

The Effect Of Risk Factors And Clinical Symptoms On Comorbid And Non-Comorbid Disease In Covid-19 Patients At Royal Prima General Hospital Medan

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Abstract.

Covid-19 is a disease caused by infection with SARS-CoV-2 and causes a variety of clinical symptoms ranging from asymptomatic to critical symptoms, depending on various risk factors. The purpose of this research is to analyze the effect of risk factors (age, gender, occupation) and clinical symptoms (asymptomatic, mild, moderate, severe, critical) on comorbid and non-comorbid diseases in Covid-19 patients at General Hospital Royal Prima Medan. This Paper research used is quantitative research with secondary data collection in April-June 2021. The number of research samples was 308 comorbid patients and 308 non-comorbid patients. Data were analyzed univariately to see a descriptive picture, bivariate using chi-square test, and multivariate using binary logistic regression test. The results of this study are: based on age risk factors, the highest age group is 46-65 years (40.1%). The conclusions in this study are there is an influence of risk factors for age, gender, and mild, moderate, and severe clinical symptoms on comorbid and non-comorbid diseases in Covid-19 patients at Royal Prima Hospital Medan.

Keywords: Covid-19, General Hospital Royal Prima Medan, Risk Factors, Clinical Symptoms.

I. INTRODUCTION

Covid-19 or Coronavirus Diseases-19 is a disease caused by infection with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). This case occurred for the first time in Wuhan City, China at the end of 2019. The rapid global spread accompanied by severe clinical symptoms made the World Health Organization (WHO) set the status of the Covid-19 pandemic on March 11, 2020, until now. (Ikawaty, 2020). Covid-19 cases in Indonesia are increasing every day. Based on the report from the Ministry of Health of the Republic of Indonesia as of March 2, 2021, there were 1,347,026 people, with details of 1,160,863 people being declared cured and 36,518 people dying. By province, the most cases occurred in DKI Jakarta with 277,694 people, followed by West Java Province with 155,370 people, and Central Java with 127,445 people. Meanwhile, North Sumatra Province has reached 21,098 people. The lowest cases occurred in North Maluku Province, amounting to 3,528 people (Ministry of Health, 2021). Several risk factors for Covid-19 comorbid patients, including: 1) age, are associated with: with Covid-19 because in elderly patients there are degenerative processes of anatomy and physiology of the body, and decreased body immunity so that they are susceptible to being infected with Covid-19, 2) gender, been shown to be a risk factor for mortality in patients, where more men die than women who associated with differences in lifestyle, smoking prevalence, and a higher incidence of chronic comorbidities in men, such as cardiovascular disease, hypertension, and lung disease., 3) work, associated with the demands of more active work outside the home so that they are more susceptible to Covid-19 infection (Chen et al., 2020; The Lancet, 2020; Hidayani, 2020).

Most Covid-19 patients have the following laboratory results: normal or decreased white blood cell levels and lymphocytopenia. In patients with severe illness, it was found that the levels of neutrophils, D-Dimer, BUN/SC, and lymphocyte levels continued to decrease. (Mehta et al., 2020). On the chest, an X-ray image was obtained from normal to ground-glass opacity (GGO), and consolidation. A Computed Tomography Scan (CT-scan) of the thorax showed GGO, consolidation, pleural effusion, and other

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pneumonia features. (Guan, 2020b). Based on the study, the main finding on chest CT scan was GGO (88%) with or without consolidation. Pulmonary involvement tends to be bilateral (87.5%), multilobular (78.8%), and more common in the inferior lobe with a more peripheral distribution (76%). (Salehi et al., 2020). The number of comorbid Covid-19 patients is 1030 people and non-comorbid is 1397 people. The number of male patients infected with Covid-19 was 1288 people, while the female patients were 2769 people. The number of male patients who died was 94 people, while the number of female patients who died was 59 people, and the number of patients aged >60 years who died was 74 people. The following data on Covid-19 patients is presented in graphical form.

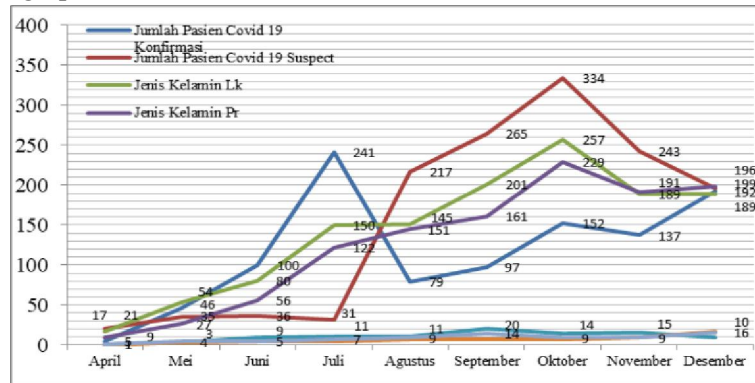


Fig 1. Graph Of Patient Covid 19

II. LITERATURE REVIEW

2.1. Level of Covid 19.

The level of utilization, quality and efficiency of inpatient services for Covid-19 patients in a hospital is assessed using the parameters BOR (Bed Occupancy Rate) is the number of beds used, LOS (Lenght of Stay) is the number of days of treatment, TOI (Turn Over Interval) is the average number of days of bed use, and BTO (Bed Turn Over) is the number of times the bed was used. The standard values are (BOR=60-80%, LOS=6-9 days, TOI=1-3 days, and BTO=40-50 times). The following is a table of BOR, LOS, TOI, and BTO values obtained at General Hospital Royal Prima Medan for the April-December 2020 period.

Table 1. Number of Hospital Indicators for Covid-19 Patients for the April-December 2020 Period

Indicator	April	May	June	July	August	Sept	Oct	Nov	Des
DRILL	16%	41%	46%	58%	80%	83%	72%	81%	84%
LOS	5.7 times	9.5 times	9.2 times	18.7 times	17.7 time	16.1 times	5.6 times	6.1 times	5.7 times
TOI	37 days	14.3 days	25.3 days	10.7 days	4.9 day	2.2 days	2 days	1.3 days	1.1 days
BTO	0.9 times	1.3 times	0.6 times	1.2 times	2.2 time	4.2 times	4.2 times	4.3 times	4.3 times

If it is observed that the use of hospital beds has increased from August to December 2020 above the national standard (>60%). The number of days hospitalized for Covid-19 patients is generally above the national standard (>6 days). The average number of days of bed use shows an average of 1 day which has met national standards, while the number of times the bed is used is still far from the set standard <40 times due to the average length of stay for Covid-19 patients for 14 days, it can even take up to 30 days if the patient has other comorbidities.

2.2. Definition and Characteristics

Coronavirus (CoV) is a positive single-strain Ribonucleic acid (RNA) virus, encapsulated and unsegmented, which looks like a crown under the electron microscope due to the presence of a glycoprotein spike on the viral envelope. Coronaviruses come from the Orthocoronavirinae subfamily of the Coronaviridae family (Ordo Nidovirales) which can be classified into four groups, namely:

Alphacoronavirus (alphaCoV), Betacoronavirus (betaCoV), Deltacoronavirus (deltaCoV), and Gammacoronavirus (gammaCoV). The betaCoV genus is divided into five sub-genera or lineages, one of which is nCov-2019(Chan, 2013; Burhan et al, 2020).

Corona viruses have capsules, the particles are spherical or elliptical, and are pleomorphic in shape with a diameter of about 50-200nm. All viruses of the order Nidovirales are capsule, unsegmented, and RNA positive viruses and have very long RNA genomes. The structure of the coronavirus looks like a cube with the S protein located on the surface of the virus. S protein or spike protein is one of the main viral antigen proteins and is the main structure for gene writing. This S protein plays a role in the attachment and entry of the virus into host cells(Burhan et al, 2020). Coronavirus is sensitive to heat and can be effectively inactivated by disinfectants containing chlorine, lipid solvents at 56°C for 30 minutes, ether, alcohol, peroxyacetic acid, non-ionic detergents, formaldehyde, oxidizing agents, and chloroform. Chlorhexidine is not effective in inactivating the virus(Burhan et al, 2020; Wang, Z., Qiang, W., Ke, 2020).

2.3. Clinical Symptoms and Diagnosis

According to the Ministry of Health of the Republic of Indonesia percentage symptoms that can be experienced by patients infected with Covid-19 are as follows: cough 63.8%, history of fever 43.6%, fever 35.9%, colds 32.3%, weakness 26.7%, shortness of breath 24.5 %, sore throat 23.9%, headache 22.2%, muscle cramps 14.8%, nausea 13%, stomach pain 5.9%, diarrhea 5.6%, chills 2.9%, etc. 0.1%(Ministry of Health, 2021).Clinical manifestations usually appear within 2 to 14 days after exposure. The symptoms most frequently complained by patients were fever (98.6%), fatigue (69.6%), cough (59.4%), myalgia (34.8%), and shortness of breath (31.2%). Less common complaints are headache, dizziness, abdominal pain, diarrhea, nausea, and vomiting. Half of patients develop dyspnea within one week. In severe cases the deterioration occurs rapidly and progressively, as in ARDS, septic shock, uncorrected metabolic acidosis and bleeding or coagulation system dysfunction within a few days. In some patients, symptoms appear mild, not even accompanied by fever. Most patients have a good prognosis, with a minority in critical condition or even death.(Burhan et al, 2020).

In imaging, the main modalities are chest X-ray and Computed Tomography Scan (CTscan) of the thorax. Chest radiography of pneumonia caused by Covid-19 infection ranging from normal to ground glass opacity (GGO), and consolidation. CT scan of the thorax can be done to see more details of abnormalities, such as GGO images, consolidation, pleural effusion and other pneumonia features.(Guan, 2020a). Based on the study, the main finding on chest CT scan was GGO (88%) with or without consolidation. Pulmonary involvement tends to be bilateral (87.5%), multilobular (78.8%), and more common in the inferior lobe with a more peripheral distribution (76%).(Salehi et al., 2020).A definite diagnosis or confirmed case is determined by reverse transcription polymerase chain reaction (RT-PCR) examination. WHO recommends collecting specimens at two locations, namely from the upper airway (nasopharyngeal or oropharyngeal swab) or the lower respiratory tract (sputum, bronchoalveolar lavage (BAL), or endotracheal aspirate]. Samples were taken for 2 consecutive days, additional samples may be taken if there is clinical deterioration. In high-risk close contacts, samples were taken on day 1 and day 14(Hudari, 2020).

2.4. Covid-19 Comorbid Disease Risk Factors

Some of the risk factors for the Covid-19 comorbid disease, including:

1. Age

According toChen et al., (2020)stated that the age factor is closely related to Covid-19 because in elderly patients there is a degenerative process of anatomy and physiology of the body, and decreased body immunity, plus someone who suffers from comorbidities will cause his body condition to be weak so that he is vulnerable to being infected with Covid-19.In addition, the advanced age factor causes negligence in maintaining health protocols, thereby increasing the risk. Factors from age distribution can also indicate differences in access to information on Covid-19 symptoms and mobility. The relatively young group received more information about the symptoms of Covid-19, which allowed them to identify the symptoms

of Covid-19 and confirm cases to the hospital. At the same time, the younger age group has relatively high mobility with a history of traveling abroad which is also more frequent.

Cases of death due to Covid-19 in Indonesia are dominated by patients who have comorbidities and the elderly age group, with an age range of around 45-65 years, and there is one case at the age of 37 years. in linewith Windi's (2021) research on clinical characteristics and comorbid factors in Covid-19 patients at Mitra Medika Amplas Hospital that the age of Covid-19 patients is dominated by the 46–65 year age group with a total of 67 people (60.9%), followed sequentially by the age group > 65 years as many as 29 people (26.4%).And of the death cases, it is dominated by comorbidities such as diabetes, hypertension, and chronic heart disease(Welle., 2020).A literature review from 5 research journals showed a significant relationship between age jian and Covid-19. The data shows that the most dominant is age 65 years with HR (hazard ratio) 2.563, meaning that people or patients aged 65 years have a 2.563 times greater risk of contracting Covid-19 compared to < 65 years.(Escalera-Antezana et al., 2020).

2. Gender

Gender has been shown to be a risk factor for mortality in Covid-19 patients, where men die more than women. Higher mortality rates are associated with higher chronic comorbidities in men, eg cardiovascular disease, hypertension, and lung disease(The Lancet, 2020).Based on the research, the HR value for men was 1,793, which indicates that men are at 1,793 times greater risk of contracting Covid-19 than women. This is because there are fundamental differences in the immune system of men and women,From a biological perspective, it is explained that women have better hormone and immune protection than men. Women are more protected because they have an X chromosome and sex hormones such as progesterone which play an important role in innate and adaptive immunity.

This is also supported by differences in lifestyle such as better self-protection behavior in women, and the prevalence of smoking in men, which can change lung cells to be more susceptible to Covid-19 infection by increasing its receptor, namely the ACE-2 . molecule (Chen et al., 2020). Studies conducted Liu et al., (2020) stated that of 78 patients with Covid-19 during 2 weeks of treatment, 11 patients worsened and 67 patients improved with 27% of the worsening group having a history of smoking while of the improving group only 3% had a history of smoking. Smoking is the cause of the increase in the ACE2 receptor which is the receptor for the Covid-19 virus.

3. Work

According to Hidayani (2020) declare pwork is the best indicator to know a person's way of life.A person who works outside the home or has a job outside relatively often or is susceptible to Covid-19 infection. Meanwhile, according to Sari's research (2020), states that there is no significant relationship between work status related to Covid-19 prevention and Covid-19 prevention behavior. Likewise, the research of Saqlain et al (2020) that there is no relationship between work and actions regarding Covid-19 in health workers. Improper prevention can cause sufferers to experience Covid-19 disease.

III. METHODS

This type of research is quantitative with an associative approach. according to Sugiyono (2017) stated that associative research is a study that aims to determine the relationship between two or more variables. Associative design can describe the effect of independent variables consisting of risk factors including age (X1), gender (X2), occupation (X3) and clinical symptoms including patients without clinical symptoms (X4), mild clinical symptoms (X5), moderate clinical symptoms (X4) X6), severe clinical symptoms (X7), critical clinical symptoms (X8) on the dependent variable, namely Covid-19 patients with comorbid and non-comorbid. This research was conducted at General Hospital Royal Prima Medan. The reason for choosing the research location is because it is one of the Type B Teaching Hospitals that accepts Covid-19 patients starting in April 2019 and because there has never been a previous study on the same topic. The sampling method in this research is secondary data. Secondary data is data that is indirectly

obtained from the source in the form of medical records of Covid-19 patients in hospitals. Secondary data can also be obtained from records and reports from RSU Royal Prima Medan and from literature studies.

IV. ANALYZE AND RESULT

4.1. Result A General.

The General Hospital Royal Prima Medan provides health services for people with Covid-19. The number of Covid-19 patients from January to June was 4,147 patients, consisting of 1,507 comorbid patients and 2,640 non-comorbid patients.

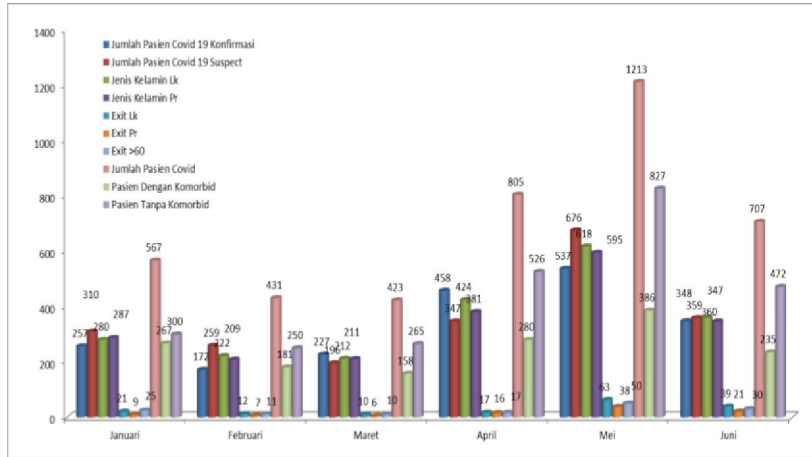


Fig 2. Graph of Covid 19 January - June 2021 Periode

Meanwhile, the results of hospital performance evaluations based on indicators for inpatient services for Covid-19 patients, namely BOR, ALOS, BTO, TOI, NDR, and GDR are presented in the following graph.

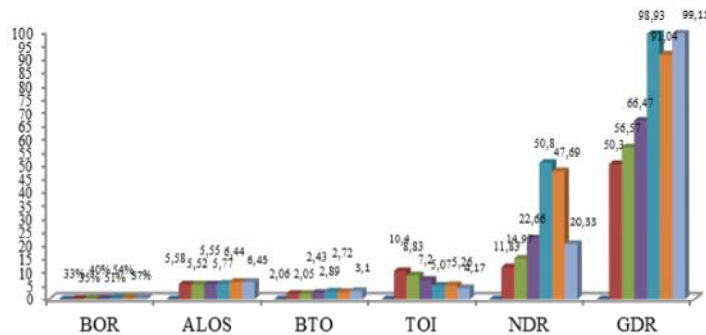


Fig 3.Graph of BOR, ALOS, BTO, TOI, NDR, and GDR RSU Royal Prima Medan January-June 2020

Based on the graph above, it can be explained that:

1. BOR (Bed Occupancy Ratio) is the percentage of bed usage at a certain time. The average bed utilization rate in January-June 2020 at RSU Royal Prima is 45%. This value is still below the ideal BOR parameter of 60-85%.
2. ALOS (Average Length of Stay) is the average length of stay for a patient. The average length of stay for Covid-19 patients in January-June 2020 at Royal Prima Hospital is 5.89 times. The length of stay of the patient has not been efficient because it is still below the ideal value between 6-9 days.
3. BTO (Bed Turn Over) is the frequency of use of the bed in one period, the number of times the bed is used in a certain time unit. The average frequency of bed use in January-June 2020 at RSU Royal Prima is 2.54 times. Ideally one bed is used on average 40-50 times in 1 year in the hospital.

4. TOI (Turn Over Interval) is the average number of days a bed was not occupied from being filled to the next time it was filled. The average frequency of bed use in January-June 2020 at RSU Royal Prima is 6.82 days. But the value is directly above the ideal empty bed not filled is 1-3 days.
5. NDR (Net Death Rate) is the death rate 48 hours after being treated for every 1000 patients discharged. The average 48-hour death rate for Covid-19 patients in January-June 2020 at RSU Royal Prima is 28.05%. This means that the death of Covid-19 patients in 48 hours is 28 per 1,000 patients. This value is considered very high because it is above the tolerable NDR value of less than 25 per 1,000.
6. GDR (Gross Death Rate) is the general death rate for every 1000 sufferers. The average death rate for Covid-19 patients in January-June 2020 at RSU Royal Prima is 77.07%. This means that the death rate for Covid-19 patients is 77 per 1,000 patients. This value is very high when compared to the GDR which should not be more than 45 per 1000 sufferers (Kemenkes RI, 2011).

Furthermore, univariate analysis aims to describe the research variables consisting of risk factors and clinical symptoms described below.

4.2. Multivariate Analysis

Multivariate analysis in this study used multiple logistic regression, which is a mathematical model approach to analyze the relationship of several independent variables to the dichotomous or binary categorical dependent variable. The variables included in the logistic regression prediction model are variables that have a p value <0.25 in the bivariate analysis.

Tables 2. Results of Requirements Analysis of Multiple Logistics Regression Modeling Based on Test *Chi Square*

No	Variable	<i>p Nilai value</i>
1.	risk factors	
	a. Age	0.000*
	b. Gender	0.000*
	c. Profession	0.000*
2.	Clinical symptoms	
	a. No symptoms	-
	b. Light	0.037*
	c. Currently	0.000*
	d. Heavy	0.001*
	e. Critical	0.000*

Note: * = regression modeling variable

The table above shows the independent variables included in the multiple logistic regression test with p value <0.25, namely the risk factor variables (age, sex, occupation) and clinical symptoms (mild, moderate, severe and critical), while the variables without clinical symptoms eliminated because the data is homogeneous. The multiple logistic method used backward stepward is to enter all predictors and then eliminate one by one until only significant predictors remain and the values of all predictor variables are known for ease of data analysis in the discussion chapter. Then, a multiple logistic regression test was conducted with the following results.

Tables 3. Effect of Risk Factors and Clinical Symptoms on Comorbid and Non-Comorbid Diseases in Covid-19 Patients at RSU Royal Prima Medan

Variable Independent	Mark χ^2	<i>p Nilai value</i>	Exp (B)
Age	1,409	0.000	4.092
Gender	0.637	0.001	1,891
Profession	0.236	0.224	1,266
Light	1,700	0.002	5,475
Currently	1,656	0.000	5,238
Heavy	1,500	0.001	4,483
Constant	-11,449	0.000	0.000

The table above shows that the risk factor variables and clinical symptoms having p values less than 0.05 are age (0.000), gender (0.001), mild clinical symptoms (0.002), moderate clinical symptoms (0.000) and severe clinical symptoms (0.001). This explains that statistically the risk factors for age, gender, mild clinical symptoms, moderate clinical symptoms and severe clinical symptoms affect the comorbid and non-comorbid diseases of Covid-19 patients. While the work variable (0.224), had no effect on comorbid and non-comorbid diseases of Covid-19 patients because the p-value was greater than 0.05. Critical symptom variables cannot be analyzed because the data is redundant data, namely data similar to other variables (duplicates) causing it to be unable to issue output for analysis. The variable age of Covid-19 patients obtained an Exp (B) value of 4.092, meaning that those aged 40 years tended to be 4.092 times not suffering from comorbidities (non comorbid) than those aged > 40 years.

The sex variable of Covid-19 patients obtained an Exp (B) value of 1.891, meaning that women tended to be 1.891 times less likely to suffer from comorbidities than men. Variable mild clinical symptoms of Covid-19 patients obtained an Exp (B) value of 5.475, meaning that patients with mild clinical symptoms tended to be 5.475 times less likely to suffer from comorbidities than severe/critical clinical symptoms. Variable mild clinical symptoms as the determining factor (dominant) because the value of Exp (B) is greater than the other variables. The variable clinical symptoms for Covid-19 patients obtained an Exp (B) value of 5.238, meaning that patients with moderate clinical symptoms tended to be 5.238 times less likely to suffer from comorbidities than severe/critical clinical symptoms. The variable of severe clinical symptoms of Covid-19 patients obtained an Exp (B) value of 4.483. This value means that patients who do not experience severe clinical symptoms tend to be 4.483 times not suffering from comorbidities than patients who experience severe clinical symptoms.

4.3. Mild Clinical Symptoms in Covid-19 Patients Comorbid and Non-Comorbid Diseases

In this research showed that more respondents experienced symptoms of the disease in the non-mild category, namely 581 people (94.3%), the rest experienced symptoms in the mild category, namely 35 people (5.7%). In general, respondents who experience symptoms in the mild category have no comorbidities (non-comorbid). According to WHO (2020), There are about 80% of cases that are classified as mild to moderate, 13.8% have severe symptoms, and 6.1% fall into the critical category. Meanwhile, according to Kangdra's research (2021), that Covid-19 Patients Under Supervision (PDP) were dominated by patients with mild degrees of 45.5% or as many as 50 people, then moderate degrees of 42.7% (47 people), and severe degrees of 11.8% (13 people) at Mitra Medika Amplas Hospital.

Patients with mild clinical symptoms, namely fever, cough, fatigue, anorexia, shortness of breath, and myalgia. Other non-specific symptoms such as sore throat, nasal congestion, headache, diarrhea, nausea and vomiting, loss of smell (anosmia) or loss of taste (ageusia) that occur before the onset of respiratory symptoms. In elderly and immunocompromised patients, atypical symptoms include fatigue, loss of consciousness, decreased mobility, diarrhea, loss of appetite, delirium, and absence of fever. (Burhan et al, 2020). This finding is supported by Yang's research (2020), that the symptoms that most often appear and complain first by patients are fever followed by cough, weakness, nausea, myalgia, decreased smell and runny nose as additional symptoms.

4.4. Moderate Clinical Symptoms in Covid-19 Patients Comorbid and Non-Comorbid Diseases

In this study, it showed that more respondents experienced symptoms of the disease in the moderate category, namely 461 people (74.8%), the rest did not experience symptoms in the moderate category, namely 155 people (25.2%). According to Nadia's (2021) research on the severity of disease in Covid-19 patients, it was obtained patients with mild degrees as many as 28.9%, moderate degrees as much as 48.2%, severe degrees as much as 12% and critical degrees as many as (10.8%). Meanwhile, according to research by Kadek (2021) about The severity and mortality of Covid-19 patients were found to be 50 patients (22.4%), moderate to 120 people (53.8%), severe-critical patients (23.8%). This is in line with the results of the work of Karya (2021) that the presentation of moderate clinical symptoms is greater than severe clinical

symptoms. Patients in the moderate group, namely with clinical signs of pneumonia (fever, cough, shortness of breath, rapid breathing) but no signs of severe pneumonia including SpO₂ > 93%.

Whereas in pediatric patients, clinical signs of pneumonia are not severe (cough or difficulty breathing and rapid breathing and/or chest indrawing). (Burhan et al, 2020). According to Windy's research (2021), in confirmed Covid-19 patients, the most common clinical symptoms were in accordance with moderate clinical signs, namely cough in 65 people (85.5%), followed by shortness of breath in 50 people (65.8. %), symptoms of fever in 49 people (64.5%), nausea and vomiting in 48 people (63.2%), abdominal pain in 17 people (22.4%), runny nose/stuffy nose in 13 people (17, 1%), and painful swallowing and diarrhea in 8 people (10.5%). This is in accordance with the latest national data on November 22, 2020 which shows the percentage of Covid-19 patients is dominated by cough symptoms of 69%, history of fever 44.2%, fever 40%, and shortness of breath 31.5%, from 5,668 available data. (SaMr. Task of Handling COVID-19, 2020). These data are also supported by research conducted by Guan et al. (2020), where researchers assessed the clinical symptoms of patients upon admission to the hospital, with cough symptoms found in 67.8% of Covid-19 patients, fever by 43.8%, while shortness of breath was found in 18.7% of patients.

V. CONCLUSION

Based on the results of the study, the authors can conclude:

1. Based on the risk factors, the highest age group was 46-65 years old (40.1%). Based on gender, men suffer from Covid-19 more (61.2%). Based on occupation, it is dominated by patients who work as private employees and civil servants (35.2%). Based on the clinical symptom group, the most clinical symptoms were moderate (74.8%), followed by severe (10.7%), critical (8.8%), and mild (5.7%).
2. There is a relationship between risk factors (age, gender, occupation) and clinical symptoms (mild, moderate, severe, critical) with Comorbid and Non-Comorbid Diseases in Covid-19 Patients at RSU Royal Prima Medan. While the asymptomatic variable had no effect.
3. There is an influence of risk factors of age ($p = 0.000$), gender ($p = 0.001$) and mild clinical symptoms ($p = 0.002$), moderate ($p = 0.000$), and severe ($p = 0.001$) on Comorbid and Non-Comorbid Diseases in Patients Covid-19 at RSU Royal Prima Medan. While the variables of occupational risk factors, without clinical symptoms, and critical clinical symptoms have no effect.
4. Variable mild clinical symptoms is a variable that has a dominant influence on Comorbid and Non-Comorbid Diseases in Covid-19 Patients at RSU Royal Prima Medan (Exp B = 5,475).

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