

Isolates Depression is Associated with the Result RT-PCR Diagnostic of COVID-19

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ABSTRACT

Depression after diagnosis of RT-PCR and positive results that do not go negative in patients with diagnosed COVID-19 still need further research. This study aims to determine the relationship of severe depression with RT-PCR results that remain positive even though it has been repeated many times. A total of 32 patients diagnosed with COVID-19 were assigned a level of depression using the Beck's Depression Inventory-II questionnaire. Pearson's correlation and linear regression were performed to identify the relationship and its strengths. Patients with a diagnosis of COVID-19 numbered 32 people, assessed the level of depression with results, minimal depression (12.5%), mild (12.5%), moderate (12.5%), severe (62.5%). Patients with severe depression have more RT-PCR repeat rates than mild depression. The correlation test results showed a significance value of 0.415 with a regression coefficient of 0.000 with $\alpha = 5\%$. In sum, the severity of depression has a strong association with RT-PCR results.

Keywords: Depression, minimally depression, mild depression, moderate depression severe depression, RT-PCR

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INTRODUCTION

A depression disorder is a common disease, with the global point prevalence estimated at 4.4%¹. Everyone who experienced symptoms and was later diagnosed as COVID-19 will have many experiences of feelings and behavioral when they try to adjust and accept the situation after being diagnosed with COVID-19 from the results of RT-PCR. There are feelings of shock, rejection, anger, sadness, and guilt for significant changes in life. Everyone finds it very difficult to control changes in emotions and behavior after experiencing COVID-19. Moreover, if patients do not know how to overcome it, then the difference becomes extraordinary and creates new problems, both when hearing the diagnosis of COVID-19, at the time of symptoms. Afterward, so it is very influential on the results of the next RT-PCR examination^{2,3,4,5,6}.

According to PPDGJ III, depression is a common mental disorder characterized by sadness, loss of interest in activities, and decreased energy. Depression was distinguished from healthy mood changes by the severity, symptoms, and duration of the disorder. Patients in depressed moods show loss of energy and interest, guilt, difficulty concentrating, loss of appetite, and thoughts about death or suicide. Other symptoms or signs include changes in activity levels, cognitive abilities, speech, and vegetative functions (such as sleep, appetite, sexual activity, and different biological rhythms). This disorder almost always leads to interpersonal, social, and work disruption.⁷

A severe depressive disorder is a disorder commonly found with a lifetime prevalence of around 15%. The prevalence of severe depressive disorders is two times greater in women than in men due to hormonal differences, the effect of childbirth, different psychosocial stressors between men and women, and the dependency behavior models studied.⁷ In terms of age, the average age of onset for severe depressive disorders is around 40 years. Nearly 50% of severe depressive disorders occur

between the ages of 20 and 50 years. In marital status, severe depression disorders often occur in people who do not have close interpersonal relationships or in people who experience divorce or separation.⁸ Based on age, children, and parents who have comorbid factors, to COVID-19 have a tendency to experience excessive anxiety, and fear. They have a fear that significantly interferes with his mental health in the pandemic COVID-19.^{9,10}

RT-PCR (*real-time reverse transcription-polymerase chain reaction*) is the recommended method for virus detection because it can find nucleic acid amplification by sequencing. Samples were said to be positive (confirmation of SARS-CoV-2) if the result of RT-PCR was positive at least two genomic targets (N, E, S, or RdRP) specific to SARS-CoV-2; OR RT-PCR positive betacoronavirus, supported by the sequencing of part or all of the viral genomes following SARS-CoV-2.¹¹

The results of RT-PCR determine the condition of the patient to get out of the isolation that was recommended by World Health Organisation (WHO) to confirm the clearance of the virus, and the patient to get out of isolation, requiring the patient to recover clinically by having twice negative RT-PCR results in sequential samples taken at least 24 hours apart. This recommendation is based on knowledge and experience with similar coronaviruses, including those that cause SARS and MERS.¹¹ This study aimed to investigate the relationship of the severity of depression with the results of RT-PCR, which remained positive despite repeated many times.

MATERIALS AND METHODS

Subject

This descriptive quantitative cross-sectional study included 32 patients who suffered from COVID-19 who were consulted in the psychiatric department of RSPAL Dr. Ramelan Surabaya Indonesia. From May 2020 to July

2020. This study has been approved by the Research Ethics Commission of RSPAL Surabaya (13/EC/KERS/2020).

Assessment of depression levels

Evaluation of the level of depression in this study used the Back-Depression Inventory-III questionnaire. This questionnaire consists of 21 question items that measure a person's symptoms of depression in terms of emotions, cognitive, motivation, and vegetative during the last two weeks. Indicators of emotions consist of sadness, crying, irritability, pessimism, dissatisfaction, guilt. Signs of cognitive such as feelings of failure, self-hatred, self-blame, feelings of punishment, body image distortion, and difficulty concentrating. Indicators of motivation are suicidal ideation, withdrawal from the social environment, and not being able to make decisions. Respondents choose one of the four statement choices that have a range of values from 0 (not at all) to 3 (extreme values of a symptom) that best suits the circumstances felt by the respondent during the last two weeks. The total value of

the 21 question points was then added up and interpreted based on the range, namely: minimal depression = 0-13, mild depression = 14-19, moderate depression = 20-28, and severe depression 29-63¹². RT-PCR in this research was the number of times the PCR is performed until the patient is considered cured with the RT-PCR result found to be two times negative in a row.

Statistical analysis

The data obtained were analyzed statistically to get a description of descriptive values, with descriptive statistics and normally distributed tested using Kolmogorov-Smirnov and further using the Pearson's correlation. Continuous variables were analyzed using a linear regression test, $p < 0.05$.

RESULTS

Characteristic data

Descriptive and characteristics data were presented in Table 1.

Table 1. Characteristics Data.

Characteristics	Frequency	%
Sex	32	
male	24	75
female	8	25
depression		
minimal	4	12.5
mild	4	12.5
moderate	4	12.5
severe	20	62.5
RT-PCR	20	
Less than equal to 3 times	12	37.5
More than three times	20	62.5

If seen from age, patients start from the youngest 18 years and the oldest 78 years.

Correlation between depression and RT-PCR and number of RT-PCR

A correlation test between the severity of depression in patients with PCR results that remained positive in the repeat test, which was concocted in the psychiatric section, is shown in Table 2.

Table 2. Results of Statistical Tests of Severity of Depression with RT-PCR Replications.

Statistical Test	Test Significance Value
Correlation	0.415
Anova	0.018
Coefficients regression	0.000

The value of the test with $\alpha = 5\%$, is used to get the next decision, continuously with the correlation test, the results are obtained, there is a relationship between the level of depression of patients with RT-PCR results. The Pearson correlation coefficient was used to know the most stable relationship, and the value obtained 0.415, meaning that there is a relationship between the severity of depression with the results of RT-PCR, with the direction of a positive (+) relationship. Patients with severe depression rates tend to have RT-PCR results that continue to be positive; conversely, patients with minimal depression levels RT-PCR results will be faster negative.

Significance of the regression model to examine the effect of depression levels on patients with RT-PCR results. Population for the generalization process. The results of

the ANOVA analysis for the significance value was the regression model 0.018, and it means that there is an influence between the results of RT-PCR with the level of depression. The next test is testing the regression coefficient; the data obtained significance value of 0.000 means the regression coefficient for the variable level of significant depression. The following regression equation is obtained: the RT-PCR result will remain positive with the RT-PCR equation = $1.211 + 0.184$ (depression rate).

DISCUSSION

The main results of this study were the relationship between the results of RT-PCR with the severity of depression. Previous studies of depression in COVID-19 known to the authors of the prevalence and factors

associated with anxiety and depression were not directly related to the results of RT-PCR.¹³

Depression in this research supposed has closely related to the pathophysiology of depression. It was associated with many biological factors, including biogenic-amine abnormalities, among others were 5-hydroxy indoleacetic acid (5-HIAA), homovanilic acid (HVA), 3-methoxy 4-hydroxyphenylglycol (MHPG). Most studies report that sufferers of depressive disorders exhibit a variety of biogenic-amine metabolic abnormalities in the blood, urine, and cerebrospinal fluid. This situation supports the hypothesis of depressive disorders associated with biogenic-amine dysregulation.¹⁴ Serotonin and norepinephrine are the two neurotransmitters that play the most role in the pathophysiology of depression.¹⁵

Other neurochemical factors associated with depression include Serotonin. With the substantial effect of selective serotonin reuptake inhibitors (SSRIs) on depression therapy, Serotonin has become the biogenic-amine neurotransmitter most commonly associated with depression.¹⁶ Serotonin activity is reduced in depression. Serotonin is responsible for the control of regulation of affect, aggression, sleep and appetite.¹⁷

Decreasing of norepinephrine related to the regulation of beta-adrenergic receptors, and have a direct role of the noradrenergic system in depression. The presence of β 2-adrenergic procapsid receptors in a depression causes a decrease in the amount of norepinephrine released. The β 2-adrenergic presynaptic receptor is also located in serotonergic neurons and regulates the amount of Serotonin released.¹⁷

Besides Serotonin and norepinephrine, dopamine was also thought to have a role in depression. The data support that dopamine activity was reduced in depression. The discovery of new dopamine receptor subtypes and increased understanding of the regulation of presynaptic and postsynaptic in dopamine function have further enriched research into the relationship between dopamine and mood disorders. Two recent theories about dopamine and depression are that the mesolimbic dopamine pathway may be dysfunctional in depression, and the dopamine D1 receptor may be hypoactive in depression.¹⁷ Depression levels associated with salivary cortisol levels and it is essential as it shows the biological aspect of clinical improvement for patient.¹⁸

Psychosocial factors from observations found that life events that are full of pressure appear to precede episodes of mood disorders. One theory explains that the stress that accompanies the first episode results in long-lasting changes in brain biology so that changes in the functional state of various neurotransmitters and the internal signaling system can even include loss of neurons and reduced synaptic contact exposure. As a result, a person has a high risk of experiencing subsequent episodes of mood disorders, even without an external stressor. Some believe that life events have an important role in depression, while others consider it only limited to the onset and time of depression.¹⁹

Personality factors are also very closely involved and require further research. They were related to these personality types and their close relationship with RT-PCR rates and COVID-19 diagnosis. All humans, whatever their personality patterns, can experience depression under appropriate circumstances. People with antisocial and paranoid personality disorders may have a lower risk for depression than people with certain personality disorders such as obsessive-compulsive disorder, histrionic, and borderline.²⁰

Limitations of the study were showed by 1). The cross-sectional study was not capable of determining the causal of the case study between the severity of the depression and the positive of RT-PCR, 2). The way to collect the data only on the patient consulting in the psychiatry department so less can be followed the course of the severity of the disease, and 3). The data taken in this study is only in 1 place, so the generalization is limited.

CONCLUSION

In conclusion, this study showed that the severity of depression has a strong association with RT-PCR results. Further research is suggested involving factors related to the cause of this condition.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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