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DESCRIPTION OF THE EOSINOPHIL LYMPHOCITE RATIO (ELR) WITH PULMONARY TUBERCULOSIS AT SEVERAL HEALTH CENTER IN JAMBI CITY

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ABSTRACT

Background: Pulmonary Tuberculosis is an infectious disease caused by the bacteria Mycobacterium Tuberculosis. To reduce the number of pulmonary tuberculosis cases, treatment is carried out using OAT or what is commonly called anti-tuberculosis drugs. The length of treatment can affect the hematological system, including eosinophil cells and lymphocyte cells. An increase or decrease in the ratio of these two cells can describe the healing process of Pulmonary Tuberculosis disease.
Method: This study was conducted to determine the description of the eosinophil lymphocyte ratio (ELR) in pulmonary tuberculosis patients based on the duration of treatment. The research method was descriptive with a cross sectional approach. The research was conducted in February-June 2023 with a total sample of 40 respondents with Pulmonary Tuberculosis in several Puskesmas in Jambi City. The research was conducted in the hematology laboratory of the Technology Laboratory Medicine, Poltekkes Kemenkes Jambi.
Result: From the research conducted, it was found that the average ELR in patients with pulmonary tuberculosis undergoing treatment for <2 months was 0.08; the average ELR at the treatment stage >2 months was 0.12;
Conclusion: the conclusion of the ELR independent T test based on the length of treatment with a sig value of 0.230 (p>0, 05).

Keywords: Pulmonary Tuberculosis; Duration of Treatment; Eosinophil Lymphocyte Ratio (ELR)

INTRODUCTION

Pulmonary Tuberculosis is an infectious disease caused by Mycobacterium tuberculosi bacteria that has become a global concern due to the high morbidity and mortality rates in a fairly short time. Based on data from the Global Tuberculosis Report, in 2020 there are an estimated 10.1 million cases of pulmonary TB in the world, while in 2021 there will be an increase to 10.6 million cases of pulmonary TB in the world (WHO, 2021). Indonesia ranks third as the country with the most cases of Pulmonary TB in the world after India and China, with around 824,000 cases (Kemenkes RI., 2021). Jambi Province is one of the provinces in Indonesia with a high prevalence of Pulmonary TB. Based on data from the Jambi Provincial Statistics Agency, in 2020 there were 4,838 cases of Pulmonary TB in Jambi Province, with the Jambi City area contributing the most cases (BPS, 2020). In 2021 there were 828 people with Lung TB with the most cases at Kenali Besar Community Health Center (Jambi Provincial Health Office, 2021).

To reduce the number of cases due to pulmonary TB, the government implemented the Directly Observed Treatment Shortcourse (DOTS) strategy recommended by WHO to break the chain of transmission of pulmonary TB. The Pulmonary TB treatment process is provided in 2 phases, namely the intensive phase and the continuation phase. The drugs used are Anti Tuberculosis Drugs (OAT) in the form of a combination of several types of drugs with sufficient quantities and the right dosage (Kemenkes RI, 2019). OAT is the most important component in the treatment of Lung TB, but OAT has side effects, especially

on the hematological system such as eosinophilia caused by Rifampicin and Isoniazid drugs. This is in line with research conducted by Sanida (2017) showing that the number of eosinophils in the intensive phase was 5.4% above normal, while in the advanced phase there were 10% of eosinophils above normal.

The length of Pulmonary TB treatment with OAT can also affect the number of lymphocytes. Active Pulmonary TB infection causes lymphocytes to decrease, after treatment lymphocytes will return to normal. Based on research conducted by Subagyo, J. (2019), stated that the number of lymphocytes based on the length of treatment in the intensive phase obtained 17% of patients with lymphocytopenia, 66% of normal patients and 17% of patients with lymphocytosis. In the advanced phase, 4% of patients experienced lymphocytopenia and 96% of patients with normal lymphocyte counts, none experienced lymphocytosis.

The increase or decrease in the number of lymphocytes and eosinophils in patients with pulmonary TB will affect the Eosinophil to Lymphocyte Ratio (ELR), this is in line with research conducted by Cristopel et al., (2018) which states that the eosinophil-lymphocyte ratio is calculated by comparing the number of eosinophils and lymphocytes from diff count examination. REL research on TB patients specifically does not yet exist, but REL research has been found in endometrial cancer patients to see the prognosis of the disease before treatment, high REL is strongly associated with a worse risk of death and survival (Holub & Biete, 2018). In addition, in patients with Covid-19 REL evaluates the clinical course and treatment success (Georgakopoulou et al., 2021). The success of Pulmonary TB treatment is expected to be seen from REL examinations such as Covid - 19, where REL can predict the course of a disease.

Based on the above background, the formulation of the problem is how the Eosinophil Lymphocyte Ratio (REL) in Pulmonary TB patients based on the length of treatment. With the hypothesis that there is a significant difference in ELR in pulmonary TB patients based on the length of treatment. The purpose of the study was to determine the description of ELR in pulmonary TB patients based on the length of treatment.

METHODS

The research method used is descriptive with a cross sectional approach with variable length of treatment. This research was conducted in February-June 2023 with a total sample of 40 respondents with Pulmonary TB at Puskesmas Simpang IV Sipin, Puskesmas Simpang Kawat, Puskesmas Rawasari, Puskesmas Putri Ayu and Puskesmas Pakuan Baru.This research was conducted in the hematology laboratory of the Medical Laboratory Technology department of the Jambi Ministry of Health Polytechnic.

RESULTS AND DISCUSSION

RESULTS

The data obtained from this study were recorded and presented in tabular form and analyzed using the independent T test whose results can be seen as follows:

Table 1. Description of eosinophil cell count based on length of treatment

Variable	n	Mean	Median	Min	Max
≤ 2 months	12	1,83	1,45	1	3,70
>2 months	28	3,53	2,55	1	18

Table 1 shows that the average number of eosinophil cells at the ≤ 2 months treatment stage is in the normal range (1-3%). whereas at the treatment stage> 2 months has an average number of eosinophils outside the normal range. While the average lymphocyte cell count at both stages of treatment was in the normal range (20-40%), it can be seen in the following tab :

Table 2. Description of lymphocyte cell count based on length of treatment

Variable	n	Mean	Median	Min	Max
≤ 2 months	12	23,23	24,35	6,80	42
>2 months	28	27,87	28,00	12,40	42,80

Based on table 2, the average number of lymphocyte cells is higher at the treatment stage > 2 months, which is 27.87, while at the ≤ 2 months stage it is 23,23.

Table 3. Description of ELR based on length of treatment

Variable	n	Mean	Std. Deviation	Std. Eror Mean	P.Value
≤ 2 months	12	0,08	0,04	0,01	0,230
>2 months	28	0,12	0,10	0,02	

The average ELR in pulmonary tuberculosis patients at both stages of treatment is in the range of normal values of 0.25-0.15 with P-value > 0.05 which can be seen in table 3.

DISCUSSION

This study was conducted on the description of ELR in patients with pulmonary tuberculosis in several health centers in Jambi city with a total sample of 40 patients with pulmonary tuberculosis. the results of ELR research based on the length of treatment showed that ELR increased at the treatment stage> 2 months. ELR is calculated by comparing eosinophil cells and lymphocyte cells so that the increase in ELR is influenced by these two cells. At the treatment stage > 2 months, the average number of eosinophil cells increased, this is the same as research conducted by Sanida (2017) found that the number of eosinophil cells increased by 10% at the treatment stage > 2 months.

The average number of lymphocyte cells is in the normal value range, this is in line with the research of Subagyo, J. (2019) which states that after treatment the number of normal lymphocyte cells is 83.7%. Eosinophil cells play a role in phagocytosing various types of foreign organisms such as parasites and bacteria, this makes eosinophil cells increase at the beginning of pulmonary TB infection. Along with treatment eosinophils and lymphocytes will return to normal, but some OAT has side effects that can disrupt the hematological system, one of which is eosinophilia caused by Rimfapisin and Isoniazid. An increase in the number of eosinophils in patients with pulmonary TB can also occur due to allergies, this is reinforced by data from the questionnaire, namely at the treatment stage> 2 months, 28% of patients with Pulmonary Tuberculosis experienced itching.

The results of research conducted on REL in patients with Pulmonary TB showed the average value of REL at the ≤ 2 treatment stage of 0.08 and the > 2 month stage of 0.012. The average value of REL at both stages of treatment is in the range of normal values (0.025-0.15) which shows the condition of patients with Lung TB when compared to the percentage value of eosinophils to lymphocytes, where as many as 33 out of 40 patients with Lung TB have normal REL values. Based on the independent T test conducted, there was no difference in the average REL based on the length of treatment (P-value>0.05).

CONCLUSION

Based on the results of research on the description of the eosinophil lymphocyte ratio (ELR) in patients with pulmonary tuberculosis in several Jambi City health centers that have been carried out, it can be concluded that there is no significant difference in ELR in patients with pulmonary tuberculosis based on the length of treatment. For future researchers, it is hoped that this research can be a reference and research can be carried out by adding other disease variables such as HIV and Hepatitis in order to get varied data.

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CONFLICT OF INTEREST

All authors involved declare no conflict of interest in the writing of this study.

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