leukocytes from time to time when lymphocytes are exposed to thymus hormones. In the elderly, most of the thymus gland does not function because the function of the organs has decreased. Organs are less efficient than young people.

The results obtained in this study indicate that the leucocyte levels in patients with diabetes mellitus based on age experienced an increase in leucocyte levels or abnormal in patients aged 46-60 years as many as 7 patients with a percentage of 87.5%.

This study is in line with previous studies showing that the majority of respondents aged 60 years experienced an increase in leukocyte levels or abnormal as many as 6 respondents with a percentage of 30% [11]

Results of Examination of Leukocyte Levels in Diabetes Mellitus Patients Based on Gender.

One of the causes of an increase in leukocytes or abnormalities is due to stress (surgery, fever, long-lasting emotional turmoil), so that in this study female patients experienced increased levels of leukocytes or leukocytosis because women were more prone to stress than men. This causes more women with Diabetes Mellitus who are hospitalized [13].

The results obtained in this study showed that the levels of leukocytes in Diabetes Mellitus patients based on gender were found that more female patients had increased or abnormal levels of leukocytes as many as 9 patients with a percentage of 75.0%.

This study is in line with previous studies showing that out of 27 sufferers, it was found that there were more women than men, namely 23 women with a percentage of 85% [5].

CONCLUSION

Based on the results of research conducted at Toto Kabila Hospital, it can be concluded that:

21 samples of inpatients with Diabetes Mellitus who were examined for leukocyte levels showed that the leukocyte levels were above normal or abnormal, which was 23.8% compared to normal, namely 76.2%.

Diabetes Mellitus patients who were included in the study sample based on age had higher levels of leukocytes above normal or abnormal at the age of 46-60 years as much as 87.5% compared to those aged 30-45 years as much as 57.1% and aged 61-75 years as much as 83.3%.

Patients with Diabetes Mellitus who were included in the study sample based on male gender who had higher than normal or abnormal leukocyte levels in women were 75.0% compared to men as much as 77.8%.

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