



## What Does Comorbid Status Implication with the End Status of Corona Virus Disease (Covid-19) Patients?

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### Abstract

**Background:** The prevalence of confirmed cases of Covid-19 is quite high and tends to continue to increase. Based on data, South Kalimantan Province in early mid-2021 experienced a high spike in cases, resulting in a large number of deaths, especially in the City of Banjarbaru. Covid-19 active cases in South Kalimantan in July 2021 were recorded at 5,279 cases (12.41%) out of a total of 42,527 positive cases. Many research results on risk factors for Covid-19 cases, the results vary widely. People with comorbidities are a very vulnerable group.

**Objective:** to analyze whether comorbid status has implications for the final status of Covid-19 patients in inpatients at the Idaman Hospital, Banjarbaru City.

**Methods:** Quantitative research using an observational design through a case-control approach. The population is 300 respondents and the research sample is 60 respondents with a sample group of 30 people and a control group of 30 people. The data used is data from the case form report (CFR). The dependent variable in this study was the final status (died/recovered) in inpatients diagnosed as positive for Covid-19 at the Idaman Hospital, Banjarbaru City, while the independent variables were age, gender, hypertension, diabetes mellitus, pneumonia, heart failure, kidney failure, chronic chronic disease (CKD) and stroke (CVA). Data were analyzed univariately and bivariately with chi-square to obtain adjusted OR. Results: Analysis using the chi-square test showed that chronic kidney failure ( $p=0,026$ ) has implications for the mortality status of patients with a risk of dying 10 times compared to patients without comorbidities, and heart disease ( $p=0.045$ ) with a risk of dying 6 times compared to patients without heart disease. Conclusion: Chronic kidney disease (CKD) and heart disease are the highest risk factors that affect death in patients with Covid-19.

**Keywords:** Covid-19, Comorbidity, Mortality

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## Introduction

Determination Covid-19 declared a pandemic by the World Health Organization (WHO) on March 11, 2020, based on cases of Covid-19 which is spreading rapidly infecting populations in many countries. *SARS-CoV-2* or *Novel Coronavirus* is the name for a virus that plays a role in disease Covid-19 or coronavirus disease. More severe illnesses, such as Middle East Severe Acute Respiratory Syndrome, can follow a series of mild symptoms such as the common cold. The cause is a large family of dominant coronaviruses infecting the respiratory tract in the human body. The first reported case in Indonesia coincided on March 2, 2021 (Directorate General of Disease Prevention and Control, 2020). The mode of transmission of the virus is by spreading through splashes of saliva produced by an infected person when coughing, sneezing, or even when the person exhales. Droplets can't stay in the air, so they quickly fall and stick to other surfaces. Even transmission can occur when breathing air containing the virus.

The prevalence of confirmed cases of Covid-19 is quite high and tends to continue to increase. Based on data, South Kalimantan Province in early mid-2021 experienced a high spike in cases, resulting in a large number of deaths, especially in Banjarbaru City. Active Covid-19 cases in South Kalimantan Province in July 2021 were recorded at 5,279 cases (12.41%) out of a total of 42,527 positive cases (Covid-19 Task Force, 2021).

Research conducted by Sijia Tian et al., entitled *Characteristics of Covid-19 infection in Beijing* with demographic, epidemiological, clinical, and laboratory tests for Covid-19, it was found that the average age of the patients was 47.5 years and 51.5% were women, 73.3% of patients were residents of Beijing, 26.0% of whom had been to Wuhan, 60.4% had close contact with confirmed cases, The most common symptoms at onset of illness were fever (82.1%), cough (45.8%), fatigue (26.3%), dyspnea (6.9%) and headache (6.5%). The average incubation period is 6.7 days, the time interval for getting sick and seeing a doctor is 4.5 days (Tian et al., 2020).

Comorbid disease is a comorbid disease or congenital disease that can worsen the infection situation Covid-19 and can also reduce the

immune system (Mazuki et al., 2021). The Indonesian Ministry of Health stated that one of the vulnerable groups was exposed to Covid-19 are people who have comorbid diseases, this group is also at high risk of death (Indonesian Ministry of Health, 2020). The role of the family is important in disease prevention Covid-19 so that prevalence can decrease (Pranata, et al, 2021).

Case prevalence Covid-19 with comorbidities globally by 57.7% and cases Covid-19 *noncomorbidity* of 42.3%. Comorbid disease in Covid-19, that is hypertension, diabetes mellitus, cardiovascular disease (CVD), chronic obstructive pulmonary syndrome (COPD), chronic kidney disease (CKD), cancer and other comorbidities including liver disease, GI disorders, immunocompromised, neurological disorders, psychiatric disorders, metabolic disorders, blood disorders, transplant, chronic pancreatitis, connective tissue disorder, smoking, obesity, hyperlipidemia. Percentage of patients Covid-19 with the highest comorbid hypertension at 27.4% and followed by DM 17.4%, CVD 8.9%, COPD 7.5%, cancer 2.6%, CKD 3.5%, other diseases 15.5% (Bajgain dk., 2020)

The results of the studies described previously showed that comorbidity was a risk factor for severity and mortality in patients Covid-19. Therefore, to answer this question, this research was conducted with the aim of analyzed whether comorbid status had implications for the final status of Covid-19 patients in inpatients at the Idaman Hospital, Banjarbaru City.

## Methods

This type of research is a quantitative study using an analytic observational design using a case control approach. The population in this study were all inpatients Covid-19 at the Idaman Hospital of Banjarbaru City 2021. Number of positive confirmed patients Covid-19 at the Idaman Hospital from January-March 2021, namely, a total of 300 people. The sample size for cases, namely, patients who were confirmed positive and had been declared dead were 30 cases, while for controls were 30 confirmed cases. Covid-19 and declared cured. The source of data in this study is the medical record report at the

Idaman Hospital, Banjarbaru City

The data that has been collected was analyzed univariately using the frequency distribution table for each variable and bivariate analysis with the chi-square test to determine the implications between the two variables and calculating the

odds ratio (OR), Fisher's alternative test was used if the chi-square test did not meet the requirements.

## Results and Discussion

### A. Characteristics of Respondents

**Table 1.1 Distribution of respondents based on characteristics**

Characteristics	Frequency (f)	Percent (%)
<b>Age</b>		
Productive	46	76.7
Non Productive	14	23.3
<b>Gender</b>		
Woman	37	61.7
Man	23	38.3
<b>Status</b>		
Healed	30	50
Die	30	50
<b>Hypertension</b>		
Yes	31	51.7
Not	29	48.3
<b>Diabetes mellitus</b>		
Yes	27	45
Not	33	55
<b>Pneumonia</b>		
Yes	10	16.7
Not	50	83.3
<b>Heart</b>		
Yes	11	18.3
Not	49	81.7
<b>CKD</b>		
Yes	9	15
Not	51	85
<b>stroke</b>		
Yes	4	6.7
Not	56	93.3

Data source: Year 2021

Table 1. Shows the age distribution based on the productive age category as many as 46 people (76.7%) compared to non-productive age respondents as many as 14 (23.3%). Gender was dominated by 37 women (61.7%) and the final status of patients for those who died 30 people (50%) and recovered as many as 30 people (50%). Several comorbid diseases that have

implications for the status of inpatients at the Idaman Banjarbaru Hospital, namely hypertension disease are 31 people (51.7%), diabetes mellitus are 27 people (45%), patients who have heart disease are 11 people (18.3%), patients with kidney failure (CKD) as many as 9 people (15%) and stroke patients as many as 4 people (6.7%).

**B. Bivariate Analysis Results**

**Table 2. Bivariate Analysis**

Variable	Case		Control		OR (95% CI)	p-value
	N	%	N(%)	(%)		
<b>Age</b>						
Productive	21	70%	25	83.3%	0.467 (0.135-1.609)	0.360
Non Productive	9	30%	5	16.7%		
<b>Gender</b>						
Woman	21	70	16	53.3	0.490 (0.170-1.414)	0.288
Man	9	30	14	45.7		
<b>Hypertension</b>						
Yes	19	63.3	12	40	0.386 (0.136-1.094)	0.121
Not	18	36.7	11	60		
<b>Diabetes mellitus</b>						
Yes	13	43.3	14	46.7	0.874 (0.316-2.418)	1,000
Not	17	56.7	16	53.3		
<b>Pneumonia</b>						
Yes	7	23.3	3	10	2,739 (0.635-11.823)	0.299
Not	23	76.7	27	90		
<b>Heart</b>						
Yes	9	30	2	6.7	6,000 (1,172-30,725)	0.045
Not	21	70%	28	93.3		
<b>CKD</b>						
Yes	8	26.7	1	3.3	10,545 (1,227-90,662)	0.026
Not	22	73.3	29	96.7		
<b>Stroke</b>						
Yes	3	10	1	3.3	3,222 (0.316-32.889)	0.612
Not	27	90	29	96.7		

Data source: Year 2022

Analysis between individual characteristic variables and the patient's final status COVID-19 shown in table 2. People with heart disease had 6 times the risk of dying compared to those without heart disease and it was not statistically significant (p=0.045). Meanwhile, people who have kidney failure have a 10.5 times risk of dying compared to patients who do not have kidney failure and it is statistically significant (p=0.026).

**Discussion**

According to the Centers for Disease Control and Prevention (CDC) shows that 94% of cases of death Covid-19 in the United States occurs in patients with comorbidities. Patients who have comorbidities need attention because their conditions are more vulnerable so that when infected, Covid-19 can have fatal consequences. The Ministry of Health lists 12 co-morbidities Covid-19 the most in positive patients Covid-19.

Five of them are hypertension, diabetes mellitus, heart disease, lung disease, and kidney disease. People who already have this disease must strictly implement health protocols to avoid transmission Covid-19 (CDC, 2021).

In table 2 it is known that, out of 46 people of productive age, 21 people died as a result of Covid-19, while out of 14 people who were unproductive, 9 people died. The results of bivariate analysis obtained p = 0.360 ( $\alpha > 0.05$ ), which means that there is no statistically significant implication between age and the final status of comorbid patients affected. Covid-19. This is in line with the research of Elviani et al, (2021) which stated that the majority of respondents were in the age range of 26-35 years, amounting to 141 respondents. This shows that this age is productive age. At productive age, the possibility of contracting Covid-19 will be larger, this is due to high mobility and activities outside

the home. The frequency and social interaction of productive groups is also higher.

The Center for Strategic and International Studies (CSIS) also stated that infection transmission came from groups with relatively high mobility, namely, relatively young age groups. Deployment Covid-19 in Italy has struck every age group. Initially, most of the recorded cases occurred among the elderly, but as the corona virus spreads, younger people are infected in greater numbers (Kalantari, 2020). This means that all ages are at risk for infection Covid-19, and Productive age is the age most at risk due to high mobility and social activities. Although it is risky, this can be prevented by continuing to follow health protocols (wearing masks, washing hands, doing physical and social distancing and avoiding crowds).

The number of women as respondents in this study were 37 people, 21 of whom died due to Covid-19, while the 23 men who were the respondents, 9 of them died. The results of statistical tests showed  $p = 0.288$  ( $\alpha > 0.05$ ), which means that gender has no implications for the final status of comorbid patients affected Covid-19. Men are more sensitive to *SARS-CoV-2* so that male gender is a risk factor Covid-19 because they are more out of the house for working conditions and more in the community, therefore they are more likely to be infected. Differences in behavior between men and women, especially in terms of health education, as well as their lack of attention to the issue of social distancing, are issues that should not be ignored (Rashedi et al, 2020).

There were 31 hypertension patients, 19 of whom died due to hypertension Covid-19, while out of 29 people who did not suffer from hypertension, 18 people died. The results of statistical analysis showed  $p = 0.121$  ( $\alpha > 0.05$ ) which means that there is no implication between hypertension status and the final status of comorbid patients affected Covid-19. This is not in line with the data found in the data on comorbid conditions found in patients Covid-19 in Indonesia until July 29, 2021, hypertension is still the most common comorbid condition, at 50.4%. In a study conducted by Gunawan et al, regarding the Effect of Hypertension on Infected Patients Covid-19. The study stated that hypertension can worsen the condition of infected patients Covid-19. This virus

will bind to *Angiotensin converting enzyme 2 (ACE2)*, an enzyme attached to the outer surface of several organs in the body, after binding to the enzyme, the virus can enter the organ and cause the patient to become infected. Covid-19 (Gunawan et al, 2020).

There were 27 diabetes mellitus patients, 13 of whom died from diabetes mellitus Covid-19. The results of statistical analysis showed  $p = 1,000$  ( $\alpha > 0.05$ ) which means that there is no implication between hypertension and the final status of affected comorbid patients. Covid-19. Diabetes is the most common metabolic disease in the world. It is a disease that weakens the immune system. The number of people with diabetes in the world is increasing, especially in developing countries. Researchers have shown that diabetes increases the risk Covid-19. Diabetic patients are less responsive to treatment and have a higher risk of death. In diabetic patients, innate immunity is compromised due to increased blood glucose levels so that glycosylation of cytokines impairs cytokine-dependent function of type 1 helper T lymphocytes (Th1). Pulmonary microangiopathy, oxidative stress-induced tissue damage in hyperglycemia, and pulmonary inflammation predispose patients to Covid-19, as is the case in patients susceptible to tuberculosis (Rashedi et al, 2020). These diabetic patients have a 2 times greater risk of developing severe or critical illness requiring treatment in an intensive care unit (Longato et al, 2020; Wang et al, 2020). On hospitalization, patients with diabetes mellitus are three times at risk of dying from diabetes mellitus Covid-19. Diabetes mellitus is an independent risk factor for age and gender (Setyarini, 2021).

There were 10 pneumonia patients, 7 of whom died from Covid-19. The results of the statistical test analysis showed the  $p$ -value = 0.299, from the  $p$ -value in the statistical test results, the decision  $H_0$  was rejected ( $p > 0.05$ ), which means that there is no implication between pneumonia and the risk of death from Covid-19 in Banjar Regency. This is not relevant to the Senewe Research (2020) which states that the most common risk factor for comorbidities is pneumonia at 18.2% (Senewe, 2020).

Patients with heart disease were found as many as 11 people, 9 of whom died from Covid-19. The results of statistical analysis obtained  $p = 0.045$  ( $\alpha$

<0.05) which means that there are significant implications between heart disease and the final status of comorbid patients affected Covid-19. *Odds Ratio (5% CI:1.172-30,725)* shows that Covid-19 patients have a 6 times higher risk of dying than Covid-19 patients who do not have comorbidities. Comorbid factors Covid-19 the third and fourth ranks are hypertension and cardiovascular system disease, with a percentage of 3.10% and 2.86%, respectively. This is in line with the analysis of 5 journals showing that from 2 journals that reported the presence of comorbid cardiovascular disease and hypertension, namely the research of Satria et al (2020) and Sanyasi & Pramudita (2020) have contributed a fairly high number, which if added up to more than 5, 96%. Cardiovascular disease and hypertension are associated with smoking, hypertension, and diabetes mellitus, which are thought to be at risk of increasing the excretion of *ACE2* receptors or *angiotensin converting enzyme 2* (Susilo et al, 2020). Indeed, there are no research results that confirm the exact link between hypertension and severity Covid-19 (Yang et al, 2020). However, in general the severity Covid-19 it will be easier to occur in people with hypertension which are generally associated with complications of other health problems and factors of old age so that it is difficult to separate the influence of each factor.

The results of Yang & Yan's (2020) study showed that 358 patients were infected Covid-19 and confirmed by nasal and/or throat swab. 66 patients (18%) died of Covid-19. 60.6% were male (OR 1.87, P 0.041), 22.7% were >64 years old (OR 2.097, P 0.041), and 83.3% were comorbid risk factors. Diabetes mellitus (30.3%) (OR 4.348, P 0.000) and cardiovascular disease (10.6%) (OR 4.319, P 0.016) were the highest risk factors for death in Covid-19. The presence of acute inflammation and decreased organ function (heart, kidney, liver, and hematology) experienced by patients at the beginning of treatment can increase the risk of death due to infection. Covid-19 (Setyarini, 2021).

There were 9 patients with chronic kidney failure, 8 of whom died as a result of Covid-19. The results of the bivariate analysis showed  $p=0.026$  ( $\alpha<0.05$ ), which means that there are statistically significant implications between heart disease and the final status of comorbid patients affected

Covid-19. *Odds Ratio (5% CI:1.172-30,725)* showed that Covid-19 patients had a 10 times higher risk of dying than Covid-19 patients who did not have cardiac comorbidities. This is in line with a meta-analysis involving 76,993 patients in 10 publications that listed chronic kidney disease as one of the seven most common comorbidities in patients Covid-19 hospitalized (Emami et al, 2020). Subsequent analysis found that chronic kidney disease was the most common risk factor for Covid-19 weight worldwide at any age and explains the increased risk Covid-19 severe for about one in four high-risk individuals worldwide (Council et al, 2021). Chronic kidney disease is well known to be a risk factor for severe bacterial and viral infections. Many theories have explained why comorbid chronic kidney disease increases the risk of developing serious infectious diseases and even death. Chronic kidney disease patients have pro-inflammatory status and functional effects on innate and acquired immune cells resulting in increased susceptibility to infection (Ishigami et al, 2017). In addition, there is an increased risk of pneumonia and upper respiratory tract infections in patients with chronic kidney disease who may also be co-infected with Covid-19.

There were 4 stroke patients, and 3 of them died due to Covid-19. The results of the bivariate analysis obtained  $p=0.612$  ( $\alpha>0.05$ ), which means that there is no statistically significant implication between stroke and the final status of comorbid patients affected by Covid-19. Stroke or CVA (Cerebro Vascular Accident) is also one of the comorbid factors for Covid-19 in Indonesia. The results of the study in the form of a review of 5 journals, showed that there were 2 journals that clearly provided information on stroke as a comorbid factor for Covid-19, namely, the research of Satria et al (2020) and Sanyasi & Pramudita (2020). Another study stated that there were 4 cases of patients diagnosed with Covid-19 who were also suffering from a stroke or had a history of stroke (Satria et al, 2020). These results are relatively new, because existing reports do not clearly mention stroke or CVA as a comorbid factor for Covid-19 (Karyono & Wicaksana, 2020). 56 patients with chronic diseases also mostly have experienced organ damage. When exposed to the Corona virus, the damage to these organs can become more severe,

Intensive action to reduce person-to-person transmission of Covid-19 is needed to control this outbreak, especially in vulnerable populations, especially those with comorbid hypertension and diabetes. It is also relevant to the research conducted by Raden Muhammad Ali Satria with the title analysis of risk factors for death with comorbid Covid-19 (Setyarini, 2021)

### Conclusion

Comorbid status has implications for the final status of the patient Covid-19 at the Idaman Hospital in Banjarbaru City. Confirmed patient Covid-19 with comorbid cardiac status with  $p=0.045$  (OR=6,000) and chronic kidney failure with  $p=0.026$  (OR=10,545) had a higher risk of death than patients without these comorbidities. The most dominant comorbid factors were patients with a history of chronic kidney failure.

### Suggestion

It is hoped that these findings can be used as a basis for policy making and educational program planning strategies to improve patient monitoring and treatment Covid-19 especially in patients who have comorbid diseases and other non-communicable diseases. Communities and individuals can maintain their lifestyle by always adhering to health protocols.

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