The Correlation between Pandemic Covid-19 Stress Level and Frequency of Relapse in Coronary Heart Disease Patients

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Abstract

Background: Severe acute respiratory syndrome of coronavirus 2 (SARS-CoV-2) as the cause of coronavirus disease (COVID-19) has caused global pandemic around the world. Patients who have coronary heart disease have been identified as highly vulnerable with increased morbidity and mortality while suffering from COVID-19. In addition, patients with coronary heart disease are also suffering with clinically significant stress. Stress can cause the body to release hormones that will make heart to beat faster.

Aim: This study aims to determine the relationship between the stress level of COVID-19 pandemic and frequency of relapse in patients with coronary heart disease.

Methodology: The design of this study was cross-sectional which involved accidental sampling technique with descriptive analytic method, using Perceived Stress Scale (PSS-10) instrument as independent variable and one-question questionnaire as dependent variable. The study was conducted at Indonesian Red Cross Hospital in Bogor City with a total sample of 33 coronary heart disease patients. The data analysis techniques used were univariate and bivariate with Kendall's Tau statistical test.

Result: Out of 33 participants, 28 (84.8.8%) had moderate COVID-19 pandemic stress levels and 17 (51.5%) experienced moderate relapse frequency.

Conclusion: There was a relationship between the COVID-19 pandemic stress level and the frequency of relapse in coronary heart disease patients.

Keywords: *Coronary heart disease, COVID-19, Relapse, Stress*

Introduction

In 2015, The World Health Organization (WHO) has estimated that non-communicable disease (NCDs) account for about 70% of all global deaths, which approximately 39.5 million out of 56.4 million deaths. 45% (17.7 million) of the morbidity cases were caused by heart and blood vessel disease. Data taken from Ministries of Regional Health Research (2018) showed that the prevalence of heart disease based on doctor's diagnosis in Indonesia was 1.5%, with the highest prevalance rank was found in West Java (1.6%).[13]

In 2014, The Indonesian Sample Registration System recorded that coronary heart disease was 12.9% of all the highest causes of death in Indonesia. Based on the data from Indonesian Health Care and Sequrity Agency, there was an increase in health costs for coronary heart disease cases from year to year. In 2016, the fund spent for coronary heart disease treatment reached to 7.4 trillion Rupiah and up to 9.3 trillion Rupiah in 2018. This imposed heavy burden on the government in limiting coronary heart disease cases by reviewing the risk factors.[1]. Carney and Freedland (2016) stated that major depression is a common comorbid condition in patients with coronary heart disease (CHD). Major

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depression is a debilitating comorbid disorder that can seriously complicate recovery and increase the risks of further cardiac morbidity and mortality.

COVID-19 is a respiratory disease, but many patients show manifestations of cardiovascular disease. In a study done by Shi, et al. (2020), out of 416 COVID-19 patients, 57 patients died from COVID-19 and 19.7% had cardiovascular injuries. It involved 4.1% having heart failure, 5.3% experiencing cerebrovascular disorders such as stroke, and 10.6% experiencing coronary heart disease.[5]

The rapid infection spread and the high number of confirmed deaths have been responsible for the symptoms of anxiety, depression and stress reported by the public and the medical team.[22] During the COVID-19 pandemic outbreak, quarantine and physical distancing are mandatory to contain the spread of the disease. The main consequence of quarantine is a change in lifestyle and nutritional habits.[8] A recent review on the psychological impact of quarantine reported negative psychological effects including post-traumatic stress symptoms, confusion, and anger.[8]

In the prevention and control of non-communicable diseases including coronary heart disease, the government initially focuses on preventive actions which include health check-ups, stop cigarette smoking, improve physical activities, healthy and balanced diet, adequate rest, and stress management.[15] Current evidence shows that depression is associated with about a doubling in risk of cardiac events in patients with coronary heart disease.[7] This condition is associated with the treatment the patients have to undergo and the occurrence of serious complications. The stress experienced by the CHD patients is related to the treatments that must be followed such as diet or eating arrangements, drug consumption and also exercise[5]. Meanwhile, the variables that are commonly regarded as components of stress includes depression, anxiety, lack of social support, acute and chronic life events.[4] In short, stress become a negative predictor for improvement of coronary heart disease. The risk of this disorder increases when there is physical fatigue or organic.[9]

Methodology

Based on the preliminary study that has been conducted at Indonesian Red Cross Hospital in Bogor City through patients medical record data, there were 109 patients diagnosed with coronary heart diseases from January to December 2019. It has recently been reported that out of 5 patients diagnosed with coronary heart diseases, 4 of them experienced stress, and 3 of them had relapse two times in the last one month.

This type of research uses descriptive analytic method with cross sectional design. The population in this study were patients with coronary heart disease with a sample of 33 participants. The study inclusion criteria were coronary heart disease patients, in conscious state, willing to fill in the Google Form. Meanwhile, the exclusion criteria were patients who had decreased consciousness or unwilling to fill in Google Form. The sampling technique used was accidental sampling.[8] After the number of samples was identified, then steps were taken for the first participant who was given code 1, the next sample number was coded 2, and so on until all the samples were fulfilled by 33 participants.

Researchers submitted a research permit issued by STIKes Wijaya Husada Bogor to the head of the PMI Bogor Education and Training Hospital. The Head of the Education and Training Division of Indonesian Red Cross Hospital in Bogor City gave permission to researchers for conducting this study. After obtaining research permit, researchers met the head of the internal medicine inpatient room to ask for permission and explained the instruments to be used for the research and asked for help to collect the cellphone numbers of coronary heart disease patients / families for filling out the questionnaire form for stress levels and the frequency of coronary heart disease recurrence. Types of data collected in this study are primary data through Google Form and secondary data through medical records to determine the number of coronary heart disease population.

The Google Form questionnaire contained personal identity, the Perceived Stress Scale (PSS-10) questionnaire and one question to assess the frequency of patient relapse.

The ordinal dispatch scales for the COVID-19 pandemic stress levels were categorized as follows:

1. Mild stress (total score 1-14)

2. Moderate stress (total score 15-26)

3. Severe stress (total score> 26)

The frequency of recurrence in patients with coronary heart disease was categorized into 3 groups:

1. ≤ 1: Low

2. 2: Moderate

3. ≥ 3: High

The magnitude of the relationship determined by the Kendall Tau test.

Results

This research was conducted in August 2020 for 5 days via Google Form. The average participants were 45-72 years old, 22 (66.7%) of participants were female, the average background education was high school, 25 participants (75.8%) did not have a history of being active smokers, and 22 participants had no coronary heart disease history in the family.

Table 1. Results of the COVID-19 pandemic stress level

COVID-19 Pandemic Stress Level	Total	Percentage (%)
Mild stress	5	15,2
Moderate stress	28	84,8
Total	33	100

Based on Table 1, it can be seen that most of the participants experienced moderate COVID-19 pandemic stress level with 28 (84.8 percent) people.

Table 2. Frequency distribution of Coronary Heart Disease (CHD) Relapse

Frequency of coronary heart disease relapse	Total	Percentage (%)
Low	1	3
Moderate	17	51,5
High	15	45,5
Total	33	100

From the Table 2 above, it can be seen that most of the participants with coronary heart disease relapse was in the moderate category, namely 17 (51.5 percent) people.

Table 3.
Correlation between COVID-19 Pandemic Stress Level and Relapse Frequency in Coronary Heart Disease Patients at Indonesian Red Cross Hospital in Bogor City

No.	COVID-19 Pandemic Stress Level	Frequency of coronary heart disease Recurrence						Total		P- Value
		Low		Moderate		High				
		F	%	F	%	F	%	F	%	
1.	Mild stress	0	0	0	0	5	15,2	5	15,2	0,006
2.	Moderate stress	1	3	17	51,5	10	30,3	28	82,8	
	Total	1	3	17	51,5	15	45,5	33	100,0	

The table above shows that, around 33 participants, which 17 (51.5%) of participants with the COVID-19 pandemic stress level were in the moderate category and the frequency of coronary heart disease recurrence was in the moderate category (1 time in 1 month).

Discussion

A. Stress level during COVID-19 pandemic

Based on the frequency distribution of the COVID 19 pandemic stress level in coronary heart disease patients at PMI Bogor Hospital, the majority of participants had moderate stress levels with a total of 28 patients (84.8%).

The results of the study are in line with Hamzah Shatria's (2018) study entitled "The effect of stress on acute myocardial infarction during intensive care". Whereas from 160 participants, 68 participants (42.5%) mostly experienced stress.[19]

According to Soeharto, I. (2014), factors related to risk factors for coronary heart disease (CHD) are determined through the interaction of two or more risk factors, including: non-modifiable and controllable risk factors. The non-modifiable factors include heredity, age, gender, and controllable factors. While modifiable risk factors involve dyslipidemia, high blood pressure, smoking, diabetes mellitus, overweight, obesity, and stress.[18]

People with coronary heart disease have high levels of stress. This condition is related to higher risk of COVID-19 complications. Stress can cause the body to release stress hormones that can make your heart to beat faster.[19] There is strong epidemiological evidence to suggest that psychological stress plays a significant role in the development of heart disease. Stress both physically and mentally is a risk factor for CHD (Coronary Heart Disease) since it has an influence on the onset of CHD which hinders the normal blood flow.[18] On the other hand, our bodies always respond to stressful situations that can help us survive.[18]

The results showed that all participants with coronary heart disease (33 participants) experienced stress within different levels. This can be seen in PSS10 questionnaire question via Google Form that the participants previously answered.

B. Relapse Frequency

Based on Table 2, it can be shown that most of the participants with the most frequency of coronary heart disease relapse was in moderate category, with 17 (51.5 percent) of participants.

Coronary heart disease is defined as heart disease caused by blockages in the coronary arteries. Acute blockage that occurs due to atherosclerotics in the walls of the coronary arteries, thus blocking blood flow to the heart muscle tissue. Not all attacks start suddenly with severe pain. The signs and symptoms of a heart attack vary from person to person. Many heart attacks go on as mild pain or discomfort. Even some people have no symptoms (it's called a silent heart attack). However, there are several signs that might refer to coronary heart disease relapse, such as: chest pain, shortness of breath, gastrointestinal symptoms, other symptoms including palpitations, pale face, rapid pulse.[14]

In accordance with Table 2, most of the 17 (51.5 percent) participants suffered relapse with as many as 2 relapses in a month. This can be related to the age factor, where participants are> 45 years old and age is one of the coronary heart disease factors that cannot be changed.

C. The Relationship between the COVID-19 Pandemic Stress Level and the Frequency of Relapse in Coronary Heart Disease Patients

Based on Table 3 from the results of the bivariate analysis, 17 participants (51.5%) suffered moderate COVID-19 pandemic stress level and relapse frequency in medium category. The results of the Kendall Tau test obtained p-value of 0.006 which indicated that there was a relationship between the stress level of the COVID-19 pandemic and the frequency of relapse in coronary heart disease patients at Indonesian Red Cross Hospital in Bogor City.

This study is in line with research conducted by Hamzah (2018) entitled "The effect of stress on Julius' myocardial infarction during intensive care". The results of this study suggested that stress was an independent predictor of complications in patients with acute myocardial infarction during intensive care with a value of 0.03. Therefore, there was a relationship between the effect of stress on complications of acute disease

infection complications during intensive care.[14]

Stress both physically and mentally is a risk factor for CHD (Coronary Heart Disease), because it has an influence on the onset of CHD. Our bodies always respond to stressful situations that can help us survive.[9]

Carney and Freedland (2016) stated that there was a relationship between stress and the frequency of acute myocardial infarction, where stress can activate bone marrow stem cells which in turn will produce excess white blood cells (leukocytes). These white blood cells can collect on the inside of the arteries, causing thickening of the artery walls.[23] Leukocytes rise is one of the factors that also contribute to the risk of heart attack.[17]

According to the theoretical analysis proposed by Hidayatullah (2014), there is a relationship between stress and the frequency of acute myocardial infarction, where stress can activate bone marrow stem cells which in turn produce excess white blood cells called leukocytes. These white blood cells can collect on the inside of the arteries, causing thickening of the artery walls caused by plaque buildup. Here the cells release enzymes that soften the connective tissue and result in disruption of plaque so this is a typical cause of coronary heart disease recurrence. Leukocytes are one of the causes besides factors such as high cholesterol, smoking, and genetic traits that also contribute to the risk of heart attack. Stress can encourage this if it is at a critical stage.[13]

From the results of this study, the p-value = 0.006 is smaller than α (≤ 0.05), which means that there was significant relationship between the independent variable and the dependent variable. The results of the stress level of the COVID-19 pandemic in 19 patients were obtained, namely from the frequency of relapse as many as 2 times a month consisting of ages ≥ 45 years. This is one of the risk factors for coronary heart disease, namely age. In addition, there are also other risk factors for coronary heart disease relapse including smoking, obesity and a family history of coronary heart disease.

Conclusion

There was a significant relationship between the COVID-19 pandemic stress level and the frequency of relapse in coronary heart disease patients at Indonesian Red Cross Hospital in Bogor City, West Java, Indonesia.

Ethical Clearance: Ethical clearance was not required hence was not obtained.

Conflict of Interest: There was no conflict of interest in the research.

Source of Funding: Self-funded

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