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HEMOGLOBIN LEVELS IN PULMONARY TUBERCULOSIS PATIENTS WHO CONSUMING ANTI-TUBERCULOSIS MEDICINE

Supriati Wila Djami[1,2], Agustina W Djuma[1], Marni Tangkelangi[1]
[1]Medical Laboratory Technology Departement, Poltekkes Kemenkes Kupang, Jl. Piet A. Tallo, Kupang, Nusa Tenggara Timur 85361, Indonesia
[2]Center of Excellent, Poltekkes Kemenkes Kupang, Jl. Piet A. Tallo, Kupang, Nusa Tenggara Timur 85361, Indonesia
*riatiputri85@gmail.com

ABSTRAK

Tuberculosis (TB) is a lung infection characterized by pulmonary infiltrates and the formation of caseous granulomas, fibrosis, and cavities. TB is the second leading cause of death from infectious diseases worldwide, after the human immunodeficiency virus (HIV). To reduce the death rate due to TB, the government carried out the Find Drugs Until Heal program with examinations for 6-9 months to kill the Mycobacterium tuberculosis bacteria with anti-tuberculosis drugs, namely Isoniazid, Rifampicin, Ethambutanol, Streptomycin, and Pyrazinamide. Anti Tuberculosis Drugs can cause fever, nausea and hematological reactions such as anemia, agranulocytosis, eosinophilia and thrombocytopenia. The research method used is descriptive using a cross sectional approach, namely to find out the description of hemoglobin levels in Tuberculosis patients who consume Anti Tuberculosis Drugs. 60%, in the productive age of 31-50 years with a percentage of 67% and occurs in patients with two months of treatment, namely initial or intensive treatment with a percentage of 87%.

Keywords: anti-tuberculosis drugs; hemoglobin; lungs; mycobacterium tuberculosis; tuberculosis

INTRODUCTION

Pulmonary tuberculosis (TB) is a lung infection characterized by pulmonary infiltrates and the formation of caseous granulomas, fibrosis and cavities. Pulmonary tuberculosis can be caused by exposure to the acid-fast bacillus Mycobacterium tuberculosis. Although the primary site of infection is in the lungs, mycobacteria are also frequently found in other parts of the body (Lasut, Rotty, & Poliii, 2014). According to the 2009 World Health Organization (WHO) report, there were 1.7 million people in the world died of pulmonary TB while there were 9.4 million new cases of pulmonary TB where most of the pulmonary TB patients were of productive age (15-55 years).

Pulmonary tuberculosis (TB) has become a health problem for millions of people in the world. Pulmonary TB is the second leading cause of death from infectious diseases worldwide, after Human Immunodeficiency Virus (HIV). This disease is transmitted directly through droplets of people who have been infected with Mycobacterium tuberculosis (Permana, 2020). Globally in 2016 there were 10.4 million TB incident cases which is equivalent to 120 cases per 100,000 population. Countries with the highest case incidence are India, Indonesia, China, the Philippines and Pakistan (Kemenkes, 2018).

Based on the Indonesian Health Profile Data and Information in (2019), the number of pulmonary TB cases found was 543,874 cases, a decrease when compared to all cases of pulmonary TB found in 2018 of 566,623 cases. The highest number of cases was reported with a large population, namely West Java, East Java and Central Java. Pulmonary TB cases in these three provinces almost reached half of the total pulmonary TB cases in Indonesia (45%). Based on the 2018 East Nusa Tenggara Health Office Profile, the total number of pulmonary TB cases in 2015 was 5,392 cases, in 2016 the total number of pulmonary TB cases was 1,320 cases, in

2017 the total number of pulmonary TB cases was 6,236 cases. This number of cases shows an increase of 4,916 cases. In 2018 the number of pulmonary TB cases increased to 6,833 cases. Districts or cities with the total number of registered and treated pulmonary TB cases were in Lembata Regency as many as 652 cases, East Flores Regency as many as 642 cases. The regency or city with the lowest number of cases is Malacca Regency with 5 cases (Dinkes Prov NTT, 2018).

Based on the Kupang City Health Profile (2018), all cases of pulmonary TB in 2018 were 645 cases consisting of 374 men and 271 women, compared to the previous year. The incidence of TB cases from 205 per 100,000 population in 2013, increased in 2015 to 211 cases per 100,000 population which then decreased to 152 cases per 100,000 population in 2018 (Dinkes Kupang, 2018). To reduce the mortality rate due to pulmonary TB, the government carried out the Find Drugs Until Heal program by providing free examinations and treatment. Pulmonary TB treatment usually can take 6-9 months to kill the Mycobacterium tuberculosis.[8] Pulmonary TB treatment with anti-tuberculosis drugs includes isoniazid, rifampin, ethambutanol, streptomycin, and pirazinamid. Although most of the anti-tuberculosis drugs are acceptable in therapy, but have potential toxic effects including the side effects of hematological reactions such as anemia, agranulocytosis, eosinophilia and thrombocytopenia (Istiantoro & Setiabudy, 2012).

Anemia is a condition where the hemoglobin level in red blood cells is lower than the body's physiological needs. Anemia is caused by a lack of iron in the blood, which is needed for the formation of hemoglobin (Fauziah & Siahaan, 2014). Hemoglobin is a tetrameric protein of erythrocytes that binds to non-protein molecules, namely iron porphyrin compounds called heme (Gunadi, Mewo, & Tiho, 2016). A person can be said to have anemia if the hemoglobin level is below 13 g/dL for men and 12 g/dL for women.[1] Research by Lasut reported in his research for the examination of hemoglobin levels from 67 samples that experienced a decrease in hemoglobin levels as many as 44 patients (65.67%) (Lasut, Rotty, & Poliii, 2014). The purpose of this study was to determine the description of hemoglobin levels in pulmonary tuberculosis patients who took anti-tuberculosis drugs at the Oesapa Health Center.

METHOD

This study uses a descriptive study using a cross sectional approach, namely to determine the description of hemoglobin levels in pulmonary TB patients who consume Anti Tuberculosis Drugs. This research was conducted at the Oesapa Health Center in April 2021. The population in this study were all pulmonary TB patients who underwent treatment and consumed Anti Tuberculosis Drugs at the Oesapa Health Center. The sample in this study were pulmonary TB patients who consumed Anti Tuberculosis Drugs, using the Non-Probability technique with purposive sampling type, namely using inclusion criteria and exclusion. The tools and materials used to check hemoglobin levels in pulmonary TB patients who take Anti Tuberculosis Drugs are Easy Touch Hemoglobin using the Point Off Care Test method. Working procedure in checking hemoglobin levels:

1. Prepare the necessary tools and materials.
2. The lancet is inserted into the autoclick tool.
3. Use an alcohol swab to disinfect the finger where the blood will be drawn.
4. Autoclick is pressed above the finger to be drawn blood.
5. After the blood comes out, the first blood is removed.
6. Insert the chip and strip on the tool properly and the tool will turn on automatically.
7. The next blood that comes out is touched on the strip, the blood will immediately seep at the end of the strip and there will be a beep sound.

8. Wait a while, until the results come out on the tool.
9. When the inspection is complete, remove the strip on the tool.

Interpretation

1. Male: 13-18 gr/dL
2. Female: 12-16 gr/dL

RESULT

This study conducted an examination of hemoglobin levels in pulmonary TB patients who took Anti Tuberculosis Drugs at the Oesapa Health Center, data collection and examination of hemoglobin levels in pulmonary TB patients who took Anti Tuberculosis Drugs was carried out for three days at the Oesapa Public Health Center, then carried out by visiting houses respondents according to the data provided by TB control staff at the Oesapa Health Center. Data based on the following characteristics.

Table 1.
Frequency Distribution of Pulmonary TB Patients Consuming Anti Tuberculosis Drugs at the Oesapa Health Center

Characteristics	f	%
Gender		
Male	14	66,67
Female	7	33,33
Age		
15-30	6	28,57
31-50	12	57,14
51-80	3	14,29
Treatment Duration		
Early	18	85,71
Advanced	3	14,29

The results showed that in patients with pulmonary TB by gender, HB levels < Normal occurred in 14 men (66.67%). A previous study by Lasut reported the same thing where TB patients with anemia were 37 (55%) male and 30 (45%) female.[10] The highest frequency based on age occurred at the age of 31-50 years as many as 12 people (57.4%). This result is in line with the research conducted by Gafar that of the 30 respondents, most of them are in the productive age, namely 14 people (46.7%).[6] The highest frequency based on length of treatment occurred at the beginning of treatment as many as 18 people (85.71%).

Table 2.
Overview of Hemoglobin Level Examination Results in TB Patients Consuming Anti-Tuberculosis Drugs

Sample Code	f	%
Normal	6	28,57
Low	15	71,42
High	0	0

Table 3.
Overview of Hemoglobin Levels in TB Patients Consuming Anti Tuberculosis Drugs Based on Characteristics at the Oesapa Health Center

Characteristics	Normal		Low		High	
Gender	f	%	f	%	f	%
Male	5	83	9	60	0	0
Female	1	17	6	40	0	0
Age (Years)						
15-30	3	50	3	20	0	0
31-50	2	33	10	67	0	0
51-80	1	17	2	13	0	0
Treatment Duration						
Early	5	83	13	87	0	0
Advanced	1	17	2	13	0	0

DISCUSSION

The results showed that the examination of hemoglobin levels in patients with pulmonary TB was the lowest as many as 15 people (71.42%). Low levels of hemoglobin in patients with pulmonary TB are caused by malnutrition or lack of calories, vitamins, iron which affects the immune system of TB patients. This research is in line with what was also found by Widoyon, that the use of Anti Tuberculosis Drugs can cause many side effects of hematological disorders, one of which is anemia (Widoyono, 2008). Previous research by Lasut which reported that the most patients with pulmonary TB experienced anemia as many as 44 people (65.67%) out of 67 people (Lasut, Rotty, & Poliii, 2014).

The results of this study showed that the decrease in hemoglobin levels in patients with pulmonary TB by gender was most common in men as many as 9 people (60%). TB sufferers tend to be taller than men than women. In the male gender, this disease is higher because men's lifestyles are mostly smoking and consuming alcohol, thus lowering the body's defense system, making it easier to be exposed to TB-causing agents. A previous study by Lasut reported that 44 patients with pulmonary tuberculosis had anemia, 37 (55%) were male and 30 (45%) were female (Lasut, Rotty, & Poliii, 2014). TB sufferers tend to be higher than men than women, In the male gender this disease is higher because men's lifestyle mostly smokes and consumes alcohol so that it lowers the body's defense system, making it easier to be exposed to TB-causing agents.

Based on age, the most pulmonary TB patients < Normal occurred at the age of 31-50 years as many as 10 people (67%). Age is very influential on the incidence of tuberculosis suffered where pulmonary TB sufferers are mostly in productive age, namely 31-50 years because of the dense work environment, many activities, work more often so that hemoglobin levels decrease and cause anemia. This result is in line with the research conducted by Gafar that of the 30 respondents, most of them are in the productive age, namely 14 people (46.7%) (Gafar, 2017). Based on the length of treatment for pulmonary TB, the highest decrease was in the early stages of 13 people (87%). The results of the study showed that most of the TB patients who took anti-tuberculosis drugs in the early phase experienced anemia, which was marked by hemoglobin levels below normal. In TB patients who have taken anti-tuberculosis drugs for 2 months or in

the early stages, the average hemoglobin level is low. These results are consistent with Sari's research in the first 2 months the percentage (91.4%) experienced side effects including nausea, and decreased appetite so that the body did not get enough food and finally the body experienced a decrease in hemoglobin levels and caused anemia (Sari, Yuniar, & Syaripuddin, 2014,)This is in line with Widoyono's opinion that in the use of anti-tuberculosis drugs it is not uncommon to find side effects that complicate the target of treatment. This anti-tuberculosis drug can cause many side effects of hematological disorders including anemia, thrombocytosis, thrombocytopenia, leukocytosis, leukopenia and eosinophilia (Widoyono, 2008).

CONCLUTION

Patients with pulmonary tuberculosis who took Anti Tuberculosis Drugs at the Oesapa Health Center were 21 respondents with the highest hemoglobin level of 17.7 g/dL and the lowest hemoglobin level of 7.9 g/dL. Overview of hemoglobin levels in pulmonary TB patients taking Anti Tuberculosis Drugs at the Oesapa Health Center with normal hemoglobin levels of 6 people (28.57%) and abnormal hemoglobin levels of 15 people (71.42%). The decrease in hemoglobin levels in pulmonary TB patients mostly occurred in men, amounting to 9 people (60%), at the age of 31-50 years, there were 10 people (67%) and occurred in patients with pulmonary TB with a length of treatment, namely initial treatment, amounting to 13 people (87%).

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