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The Analysis of Oxygen Saturation Value D-Dimer Levels and the Neutrophil-Lymphocyte Ratio Toward the Death of Covid-19 Patients with Comorbid at Gambiran Hospital, Kediri

Siti Hasna Ulfiah[1*], Yuly Peristiowati[2]

[1] Gambiran Hospital, Kediri
[2] Institut Ilmu Kesehatan STRADA Indonesia

***Email:**
ulfidkk@gmail.com

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ABSTRACT

There is exponential growth of Covid-19 cases throughout the world which mean the number of people infected with the virus has increased rapidly. This study aims about saturation oxygen, and laboratory examination results like of D-dimer and Nitrofil-limfosit Ratio to predict Covid-19 severity early. One hundred-one Covid-19 died at Gambiran Hospital Kediri to positive PCR results and with Comorbidites between June-Agust 2021 were retrospectively and classified by saturation oxygen value, level of D-dimer and level of Nitrofil-limfocytes Ratio according to CT value of PCR results. Of included patients, 52 (51.5%) female gender, 32 (31.7%) age 51-60 years, 22 (21.8) needed ICU admission, 66 (65.3%) 1-5 days hospitalized, the most comorbidities are Diabetes Melitus (60.4 %), Hipertension (9,.9%), Chronic Kidney Disesases (9.9 %), Cerebro Vascular Accident (7.9 %). Mean, median and modus Saturation Oxygen, D-dimer, NLR and CT value are 85,27 %; 90%; 93 %; 3.04 mg/L; 1.5 mg/L; 10 mg/L; 11.6; 6.8; 6.4; 21.67; 20.5; 16.59, 18.6. How ever, by applying multiple regression, D-dimer showed significant effect with CT Value of PCR results with sig. .016. Not for Saturation Oxygen (sig. .104) and NLR (sig .461). By simultant test showed Saturation oxygen, D-dimer and NLR significans effect R .029 with R *square* 0.189. D-dimer level more than 3.04 mg/L could be predictors for severe COVID-19 early. COVID-19, Severity, Saturation, Oxygen, Neutrophil-lymphocyte ratio, NLR, D-dimer, CT value, PCR, comorbidities.

Keywords: covid-19, comorbidities, CT value, D-dimer, neutrophil-lymphocyte ratio, NLR, oxygen, PCR, saturation, severity

INTRODUCTION

At the beginning of 2020, the world was shocked by the outbreak of the corona virus (Covid-19) which infects almost all countries in the world. There is exponential growth of Covid-19 cases throughout the world which mean the number of people infected with the virus has increased rapidly. The world is entering a global emergency related to this virus (Axel et al., 2021). It is reported that confirm Covid-19 cases in the world at June 2021 are 173 million cases with 3,7 million deaths. Cases in Indonesia from June 2020 to June 2021 are 1,8 million cases with 51 thousand deaths (WHO, 2020). While in Kediri, Covid-19 cases treated at Gambiran Hospital from June 2020 to 2021 are 1074 cases with 177 deaths. Patients who died in June 2021, there were several patients with saturation above 95 % and 35 % of the 165 patients with comorbid (internal report Gambiran Hospital, 2021).

Oxygen saturation becomes one indicator of the severity level of Covid-19 where patients tend to have low levels of oxygen in their blood (O'Carroll et al., 2020). Moreover, the death level influenced by the existence of non-infectious disease (WHO Headquarters, 2021) such as DM and hypertension. Oxygen saturation < 90-94% in room air is abnormal in patients with normal lungs and can be one of the early symptoms of severe disease (WHO Headquarters, 2021). SpO2 Target in shock patients is 90%, pregnant patients 92-95%, children 94% (Kepmenkes RI, 2020). Oxygen saturation is an indicator of whether a COVID-19 patient needs to be hospitalized, in addition to age, comorbidities and respiratory frequency (Kluge et al., 2021).

High D-dimer is found in conditions of venous thrombosis and thromboembolism and disseminated intravascular coagulation (Weitz, Fredenburgh and Eikelboom, 2017). The changes in D-dimer also positively correlated with Covid-19 prognosis (Li et al., 2020) where it can predict severe and fatal cases of Covid-19 with moderate accuracy. The normal value of D-dimer is < 0.05 mg/L. D-dimer 2.025 mg/L risk of death. High D-dimer can evaluate the prognosis and complications of COVID-19 patients (He et al., 2021. D-dimer > 2.0 predicts COVID-19 mortality (Zhang et al., 2020). D-dimer 370 ng/ml has a positive correlation between age, length of stay, lung role, fibrinogen, neutrophil count but negative correlation with lymphocytes (Ozen et al., 2021).

Low lymphocyte levels are the main feature of COVID-19 patients, especially in severe cases (Yang et al., 2020). Neutrophil to lymphocyte ratio (NLR) is an indicator of systemic inflammation in COVID-19 patients. NLR > 6.11 predicts higher mortality in COVID-19 patients (Cai et al., 2021). NLR > 3.3 the risk is 6.2 times greater for severe COVID-19 attacks (I. Pramana, P. Masyuni, I. Surawan, 2021).

In addition there is immunopathology of Covid-19 (Cavalcante-Silva et al., 2021). It has been shown that the virus disrupts normal immune responses, role of neutrophils as effector cells. So, that low neutrophils are an indicator of severe respiratory symptoms that worsen patient recovery.

Based on this background, a problem that will be investigation further can be formulated is "How the effect of oxygen saturation value, D-dimer level and Neutrophils-Lymphocytes ratio toward the death of Covid-19 patients with comorbid at the Gambiran Hospital, Kediri?"

The purposes of this study aret to analyze the effect of Oxygen saturation value toward the death of covid-19 patients with comorbid, to analyze the effect of D-dimer level toward the death of covid-19 patients with comorbid, to analyze the effect of Neutrophils-Lymphocytes ratio toward the death of covid-19 patients with comorbid and to analyze the effect of oxygen saturation value, D-dimer level, and Neutrophils-Lymphocytes ratio toward the death of covid-19 patients with comorbid at Gambiran Hospital, Kediri.

METHODS

This study is carried out in order to obtain scientific truth. To obtain this truth, it is necessary to have a research method which is a quantitative approach and using analytics-retrospective design. The independent variables are Oxygen saturation value (X1) , Level of D-dimer (X2), and Neutrophil-lymphocyte Ratio (X3) with dependent variable is Death of COVID-19 patient with comorbid (Y). The population of this study are data from medical rcords COVID-19 patients with positively PCR result who died in the isolation room at Gambiran Hospital in June-August 2021 wich amount are 135. While the sample sizes are 101 data , which is calculated based on the Slovin formula and selected by simple random sampling.

The data collected through observation sheet and then analyze with normality test using SPSS software. Then the variabel independents and variabel dependent analized use multiple regression with SPSS software. This research has been ethical tested by The Health Research Ethics Committee of The Institute of Health Sciences Strada Indonesia and has ethical approval with ethics test certificate number 2678/ KEPK/IX/2021.

RESULTS

The characteristics of respondents from 101 samples based on gender were the percentage of respondents with females gender are 51.5 % and males gender are 48.5 %. Respondents with females gender are more higher than males gender. The characteristics of respondent based on age are mostly in the age 51-60 years, as many as 32 people (31.7%) and the least are the age 31-40 years (4%). Respondents who were treated in the isolation room (78.2 %) more higher than respondents who were

treated in the ICU isolation room (21.8%). Based on addres of respondents that most of respondents addres of origin from the city of Kediri (94.1 %). From the data above, it can be illustrated that the most respondents with Long of Stay 1-5 days are 66 people (65.3%) and the least are of 16-20 days, namely 2 people (2 %). The data illustrated that the most comorbidities is Diabetes Mellitus (60.4 %), than Hipertension (9,9%), Chronic Kidney Disesases (9.9 %), Cerebro Vascular Accident (7.9 %), than the least is HHD (1%).

Table 4.8 Multiple Regression Test

		Unstandardized Residual
N		101
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	773.11518470
Most Extreme Differences	Absolute	.104
	Positive	.066
	Negative	-.104
Kolmogorov-Smirnov Z		1.048
Asymp. Sig. (2-tailed)		.222

a. Test distribution is Normal.

b. Calculated from data.

This table shown that *sig kolmogorov smirnov* values 0,222. Its mean that data of 101 samples were normally distributed.

Table 4.8 Multiple Regression Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1429.557	538.179		2.656	.009
	X1 (Nilai Saturasi Oksigen /SpO2)	5.829	6.054	.097	.963	.338
	X2 (Kadar D-dimer)	9.343	4.015	.237	2.327	.022
	X3 (Rasio Netrofil-Limfosit/NLR)	-.946	.677	-.140	-1.398	.165

Table 4.9 Parsial t Test

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Table 4.10 ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4055678.029	3	1351892.676	2.194	.094[b]
	Residual	59770708.882	97	616192.875		
	Total	63826386.911	100			

Table 4.11. Determinantc Coeffisien test (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.252[a]	.164	.135	784.980

This data from table 4-8-4.11 shown that :

1. Variabel X1 (Oxygen saturation Value) a significant value 0.338 so that no significant effect of X1 (Oxygen saturation Value) on Y (CT Value of PCR results).
2. Varibel X2 (D-Dimer) a significant value 0.022 so that significant effect X2 (D-Dimer) on Y (CT Value of PCR results).
3. Variabel X3 (NLR ratio) a significant value 0.165 so that no significant effect X3 (NLR Ratio) on Y (CT Value of PCR results).
4. The significant value of the F test is 0,094 so there is no significant effect of X1 (Oxygen saturation Value), X2 (D-Dimer) and (NLR ratio) on Y (CT Value of PCR results).
5. R value that shows the degree of correlation between X1 (Oxygen saturation Value), X2 (D-Dimer) and (NLR ratio) to Y (CT Value of PCR results) is 0.252. the R Square value of 0.164 means that the Y variabel (CT Value of PCR results) can explained by the variabel X1 (Oxygen saturation Value), X2 (D-Dimer) and (NLR ratio) through a regression model of 16.4 % the rest comes from other variables outside the research.

DISCUSSION

There is no significant effect between the independent variabel Oxygen saturation value (X1) and Varibel Independent Netrofil-limfosit Ratio on the dependent variabel Y (CT value of PCR results) because of the presence of other factor that no research on the respondents like breathing frequency variabel which indirectly affects the level of oxygen demand. And other factor about the degree of severity of comorbid disease detected by laboratory results like HbA1c (DM), PCR and APPT and KPPT. Other than that, data collection of saturation oxygen and NLR (Netrofil-Limfosit Ratio) is aat beginning of the patient's admission to the emergency room, while some PCR examinations are carried out after the patient is in treatment room.

CONCLUSION

There is significant correlation between D-dimer levels and CT value of PCR results and no significant correlation between Saturation oxygen value and CT value of PCR results. Other than that no significant correlation between Nitrofil-limfosit ratio (NLR) and CT Value PCR results.

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