The Roles of Living Place Environment and Comorbidities Status on The Incidence of COVID-19: a study at health care facility of Lampung University

Latifah Widya Ningrum[1], Evi Kurniawaty[2], Khairun Nisa Berawi[3], Bainah Sari Dewi[4], Asep Sukohar[5], Samsul Bakri[6]

[1] *Magister Ilmu Lingkungan, Universitas Lampung, Lampung*
[2,3,5] *Fakultas Kedokteran,Universitas Lampung, Lampung*
[4,5] *Pascasarjana Ilmu Lingkungan, Universitas Lampung, Lampung*
[*] *Corresponding author. Email: latifawidya16@gmail.com*

ABSTRACT

Almost two years novel coronavirus (COVID-19) since first reported in the city of Wuhan, China classified as a pandemic. World Health Organization (WHO) has classified this disease as a pandemic with more than two hundred thousand active cases and more than eight thousand deaths in the world, as on eleven March 2020. The Purpose of this research to determine the roles of living place environment and comorbidities on the incidence of COVID-19. Method in this research is cross sectional and using quantitative research, which uses secondary data at health facilities from University of Lampung. Sample in this research using the Isaac & Michael test, obtained 186 samples with purposive sampling technique. The results of the logistic regression test, the result of age with OR value 2,057, B value = 0,721, p-value 0,039 in the health condition the OR value is 0,430, B value is 0,844, p-value is 0.019, history of hypertension comorbid OR = 9,123 with B value = 2,211, p-value 0,009 and diabetes comorbid OR = 5,551, B value = 1,714, p-value 0,049 and living place environment OR value = 1,983 and B value = 0,685, p-value is 0,044 they are have p-value less than 0,05 the meaning is age, health condition, comorbid history, and a person's living place environment have a significant effect on the incidence of COVID-19. The conclusion of this study reports that prevalence of productive age, poor health conditions, history of comorbidities hypertension and comorbidities of diabetes as well as the status of densely populated living place environment have a higher chance of contracting COVID-19 infection.

Keywords: Living Place Environment, Comorbidities, COVID-19

1. INTRODUCTION

Novel coronavirus (COVID-19) was first reported from wuhan since the first case in December 2019 in the city of Wuhan, China. SARS-CoV-2 has become one of the leading causes of death in the world. The World Heatlh Organization (WHO) has classified this disease as a pandemic with more than 210,000 active cases and more than 8,000 deaths in worldwide as of March 11, 2022 [9].

COVID-19 is one of the non-natural disasters that can disrupt survival of the community, based on Law Number 24 of 2007 a disaster is an event that threatens life and livelihood of the community both due to natural and non-natural factors. Population growth is one of the things that can affect the natural conditions of the occurrence of disasters. The increase in population is caused by economic activities that continue to develop so that it suppresses the number of residential areas which causes an increase in the level of population density [12] .

Population density has an influence on the spread of COVID-19, especially in Indonesia this is in accordance with the fact that urban areas have a high population density compared to suburban areas which can be a faster and more complex disease transmission [4]. This parameter has been shown to have an effect on the spread of COVID-19 in the State of South India based on research [1], which found three states with high density and high case distribution, namely Tamil Nadu, Karnataka and Telangana. Another research which states that there is a correlation between population density and disease outbreaks was also revealed by Li et al., (2018) in Hardianto [4]. The spread of significant COVID-19 cases due to population density also affects the high risk, especially in the elderly and comorbid patients. Comorbid is a history of a comorbid disease in a person, people who have a history of comorbid diseases will be more susceptible to being infected with COVID-19. Comorbid diseases include hypertension, diabetes, obstructive pulmonary disease, heart disease, asthma, kidney failure and

malignancy [13]. Gentile said that in Italy COVID-19 cases in March 2020 were reported to be predominantly influenced by male sex and the elderly with comorbidities, especially pulmonary, diabetes and hypertension [3].

Based on data from the Task Force for the Acceleration and Handling Province of Lampung, Lampung have a high rate distribution, because Lampung is transit area between the islands of Java and Sumatra. The spread of COVID-19 cases at the University of Lampung is quite high, this is based on data obtained from the First Health Facility of the University of Lampung. It is interesting to do research because the campus is part of the educational support. The purpose of this study was to determine the relationship between environmental variables and comorbidities on the incidence of COVID-19 at the Lampung University Health Facility.

2. MATERIALS AND METHODS

This research uses quantitative research with the research method used is cross sectional, which uses secondary data at the first health facilities from University of Lampung. The sample size in this research uses the Isaac & Michael test formula as many as 186 samples with purposive sampling technique. Respondents in this study used reactive and non-reactive confirmed data Covid-19 antigen test at health care facility University of Lampung. The data collected includes data in the form of age, gender, education, health condition, comorbidities, living place.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Univariate Analysis Results

The results of data analysis on the distribution of the frequency of COVID-19 occurrences at health facilities at the University of Lampung.

Table 1. Distribution frequency of COVID-19

Based on data from Table 1, it is known that the number of respondents with positive antigen swabs is 97 (52.2%) respondents and negative 89 (47.8%) respondents.

Characteristics of respondents consist of age, gender, education, health condition (table 2). The results of the analysis of the distribution of the age frequency data of the respondents were categorized into two groups, namely the age group less than 35 years with the number of respondents being 87 (46,8%) and more than 35 years 99 (53,2%). The gender of the respondents were mostly male is 104 (55.9%) respondents , female as many as 82 (44,1%) respondents. The results of the analysis of the distribution of education levels at the junior high school level obtained 14 (7.5%) respondents, senior high school level 32 (17.2%) respondents, Diploma obtained 28 respondents (15,1%), Bachelor totalled 43 respondents (23,1 %) and Master as many as 49 respondents (26.3%).

Table 2. Distribution of characteristics behavioral respondents

Table 3. Distribution frequency of Comorbid

Health condition is the respondent's perception of their health, the distribution results are mostly healthy namely 78 people (41.9%) and unhealth namely108 people (58.1%).
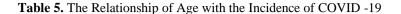
The frequency distribution in the history of comorbidities (Table 3) showed that the most comorbid history of respondents was in patients with diabetes as many as 25 people (8.0%), then the second most comorbid history was with a history of hypertension as many as 18 people (9,7%) the third diabetes was accompanied by hypertension 7 people (3.8%), cardio 3 people (1.6%), autoimmune 2 (1.1%).

The population density based on the frequency distribution of Living Place Environment table 4, the results are 102 (54,8%) respondents who live in Bandar Lampung and the results are those who live outside Bandar Lampung 65 respondents (45,2%).

3.1.2. Results of Bivariate Analysis

Bivariate analysis in this research was conducted to determine the relationship between the independent variable (independent) and the dependent variable (dependent). Bivariate analysis in this study used the Chi-square test. Based on testing the relationship between the age variable and the incidence of COVID-19 using the chi square test, the results obtained Table 5.

Table 4. Distribution frequency Living Place Environment

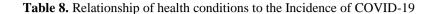**Table 5.** The Relationship of Age with the Incidence of COVID -19

The results of the statistical test between age and the incidence of COVID-19 obtained p-value = 0.021 meaning that there is a relationship between age and the incidence of COVID-19 where the age range can be at risk for the incidence of COVID-19.

Table 6. Relationship of gender to the Incidence of COVID-19

Based on testing Relationship between the gender variable and the incidence of COVID-19 using the chi-square test, the results obtained in (Table 6) are the statistical test results between gender and the incidence of COVID-19, the p-value = 0,418 means that there is no relationship between gender with the incidence of COVID-19 because male and female have the same opportunity to the incidence of COVID-19.

Table 7. Relationship of education to the Incidence of COVID-19

Based on testing the relationship between education variables and the incidence of COVID-19 using the chi-square test. The results in (Table 7) are got namely the results of statistical tests between education and the incidence of COVID-19, p-values at junior high, high school, diploma, bachelor, masters obtained p-value more than 0,05 which means there is no relationship between education levels of the COVID-19 incident, the spread of COVID-19 does not look at a person's education level to be infected with the virus.

Table 8. Relationship of health conditions to the Incidence of COVID-19

Based on the test data conducted to see the relationship between health conditions and the incidence of COVID-19 using the chi-square test, the results in (Table 8) are obtained, p-value = 0.001, which is less than 0.05, meaning that there is a relationship between health conditions and the incidence of COVID -19. Based on the data in the table of respondents with an unhealthy condition, 68 (36,56%) people were tested positive for COVID-19 and 40 (21,50%) people were said to be negative, while respondents with healthy conditions found 29 (15,59%) people tested positive for COVID-19 and 49 (26,34%) people were negative.

Table 9. Relationship of comorbid to the Incidence of COVID-19

Based on the data (Table 9) shows that there are several comorbidities that have a relationship with the incidence of COVID-19, the test was carried out using the chi-square test and obtained two results that had an p-value less than 0,05, namely the history of comorbid diabetes with a p-value = 0,00 and history of comorbid hypertension with p-value 0,041. This shows that there is a comorbid relationship between hypertension and diabetes with the

Table 10. Relationship of living place environment to the Incidence of COVID-19

incidence of COVID-19.

Based on the data (Table 10) showing that the Living place environment has a relationship with the incidence of COVID-19, the test was carried out using the chi-square test, it was found that the p value in the residential environment was = 0,003 where the p value was less than 0,05. This research is in line with Nelwan where population density and altitude have potential risk factors for the incidence of COVID-19 [8].

3.1.3. Multivariate Analysis Results

The results of the analysis of the relationship between respondent characteristics and the incidence of COVID-19 obtained health conditions, history comorbid of diabetes, hypertension and living environment with p less than 0,05, making them the main candidates for multivariate modelling. Multivariate analysis using logistic regression test. This analysis was conducted to obtain significant risk factors for the incidence of COVID-19.

Table 11. Logistic regression test results

Based on multivariate analysis of logistic regression model, several variables have p-value or Sig < 0.05, namely age, health condition, diabetes comorbid, hypertension comorbid, and living environment.

The results of the age analysis have an OR value of 2,787and B value = 1,477 (positive value) because age can have an influence on the incidence of COVID-19. Health conditions have an OR value of 0,237 and B value of -1.442 (negative value) because health conditions have a positive relationship to the incidence of COVID-19, when you have an unhealthy condition, the higher the risk of contracting COVID-19.

The results of the multivariate analysis showed that comorbid comorbid Diabetes had an OR value of 29,069 and B value = 3,370 (positive value)and hypertension had an OR value of 6,743 with B value of 1,908 (positive value) . This is in line with research conducted byNanda et al, where comorbid patients have a higher level of risk, so they must increase the level of self-protection by implementing health protocols [7].

The results of the analysis of the residential environment obtained an OR value = 2,742 and B value = 1,009 (positive value) meaning that the status of residence affects the spread of COVID-19,unfavorable environmental conditions will have a higher risk of the incidence of COVID-19.

3.1. Discussion

This research discusses the role of residence and comorbidities in the incidence of COVID-19. Based on table 12. Regarding the logistic regression test, it can be concluded that the factors of age, health condition, history of comorbidities and a person's residence status have a significant effect on the incidence of COVID-19.

Based on table 12. Age and health conditions are elements that affect the incidence of COVID-19, this can be seen from the OR and B values where the OR value at age is 2,787 B value = 1,477, p value is 0,49 or <0.05 and at health conditions, the OR value is 0,237 and B value of -1.442, the p value is 0,007 or <0.05. This means that the age range of more than 35 years has a significant level of risk of transmission because the immune quality of adults tends to decrease compared to the age range of less than 35 years. This is in line with research conducted Starke et al, in their research that age is one of the qualifications that causes the severity of COVID-19 disease, in addition to age a person's health condition is a supporting component of COVID-19 transmission [11]. Unhealthy conditions will increase the risk of contracting COVID-19. This is in line with the CDCwhich states that certain medical conditions increase the risk of COVID-19 [2]. Age over 35 years is a productive age where the incidence of COVID-19 at that age is more dominant than the age range less than 35 years. Adults are actively working and involved in many daily activities. As a result, they are vulnerable to contracting the COVID-19 virus if they do not take care of their health conditions

The highest history of comorbidities in this research is diabetes and hypertension, it can be seen from the OR value = 29,069 with B value of 3,370and p value 0,008 in patients with diabetes and the OR value = 6,743 and B value = 1,908 and p value 0,046in hypertension, which means that people who have a history of comorbid diabetes have

a risk 3.000 times higher compared to people who do not have diabetes, as well as patients with a history of coexisting hypertension have a risk of 1000 times higher than those without a history of hypertension.

This phenomenon is similar to previous reports in China and the UK in the research conducted by Huang et al, hypertension is more dominant than diabetes [5]. This is similar to research conducted at the first-level health facilities at the University of Lampung where comorbid of diabetes is a history of comorbidities that dominate the incidence of COVID-19. Diabetes is a disease that disrupts the insulin hormone in a person, causing blood sugar levels to be higher than normal, besides diabetes can reduce the immune system, patients with a history of diabetes have a 2 times greater risk of getting infected.Roncon et al,said that poor glycemic control will lead to severity in COVID-19 sufferers [10]. Patients with a history of hypertension have a double risk of death because studies say that hypertension can worsen the condition of patients infected with COVID-19, this virus binds to angiotensin converting enzyme (ACE2), an enzyme that attaches to the outer surface of internal organs [5].

The characteristics of the status of the place have an influence on the incidence of COVID-19. Based on table 12, the value of OR = 2,742 and the value of B = 1,009, the p-valueof 0,039 means that the status of residence in Bandar Lampung has an effect of 600 times higher than that of domicile outside Bandar Lampung. The city of Bandar Lampung has a larger population than the districts of South Lampung, Pesawaran, Pringsewu and others. High population density can trigger the transmission of COVID-19 infection, when an area has high transmissibility, social contact, and communication between populations of people who live in cities have access to social communication that is more significant to the surrounding environment because they work in offices and businesses that have indoor activities with poor air circulation are different from people who live in areas where most of the people are gardening and farming which have outdoor activities and sufficient air. This is in line with research conducted byKadi & Khelfaoui, where population density is a factor in the spread of COVID-19 in Algeria [6].

4. CONCLUSION

The conclusion of this research is that it is reported that the incidence of COVID-19 is influenced by age, poor health conditions, a history of accompanying hypertension and a history of accompanying diabetes as well as the status of a densely populated residence, the higher the chance of being infected with COVID-19. Therefore, in the implementation of COVID-19 prevention measures, it is necessary to apply health protocols in a disciplined manner without ignoring them, as well as through this research in order to consider comorbid survivors who have a densely populated residential status from all necessary measures to prevent the spread of the COVID-19 virus.

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