

The Relationship of Hypertension with Neutrophil Lymphocyte Ratio Value in Patients Confirmed Covid-19 at East Jakarta Regional Hospital

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ABSTRACT

Comorbid factors hypertension and neutrophil ratio values lymphocytes (RNL) in patients with confirmed Covid-19 due to cause reduced amount plasma cells that produce antibodies so aggravate and slow down the healing process . Study This use approach descriptive quantitative with use Chi Square test analysis . Result of study namely : the neutrophil ratio value lymphocytes (RNL) and comorbidities hypertension (disease comorbidities) in patients with confirmed Covid-19 is influenced by type gender and range age at each patient . And found exists connection hypertension with neutrophil ratio value lymphocytes in patients confirmed covid-19 AT EAST JAKARTA Regional Hospital from July to September 2021. For consider factors others in patients confirmed covid-19 as one of the parameters is For increase patient and control antibodies risk comorbidity others to avoid from SARS-CoV-2 infection due to poor prognosis until can prevent happen mortality in covid-19 patients .

Keywords: Covid- 19 , neutrophil ratio value lymphocytes (RNL), comorbid hypertension

INTRODUCTION

Covid-19 pandemic was first detected in the city [Wuhan](#) , [Hubei](#) , [China](#) on December 1 , 2019, and established as [pandemic](#) by the [World Health Organization](#) (WHO) on March 11 2020. As of April 30 , the total cases confirmation of covid-19 in the world is 512,707,078 cases with 6,258,546 cases death . Government The Republic of Indonesia has reported 6,046,467 confirmed people positive for COVID-19 and there 156,240 deaths related to COVID-19 (Dewi, 2022).

There are three types of tests that are often used to detect whether someone is infected with the corona virus or not. These examinations are antibody tests , antigen tests and molecular tests using the polymerase method chains reaction (PCR). Cycle Threshold (CT) value is the value that comes out of the reverse results transcriptase quantitative polymerase chains reaction (RT qPCR) which is capable of detecting genetic material through signals entering the machine. The results of this examination only describe the condition of the samples that have been taken and do not show the total amount of virus contained in the patient's body (Mardiana, 2021).

The clinical manifestations of Covid-19 found are very diverse, as well with accompanying comorbid factors . Hypertension was declared the most dangerous disease during the Covid-19 pandemic. This is because the latest data on Covid-19 sufferers shows that hypertension is the highest comorbidity , namely 50.1% and can worsen the condition of Covid-19 sufferers. Although apart from hypertension, other comorbid diseases that can also cause death for Covid-19 patients are diabetes, lung disease, heart disease and dengue hemorrhagic fever (Mutiar, 2021) .

WHO says hypertension or high blood pressure is a condition where the increase in systolic pressure is greater than or equal to 140 mmHg and/or diastolic pressure is equal to or greater than 90 mmHg . Hypertension is an important risk factor for cardiovascular disease that is often found in health centers in Indonesia. The mechanism for hypertension is through the formation of angiotensin II from angiotensin I by angiotensin I converting enzyme (ACE). ACE plays an important physiological role in regulating blood pressure. Blood contains angiotensinogen which is produced in the liver. Furthermore, by hormones, renin (produced by the kidneys) will be converted into angiotensin I. By ACE in the lungs, angiotensin I is converted into angiotensin II. Angiotensin II has a key role in raising blood pressure (Anonymous, 2014). So that patients with comorbid hypertension are more susceptible to infection with SARS-CoV-2 and can experience more severe clinical manifestations, presumably because it is related to increased expression of ACE2 which can bind to the viral surface spike protein directly in comorbid hypertension compared to patients without comorbid hypertension (Siallagan, 2022).

Neutrophils are white blood cells that are very important in blood circulation, and as the first defense system in the innate immune system . The task of neutrophils is to capture and destroy micro-organisms that invade the human body through intracellular phagocytosis and degradation, release of granules , and formation of extracellular traps. neutrophils upon detection of pathogens. Neutrophils also participate as inflammatory mediators. Lymphocytes are white blood cells that have several roles in the immune system, including protecting the body from viruses, parasites, fungi and bacteria. A very severe lack of lymphocytes can cause uncontrolled infections that can be fatal. The Neutrophil Lymphocyte Ratio (NLR) value is divided by the absolute number of neutrophils on the absolute lymphocyte count. Simple laboratory tests such as measuring the neutrophil -lymphocyte ratio are known to be used as a factor to determine circulating biomarkers that can present inflammatory and immune status which can be useful as potential indicators in prognosis and early intervention, reducing unnecessary examination and treatment of patients. covid-19 (Yang et al. , 2020).

MATERIALS & METHODS

Approach research used _ is approach quantitative . Method used is with Chi Square test , Analysis analytic or bivariate For measure relationship between neutrophil lymphocyte ratio with factor comorbid (categorical). Study done AT EAST JAKARTA Regional Hospital with research time is 6 months . Population in study This is as many as 88,895 people (taken from the average number of BPJS Health participants registered at the EAST JAKARTA Regional Hospital. Samples in the study are 400 BPJS Health participants and 77 employees and management at the EAST JAKARTA Regional Hospital. Internal variables research This is comorbid hypertension in patients confirmed covid-19, neutrophil ratio lymphocytes in patients confirmed covid-19. Deep data collection study This is interviews and questionnaires. Design deep data analysis study uses studies correlation in a way cross-sectional.

RESULTS & DISCUSSION

Results

Based on results research conducted _ towards that which consists of 95 confirmed patients positive for Covid-19 AT EAST JAKARTA Regional Hospital period July to September 2021 AT EAST JAKARTA Regional Hospital. The study has get ethical approval

from DI RSUD East Jakarta. which then done processing with using SPSS and known a number of characteristics respondents as following:

Analysis Statistics Descriptive

Characteristics COVID-19 patients AT EAST JAKARTA Regional Hospital in study This covers type sex, age, neutrophil ratio value lymphocytes (RNL), comorbid : hypertension (disease accompanying) who will served in table following This :

A. Hypertension

1. Hypertension and Gender

Table 1. Distribution Answer Respondent Based on Hypertension and Gender .

No	Jenis Kelamin	Komorbid						Jumlah		%
		Hipertensi		%		Normal				
1	Laki-Laki	33	Orang	75	25	Orang	49.02	58	Orang	61.05
2	Perempuan	11	Orang	25	26	Orang	50.98	37	Orang	38.95
Jumlah		44	Orang	100	51	Orang	100	95	Orang	100

Sumber : Diolah oleh penulis

Based on the data obtained researcher from record medical on the table Previously , there were patients which is confirmed positive for Covid-19 At East Jakarta Regional Hospital For The Period July To September 2021. At East Jakarta Regional Hospital, there were 58 patients (61.05%) who were male and 37 patients (38.05 %) who were male and female. .95%) who are female. These results show that there is a difference in the number of patients which is confirmed positive for Covid-19 at East Jakarta Regional Hospital for the period July to September 2021 at EAST JAKARTA Regional Hospital .

From the results the can seen that confirmed patients _ positive for Covid-19 in East Jakarta Regional Hospital for the period January - March 2022. In East Jakarta Regional Hospital, male is is most patients _ confirmed positive for Covid-19 at East Jakarta Regional Hospital for the period July to September 2021 at East Jakarta Regional Hospital.

Research results show part big confirmed patients _ positive for covid-19 At East Jakarta Regional Hospital for the period January - March 2022 with comorbid hypertension namely 44 patients and 51 patients .

Research result this also saw amount confirmed patients _ positive for covid -19 with coorbid hypertension , patient type man more Lots compared to with amount patient who manifold Woman . There were 33 patients (75%) of this type male and 11 patients (25%) were of the same sex Woman with coorbid hypertension. Whereas amount confirmed patients _ positive for covid -19 with normal coorbits are A little more Lots the amount compared with various types of patients Woman compared to with various types of patients men , namely 25 patients of this type female and 26 male patients .

2. Hypertension and Age

Table 2. Distribution Answer Respondent Based on Hypertension and Age

No	Usia	Komorbit					
		Hipertensi		%		Normal	
1	50 - 55 Tahun	5	Orang	11.36	28	Orang	54
2	56 - 60 Tahun	10	Orang	22.72	5	Orang	10
3	61 - 65 Tahun	15	Orang	34.1	12	Orang	24
4	66- 70 Tahun	6	Orang	13.63	6	Orang	12
5	71- 75 Tahun	3	Orang	6.82	0	Orang	0
6	76 - 80 Tahun	4	Orang	9.1	0	Orang	0
7	81 - 85 Tahun	1	Orang	2.27	0	Orang	0
Jumlah		44	Orang	100	51	Orang	100

Sumber : Diolah oleh penulis

Result of analysis carried out by researchers, found patient which is confirmed positive for Covid-19 AT EAST JAKARTA Regional Hospital for the period July to September 2021. EAST JAKARTA Regional Hospital has different ages, consisting of ages from 50 – 85 years consisting of 32 patient person with coorbit hypertension and 25 patients with normal comorbidit.

Results of data analysis carried out researchers also found confirmed patients _ positive for covid -19 with range aged 61-65 years is most patients the amount with coorbit hypertension compared to with patient with range age other . And no found confirmed patients _ positive for covid -19 with range aged 50-55 years. However there is difference amount confirmed patients _ positive for covid -19 with range aged 50-55 years with normal coorbits are is the greatest number the amount compared to with amount range other ages.

B. Neutrophil Ratio Value Lymphocytes (RNL)

1. Neutrophil Ratio Value Lymphocytes (RNL) and Gender

Table 3. Distribution Answer Respondent
Based on the Neutrophil Ratio Value Lymphocytes (RNL) and Gender

No	Jenis Kelamin	Nilai Ratio Neutrofil Limfosit (RNL)								Jumlah	%
		Normal				Abnormal					
1	Laki-Laki	25	Orang	58.14	33	Orang	63.46	58	Orang	61.05	
2	Perempuan	18	Orang	41.86	19	Orang	36.54	37	Orang	38.95	
Jumlah		43	Orang	100	52	Orang	100	95	Orang	100	

Sumber : Diolah oleh penulis

Research result show part big confirmed patients _ positive for Covid-19 at East Jakarta Regional Hospital for the period July to September 2021 at East Jakarta Regional Hospital with Neutrophil Value lymphocytes ratio (NLR) namely 43 patients who had Neutrophil Value lymphocytes ratio (NLR) was normal and 52 patients had it Neutrophil Value lymphocytes ratio (NLR) abnormal).

Research result This explain that there is A total of 33 patients (63.46%) were confirmed positive for covid-19 is patient with type sex male and 19 patients (41.86) were classified as patient with category mark neutrophils lymphocytes ratio (NLR) was abnormal and 25 patients (58.14%) with type sex male and 18 patients (41.86%) with category mark neutrophils lymphocytes ratio (NLR) is normal. Patient type man is is patients who have more amount _ Lots from the patient with type Woman .

Other results are also illuminating that amount patient type man is is amount patient with category mark neutrophils lymphocytes ratio (NLR) is more abnormal Lots compared to with amount patient type women who also have category mark neutrophils lymphocytes The abnormal ratio (NLR) was 33 patients (63.46%) and 19 patients (36.54%).

For overcome lack very severe lymphocytosis in each individual patient which is confirmed positive for covid -19, patients who have Neutrophil Value lymphocytes ratio (NLR) is high must more be careful to avoid it from SARS-CoV-2 infection due to cause reduced amount producing plasma cells antibodies . (Galani et al., 2015).

2. Neutrophil Ratio Value Lymphocytes (RNL) and Age

Nilai Ratio Neutrofil Limfosit											
No	Usia	(RNL)						Jumlah		%	
		Normal		%	Abnormal		%				
1	50 - 55 Tahun	24	Orang	55.82	9	Orang	17.3	33	Orang	34.74	
2	56 - 60 Tahun	4	Orang	9.3	11	Orang	21.15	15	Orang	15.79	
3	61 - 65 Tahun	11	Orang	25.58	16	Orang	30.77	27	Orang	28.42	
4	66- 70 Tahun	4	Orang	9.3	8	Orang	15.38	12	Orang	12.63	
5	71- 75 Tahun	0	Orang	0	3	Orang	5.77	3	Orang	3.16	
6	76 - 80 Tahun	0	Orang	0	4	Orang	7.7	4	Orang	4.21	
7	81 - 85 Tahun	0	Orang	0	1	Orang	1.93	1	Orang	1.05	
Jumlah		43	Orang	100	52	Orang	100	95	Orang	100	

Sumber : Diolah oleh penulis

Result of analysis carried out by researchers, found patient which is confirmed positive for Covid-19 AT EAST JAKARTA Regional Hospital for the period July to September 2021. EAST JAKARTA Regional Hospital has different ages, consisting of ages from 50 – 85 years consisting of 43 patient person with category mark neutrophils lymphocytes normal ratio (NLR) and 52 patients with category mark neutrophils lymphocytes abnormal ratio (NLR) .

Result of data analysis carried out researcher find confirmed patients _ positive for covid -19 with range aged 61-65 years is most patients the amount with category mark neutrophils lymphocytes abnormal ratio (NLR) with the number of 16 patients (30.77%) was compared patient with range age other.

Confirmed patient _ positive for covid -19 with range 50-55 years old , that is is range most ages _ the amount with category mark neutrophils lymphocytes normal ratio (NLR) ie totaling 24 patients (55.82%). Amount confirmed patients _ positive for COVID-19 with range aged 61-65 years with category mark neutrophils lymphocytes abnormal ratio (NLR), namely 16 people (30.77%) were is the most numerous the amount compared to with amount range other ages .

From the description results analysis on the that amount confirmed patients _ positive for covid -19 with every category age connected with category mark neutrophils lymphocytes ratio (NLR), visible clear that category mark neutrophils lymphocytes abnormal ratio (NLR) is the most numerous the amount compared to with patient with category mark neutrophils lymphocytes ratio (NLR) is normal.

C. Chi square analysis

Analysis in study This done aim For know relationship between two variables that is variable free and variable bound, Statistical test in study This is the chi-square test. Analysis bivariate using crosstab and chiSquare test with degrees 95% confidence. If P-value ≤ 0.05 , then calculation in a way statistics show that exists connection meaningful between variable free with bound. If P-value > 0.05 then calculation in a way statistics show that No exists connection meaningful between variable free with bound.

Table. Variable Chi square results Study Blood Pressure and Neutrophil Ratio Lymphocytes (RNL) in Patients AT East Jakarta Regional Hospital Period July to September 2021

No	Variabel	Normal		Tidak Normal		Total		QR (95% CI)	P Value
		n	%	n	%	n	%		
1	Tekanan Darah	50	47.36	45	52.64	95	100	0.008 - 0.703	0.0356
2	Ratio Neutrofil Limfosit (RNL)	43	45.26	52	54.74	95	100	0.011 - 0.932	0.0473

Based on results research conducted towards that which consists of 95 confirmed patients positive for covid-19 At East Jakarta Regional Hospital for the period July to September 2021 at East Jakarta Regional Hospital , which was carried out with examine amount confirmed patients _ positive for covid-19. From the results of recorded data medical treatment performed is known a number of characteristics respondents as following :

Based on results calculation with Chi Square Tests then The p-value for each variable is obtained pressure blood patient and value neutrophils lymphocytes ratio (NLR). Obtained variable p- value pressure blood patient as big as 0.0356 (<0.05) which means There is connection among those confirmed positive for covid -19 with Patients who have pressure abnormal blood / hypertension .

The calculation results with use of chisquare to variable Neutrophil value lymphocytes ratio (NLR), found There is connection between confirmed patients _ positive for covid-19 own mark neutrophils lymphocytes abnormal ratio (NLR) , with mark p-value 0.0473 (<0.05) which means There is connection between confirmed patients _ positive for covid-19 own mark neutrophils lymphocytes abnormal ratio (NLR).

From the results and discussions that have been carried out described by researchers, then Hypothesis previous research _ Already explained previously that patient confirmed covid-19 At East Jakarta Regional Hospital for the period July to September 2021 has connection with patients who have pressure abnormal/ comorbid blood hypertension and neutrophil ratio value abnormal lymphocytes.

CONCLUSION

Based on from results discussion that has been carried out by the author about connection neutrophil ratio value lymphocytes with factor comorbid hypertension in patients confirmed covid-19 At East Jakarta Regional Hospital for the period January - March 2022, can concluded as following :

1. Comorbid Factors hypertension in patients Covid 19 has been confirmed at the East Jakarta Regional Hospital connection to level severity in patients confirmed as Covid-19 is good to various types of patients boy and girl and is also influenced by range age of each patient confirmed as Covid 19 .

2. Neutrophil ratio value The lymphocytes (RNL) of each patient at the East Jakarta Regional Hospital who were confirmed to have Covid-19, both normal and abnormal, were also influenced by factors type gender and range age each patient.
3. From the results analysis carried out by researchers found exists connection hypertension with neutrophil ratio value lymphocytes in patients confirmed covid-19 At East Jakarta Regional Hospital.

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