

# Complete Blood Analysis for Filariasis Patients and Control in Langkat Regency

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**Abstract:-** Filariasis is a tropical disease which is endemic in Indonesia. In Langkat Regency there are still many cases of filariasis that are not monitored by health care workers. Filariasis makes an excessive immune response that causes "eosinophilic inflammation". This syndrome is called "tropical pulmonary eosinophilia" (TPE), where patients come with a cough, with or without breathless and eosinophilia. Microfilariae live in the blood vessel and lymph vessel. Until now, there is no research about how microfilariae get the nutrition. Whether these microfilariae consume lymphatic fluid or blood cells. The study design is cross-sectional with a sample of seven filariasis sufferers and seven control characteristics adjusted. The sampling technique is Total Sampling. Data was analyzed using the Spearman Correlation test, after normality testing with Shapiro Wilk.

This research showed there is correlation between risk factors of job  $p = 0.000$  with strength of correlation = 0.897 and eosinophils count  $p = 0.000$  with strength of correlation = 0.866. There is a strong correlation between risk factors of job and increasing of eosinophils count.

**Keywords:-** Filariasis, Complete Blood Count, Eosinophils, Leukocytes.

## I. INTRODUCTION

Filariasis is a tropical disease that causes health problems in the community. Filariasis transmitted by mosquitoes, characterized by hydrocele, lymphedema, and elephantiasis, that is a chronic disability due to lymphatic vessel infection, by 3 species of filarial parasites, namely *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori*. [1]

Adult filaria worms or macrophilaria are in lymphatic tissue and release microfilaria into peripheral circulation. This microfilaria is trapped in the lungs. In less than 0.5% of cases, there may be an excessive immune response to microfilaria that causes *eosinophilic inflammation* in the lower respiratory tract. This disorder is called as *tropical pulmonary eosinophilia syndrome* (TPE), where patients present with a cough with or without shortness of breath and eosinophilia. [2]

According to WHO data 2016, filariasis cases have attacked 1,580,834 people in 72 risk filariasis countries. Filariasis cases have attack 1,405,316 people in Southeast Asia. [1]

This disease is endemic in countries such as Cambodia, Laos, Myanmar, Thailand, Vietnam, Malaysia and Indonesia. In Indonesia, there are 55.7% cases of 96.4% risk population with lymphedema cases reported as many as 85.2% of hydrocele cases reported globally. [3]

According to data reported by the provincial health office and survey in Indonesia, chronic cases of filariasis from 2002 to 2014 continue to increase. In 2015, filariasis cases decreased to 13,032 cases from 14,932 in 2014. In 2016, decreases in every regency/city which have completed the stages of filariasis elimination. [4] Data from the Ministry of Health of the Republic of Indonesia show that out of 34 provinces, North Sumatra ranks 20<sup>th</sup> in cases of chronic defective filariasis per province in Indonesia. For the province, there are 24 regencies/cities with total cumulative data 141 persons from 2002-2014. [5]

According to data from North Sumatra Health Office, in 2017, there are 7 chronic filariasis sufferers in Langkat Regency, consisted of 4 male and 3 female. Age of patients range from 45 to 88 years, and this case was found in period 2015-2017. [6]

Complete blood tests are basic screening and one of the laboratory tests commonly used to evaluate a clinical condition. Results of a complete blood test provides diagnostic information about hematology and other body systems, prognosis, and response to treatment. A complete blood count check contains a number of tests that determine number, variety, percentage, concentration and quality of blood cells; leukocytes, differential count, erythrocytes, hematocrit, hemoglobin, platelets, mean erythrocyte volume (mean corpuscular volume), mean erythrocyte hemoglobin concentration (mean corpuscular hemoglobin concentration), and mean erythrocyte hemoglobin (mean corpuscular hemoglobin).[7] Microfilariae live in bloodstream and lymph vessels, and it is not yet clear the source of nutrition for microfilariae worms, whether these microfilariae worms consume lymphatic fluid or red blood cells. [8]

The research objectives are as follow:

- To analyze hemoglobin value in patients with filariasis and control in Langkat Regency.
- To analyze hematocrit value in patients with filariasis and control in Langkat Regency.
- To analyze the number of erythrocytes in patients with filariasis and control in Langkat Regency.
- To analyze the mean of erythrocyte values/Mean Corpuscular (MCV, MCH, MCHC) in patients with filariasis and control in Langkat Regency
- To analyze platelet counts in patients with filariasis and control in Langkat Regency.
- To analyze the number of leukocytes in patients with filariasis and control in Langkat Regency.
- To analyze the count of leukocytes in patients with filariasis and control in Langkat Regency.

## II. RESEARCH METHODS

This type of research is descriptive analytic method with cross sectional study approach, namely by collecting data at once at a time to analyze data of complete blood test in patients with filariasis in Langkat Regency.

The sample was collected from seven filariasis patients without clinical symptoms, with inflammation, and blockages. Respondents were found based on data from the North Sumatra Health Office 2017. Controls in this study was adjusted with characteristics of each filariasis patient according to age and gender. The sampling technique is total sampling, namely using all existing population subjects as samples. The analysis test is the Spearman Correlation, after the normality test with Shapiro Wilk .

## III. RESEARCH RESULT

Gender	Filariasis		Non Filariasis		Sig	Relationship Strength
	N	(%)	N	(%)		
Male	4	57,1	4	57,1	1,000	0,000
Female	3	42,9	3	42,9		
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 1:- Filariasis by Gender

There are 4 male (57.1%) and 3 female respondents (42.9%) who suffer filariasis and 4 male (57.1%) and 3 female respondents (42.9%) as non-filariasis. There was no significant relationship between male and female respondents with filariasis  $p = 1,000$  ( $p > 0.05$ ).

Age	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
45-54	2	28,6	2	28,6	1,000	0,000
55-64	2	28,6	2	28,6		
>65	3	42,8	3	42,8		
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 2:- Filariasis by Age

Respondents by age show that at age range of 45-54 years, there are 2 respondents (28.6%) filariasis and 2 respondents (28.6%) non filariasis. At age range of 55-64, there are 2 respondents (28.6%) filariasis and 2 (28.6%) respondents non filariasis, at age more than 65 years, there are 3 respondents (42.8%) filariasis and 3 respondents (42.8%) non filariasis. There was no significant relationship between age range of 45-54 years, 55-64 years and above 65 years in filariasis namely  $p = 1,000$  ( $p > 0.05$ ).

Occupation	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Farmer	5	71,4	0	0,0	0,000	0,897
Fisherman	2	28,6	0	0,0		
Trader	0	0,0	3	43,9		
Housewife	0	0,0	3	43,9		
Others	0	0,0	1	12,2		
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 3:- Pekerjaan terhadap Filariasis

Filariasis respondents who works as farmers are 5 respondents (71.4%) and fishermen are 2 respondents (28.6%). Whereas for non-filariasis respondents, traders is 3 respondents (43.9%), housewives 3 respondents (43.9%), and others is 1 respondent (12.2%).

There is a significant relationship between respondents who worked as farmers on the occurrence of filariasis, namely  $p = 0,000$  ( $p < 0.05$ ), with relationship strength  $0.897$  ( $0.760-0.990 = \text{very strong}$ ). In other words, filariasis has a very strong relationship with respondents who work as farmers.

Hemoglobin	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Decrease	2	28,6	1	14,3		
Normal	5	71,4	6	85,7	0,552	0,174
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 4:- Filariasis by Hemoglobin

For filariasis respondents, there are 2 respondents (28.6%) who experiencing decrease in hemoglobin levels and 1 respondent (14.3%) for non filariasis. Responden with normal hemoglobin is 5 respondents (71.4%) for filariasis and 6 respondents (87.5%) for non filariasis.

In the analysis of the incidence of filariasis on decreased hemoglobin levels, there is no significant relationship to filariasis among respondents with normal and decreased hemoglobin, namely  $p = 0.552$  ( $p > 0.05$ ).

Hematocrit	Filariasis		non Filariasis		Sig	Relationship Strength
	N	(%)	n	(%)		
Decrease	3	42,9	0	0,0		
Normal	4	57,1	7	100,0	0,055	0,522
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 5:- Filariasis by hematocrit

Respondents who experiencing decrease in hematocrit is 3 respondents (42.9%) for filariasis and none for non-filariasis, while who had normal hematocrit is 4 respondents (57.1%) for filariasis and 7 respondents (100%) for non filariasis.

Analysis of hematocrit levels in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and decreased hematocrit, namely  $p = 0.055$  ( $p > 0.05$ ).

erythrocyte	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Decrease	2	28,6	1	14,3		
Normal	5	71,4	6	85,7	0,552	0,174
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 6:- Eritrosit terhadap Filariasis

For filariasis respondents, there are 2 respondents (28.6%) who experiencing decrease in erythrocytes and 1 respondent (14.3%) for non filariasis. Responden with normal erythrocyte levels is 5 respondents (71.4%) for filariasis and 6 respondents (85,7%) for non filariasis.

In the case of filariasis, there is no significant relationship between normal and decreased levels of erythrocytes against filariasis disease, namely  $p = 0.552$  ( $p > 0.05$ ).

Leukocytes	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	1	14,3	0	0,0		
Normal	6	85,7	7	100,0	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 7:- Leukosit terhadap Filariasis

Respondents who experiencing increase in leukocytes is 1 respondent (14.3%) for filariasis and none for non-filariasis. Whereas for normal leukocytes, there are 6 respondents (85.7%) for filariasis and 7 respondents (100%) for non filariasis.

Analysis of leukocytes levels in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and increased leukocytes, namely  $p = 0.337$  ( $p > 0.05$ ).

Platelets	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	N	(%)		
Decrease	0	0,0	0	0,0		
Normal	7	100,0	7	100,0	-	-
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 8:- Filariasis by platelets

None of responden experiencing decrease in platelets both for filariasis and nonfilariasis. There are 7 respondents (100%) with normal platelet for filariasis and 7 respondents for non filariasis.

There is no significant relationship between platelet levels on the incidence of filariasis because all of the respondent's platelet values were normal and none were decreased.

MCV	Filariasis		Bukan Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Decrease	0	0,0	1	14,3		
Normal	7	100,0	6	85,7	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 9:- Filariasis by MC (Mean Corpuscular Volume)

Based on the characteristics of MCV (Mean Corpuscular Volume), for filariasis respondents, none of respondents (14,3%) who experiencing decrease in MCV and 1 respondent (14.3%) for non filariasis. Respondents with normal MCV is 7 respondents (100%) for filariasis, and 6 respondents (85.7%) for non filariasis.

Analysis of MVC value in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and decreased MVC, namely  $p = 0.337$  ( $p > 0.05$ ).

MCH	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Decrease	0	0,0	1	14,3		
Normal	7	100,0	6	85,7	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 10:- Filariasis by MCH (Mean Corpuscular Hemoglobin)

Based on the characteristics of MCH (Mean Corpuscular *Hemoglobin*), none of filariasis respondents experiencing decrease in MCH and 1 respondent (14.3%) for non filariasis. Respondents with normal MCH is 7 respondents (100%) for filariasis, and 6 respondents (85.7%) for non filariasis.

Analysis of MVH in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and decreased MVC, namely  $p = 0.337$  ( $p > 0.05$ ).

MCHC	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Decrease	0	0,0	1	14,3		
Normal	7	100,0	6	85,7	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 11:- Filariasis by MCHC (Mean Corpuscular Hemoglobin Concentration)

Based on the characteristics of MCHC (*Mean Corpuscular Hemoglobin Corpuscular*), none of filariasis respondents experiencing decrease in MCHC and 1 respondent (14.3%) for non filariasis. Respondents with normal MCHC is 7 respondents (100%) for filariasis, and 6 respondents (85.7%) for non filariasis.

Analysis of MCHC in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and decreased MCHC, namely  $p = 0.337$  ( $p > 0.05$ ).

lymphocytes	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	1	14,3	0	0,0		
Normal	6	85,7	7	100,0	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 12:- Filariasis by lymphocytes

Only 1 filariasis respondents experiencing increase in lymphocytes (14,3%) and none for non filariasis. Respondents with normal lymphocytes is 6 respondents (85.7%) for filariasis, and 7 respondents (85.7%) for non filariasis.

Analysis of lymphocytes in the incidence of filariasis also found no significant relationship between respondents who has normal and increased lymphocytes, namely  $p = 0.337$  ( $p > 0.05$ ).

monocytes	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	1	14,3	0	0,0		
Normal	6	85,7	7	100,0	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 13:- Filariasis by monocytes

Based on the number of monocytes, 1 filariasis respondents (14,3%) who experiencing increase in monocytes and none for non filariasis. Respondents with normal monocytes is 6 respondents (85.7%) for filariasis, and 7 respondents (100%) for non filariasis.

Analysis of monocytes in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and increased monocytes, namely  $p = 0.337$  ( $p > 0.05$ ).

Neutrophils	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	1	14,3	0	0,0		
Normal	6	85,7	7	100,0	0,337	0,227
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 14:- Filariasis by Neutrophils

Based on the number of Neutrophils, only 1 filariasis respondents experiencing increase in Neutrophils (14.3%) and none for non filariasis. Respondents with normal Neutrophils is 6 respondents (85.7%) for filariasis, and 7 respondents (100%) for non filariasis.

Analysis of Neutrophils in the incidence of filariasis also found no significant relationship to filariasis among respondents who has normal and increased Neutrophils, namely  $p = 0.337$  ( $p > 0.05$ ).

Eosinophils	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	6	85,7	0	0,0		
Normal	1	14,3	7	100,0	0,000	0,866
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 15:- Filariasis by eosinophils

Based on the number of eosinophils, 6 filariasis respondents (85.7%) experiencing increase in eosinophils and none for non filariasis. Respondents with normal eosinophils is 1 respondent (14,3%) for filariasis, and 7 respondents (100%) for non filariasis.

Analysis of eosinophils in the incidence of filariasis found significant relationship among respondents who has normal and increased eosinophils, namely  $p=0,000$  ( $p < 0,05$ ) and Relationship Strength  $p = 0.886$  (0,760-0,990 = very strong). In other words, filariasis has very strong relationship with the increasing number of eosinophils

Basophils	Filariasis		Non Filariasis		Sig	Relationship Strength
	n	(%)	n	(%)		
Increase	0	0,0	0	0,0		
Normal	7	100,0	7	100,0	-	-
<b>Total</b>	<b>7</b>	<b>100,0</b>	<b>7</b>	<b>100,0</b>		

Table 16:- Filariasis by Basophils

Based on the number of Basophils, none of respondents experiencing increase in Basophils both for filariasis and non filariasis. Respondents with normal Basophils is 7 respondent (100%) for filariasis, and 7 respondents (100%) for non filariasis.

Analysis of Basophils in the incidence of filariasis found no significant relationship to filariasis among respondents who has normal and increased Basophils.

#### IV. DISCUSSION

##### ➤ *The incidence of filariasis*

Langkat Regency is a filariasis endemic area as cited from filariasis case report of Health Office 2017. Several Puskesmas (Public Health Center) has handle filariasis cases in Langkat Regency, including Puskesmas Kuala, Lama Village, Serampit, Tanjung Pura, Tanjung Beringin, and Pematang Jaya.

##### ➤ *Gender*

In accordance with Table 4.1 univariate and Table 4.18 bivariate shows that sex factors do not have a significant relationship to the incidence of filariasis between male and female respondents  $p = 1,000$  ( $p > 0.05$ ) in Langkat District. This is in line with Mardiana, Lestari and Perwitasari's 2011 study with the title of factors affecting the incidence of filariasis in Indonesia (Riskesdas 2007 data) with a sample of 424 people,  $p = 0.09$  ( $p > 0.05$ ) there were no differences in women and men with filarasis. [9]

##### ➤ *Age*

Analysis of Age factor show there is no significant relationship between productive age (15-64 years) and non-productive ( $> 65$  years) to the occurrence of filariasis, namely  $p = 1,000$  ( $p > 0.05$ ) as shown in Table 4.2 univariate and Table 4.19 bivariate. Mardiana, Lestari and Perwitasari (2011) in a study entitled the factors that influence the incidence of filariasis in Indonesia (Riskesdas data 2007) with a sample of 424 persons,  $p = 0.089$  ( $p > 0.05$ ), found no relationship between risk age groups and non risk age with the incidence of filarasis. [9]

##### ➤ *Occupation*

Occupational risk factors have significant relationship to the incidence of filariasis, as indicated by very strong relationship. Table 4.3 and Table 4.20 show  $p = 0.000$  ( $p < 0.05$ ) and the strength of the relationship = 0.897 (very strong). In other words occupation such as Farmers have a strong relationship with the incidence of filarasis. It is confirmed by Amelia (2014) in a study entitled analysis of risk factors for the incidence of filariasis with a sample of 34 persons,  $p = 0.034$  ( $p > 0.05$ ). But Ardias, Setiani and

Hanani (2012) in as study entitled environmental factors and community behavior related to the incidence of filariasis in Sambas Regency found there was no relationship between types of work and filariasis with a sample of 32 persons,  $p = 0.708$  ( $p > 0.05$ ). [11] In this study, 5 out of 7 of filariasis sufferers are farmers and 2 are fishermen. Where farmers and fishermen are at risk of filariasis events. Farmers harvest their crops from night to morning, farmers who do not wear closed clothing and are anti-mosquito will be more easily infected with filariasis.

##### ➤ *Hemoglobin*

According to Table 4.4 univariate and Table 4.21 bivariate, decreased hemoglobin levels do not have a significant relationship to filariasis  $p = 0.552$  ( $p > 0.05$ ) in Langkat Regency.

##### ➤ *Hematocrit*

Hematocrit analysis of the incidence of filariasis found no significant relationship between decreased hematocrit and normal to the occurrence of filariasis  $p = 0.055$  ( $p > 0.05$ ) as indicated by Table 4.5 univariate and Table 4.22 bivariate.

##### ➤ *Erythrocyte*

Decreasing erythrocyte levels did not have significant relationship with filariasis among respondents,  $p = 0.552$  ( $p > 0.05$ ) in Langkat Regency as shown in Table 4.6 univariate and Table 4.23 bivariate.

##### ➤ *Leukocytes*

As shown in Table 4.7 univariate and Table 4.24 bivariate, increasing number of leukocytes did not have a significant relationship to filariasis  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency. In contrasts, Pohan's book entitled Internal Medicine states blood tests in patients with filariasis that contain microfilaremia usually indicate leukocytosis. [12]

##### ➤ *Platelet*

Analysis of platelet shows no significant relationship between decreased and normal platelets to the occurrence of filariasis, because in this study all respondents had normal platelet counts.

##### ➤ *MCV (Mean Corpuscular Volume)*

Decreasing MCV value did not have a significant relationship with filariasis among respondents,  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency as shown by Table 4.9 univariate and Table 4.26 bivariate.

➤ *MCH*

According to Table 4.10 univariate and Table 4.27 bivariate, decreasing MCH value did not have significant relationship to filariasis  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency.

➤ *MCHC*

Analysis of MCHC values did not have significant relationship to filariasis among decreased and normal MCHC,  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency as shown in Table 4.11 univariate and Table 4.28 bivariate.

➤ *Lymphocytes*

Analysis of the number of lymphocytes show there is no significant relationship between increased and normal lymphocytes to the occurrence of filariasis,  $p = 0.337$  ( $p > 0.05$ ) as shown in Table 4.12 univariate and Table 4.29 bivariate.

➤ *Monosit*

As shown in Table 4.13 univariate and Table 4.30 bivariate, increasing number of monocytes did not have significant relationship with filariasis,  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency.

➤ *Neutrophils*

Increasing number of neutrophils in this study did not have significant relationship with filariasis among increased and normal respondents,  $p = 0.337$  ( $p > 0.05$ ) in Langkat Regency as indicated by Table 4.14 univariate and Table 4.31 bivariate. In theory of Muhsin, Safarianti, Maryatun, neutrophils are effector cells of the innate immune system that are short-lived and important in immunity against extracellular pathogens including during the early phases of filariasis infection. Neutrophils are involved in the destruction of filaria worms in at least two ways, namely directly by phagocytic activity and indirectly by encapsulation method in granulomata. [13]

➤ *Eosinophils*

Increasing number of eosinophils has very strong relationship to the incidence of filariasis. Pohan in the book of Internal Medicine states blood tests in patients with filariasis containing microfilaremia usually show 6-26% of eosinophilia [12]. Eosinophils are granulocytes that develop in the bone marrow. The protection role against filariasis infection is carried out by eosinophils through direct and indirect destruction of filarial worms by releasing some attractant proteins. Eosinophils involved in the effector mechanism in helminth infections and allergic diseases.[13] *Wuchereria Bancrofti*, *Brugia Malayi* and *Brugia Timori* infections cause an increase in the amount of eosinophils in the blood in an attempt by the body's immune system to kill the worms. In this study, six out of seven patients with filariasis increased their eosinophil.

➤ *Basophils*

Analysis of the number of basophils found no significant relationship between decreased and normal basophils on the occurrence of filariasis, because in this study all respondents had normal platelet counts. This is in line with several studies showing that the role of basophils is not too significant in filariasis. [13]

## V. CONCLUSION

This study concluded that occupational factors and the increasing number of eosinophils have very strong relationship with filariasis, while age, gender, hemoglobin levels, hematocrit, number of leukocytes, platelets, MCV values, MCH, MCHC, lymphocyte, monocytes, neutrophils, eosinophils, and basophils have no relationship with the incidence of filariasis.

Occupational factors has  $p = 0,000$  ( $p < 0.05$ ) and relationship strength = 0.897 (very strong). means that individuals/communities who have risky jobs such as farmers and fishermen are strongly associated with the occurrence of filariasis in Langkat Regency.

Filariasis also has a strong relationship with increasing the number of eosinophils,  $p = 0,000$  ( $p < 0.05$ ) and relationship strength = 0.866 (very strong). It means the increasing number of eosinophils in filariasis patients has a very strong relationship with occurrence of filariasis.

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