Prevalence of Death in Geriatric COVID-19 Patients with Comorbid Hypertension and/or Diabetes Mellitus in Samarinda City Hospital

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Abstract: *Corona virus or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a disease caused by a viral infection that attacks the respiratory tract which is often referred to as COVID-19. This study aims to determine the percentage of mortality prevalence in geriatric Covid-19 patients with comorbid hypertension and/or diabetes mellitus at the Samarinda City Hospital. This research method uses a non-experimental observational method with a descriptive research design. Data collection was carried out retrospectively using patient medical record data at the Samarinda City Hospital for the period March 2020-December 2021. Data analysis used the percentage of mortality prevalence in geriatric Covid-19 patients with comorbid hypertension and/or diabetes mellitus at the Samarinda Hospital using Microsoft excel. Based on the results of the study, from 70 samples of patients, the most based on gender, namely male as many as 43 patients (61%), while based on age, namely elderly elderly 60-74 years as many as 56 patients (80%). Based on the status of confirmed Covid-19 patients with comorbidities, the highest number of patients who died was 42 patients (60%). Most of the patients who died with comorbidities were found in confirmed Covid-19 patients with comorbid diabetes mellitus, namely 13 patients (44.83%). It can be concluded that the prevalence of death in geriatric COVID-19 patients with comorbid diabetes mellitus is 44.83%, hypertension is 27.59%, and hypertension with diabetes mellitus is 27.59%.*

1. Introduction

Coronavirus Disease-19 is a new type of disease that has never been identified before in humans. Severe acute respiratory syndrome coronavirus 2 (Sars-CoV-2) causes COVID-19. Corona viruses that are transmitted between animals and humans are called zoonoses. A large family of viruses that can cause mild to severe illness. There are at least two types of corona viruses that have been found to cause diseases that can increase severe symptoms, such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (Purba, 2021).

The symptoms are flu-like, fever, cough, and colds. At first the cause of the Corona virus had not been found with certainty, but it was known that the spread of the virus originated from animals transmitting from one species to another, the same thing can be infected and transmitted between humans. After spreading in Wuhan, it quickly spread to other provinces in China and claimed more and more victims (Altuntas and Gok, 2021).

The virus can spread in only a short time, amazingly taking lives not only in China but quickly spreading throughout the world to various other countries including Indonesia (Wong et al., 2020).

The indications for hospitalization for COVID-19 patients are difficult to quantify as they depend on the prevalence of community testing and acceptance criteria, which vary from country to country. However, it is estimated that 1 in 5-10 adults has a disease of sufficient severity and meets the criteria for hospitalization. Most of the patients were admitted with severe acute respiratory infection or severe acute respiratory syndrome according to WHO case definitions. The criteria for treatment in the intensive care unit also vary from country to country. Old age, chronic disease, and male gender are consistently associated with increased mortality (Docherty et al., 2020).

The majority of hypertension sufferers in Indonesia are aged over 65 years while in diabetes mellitus the majority are aged over 60 years based on 2018 data (Riskesdas, 2018). A history of high blood pressure and diabetes mellitus is very likely to indicate acute respiratory distress syndrome in older adults infected with COVID-19 (Schiffrin et al., 2020). In China, it was reported that 20% of deaths with COVID-19 were over 60 years old (Wu and McGoogan, 2020). It also has similarities as in several other parts of the country, namely in South Korea, Spain, Iran, Italy and the United States (Rothan and Byrareddy, 2020).

The situation in Indonesia, distribution of the number of deaths of residents exposed to the corona virus (Covid-19) is worse in the second year of the pandemic. Data from the Covid-19 Handling Task Force, the graph of Covid-19 deaths has soared in 2021. Accumulated data on Covid-19 deaths as of 23 June 2021 totaled 55,594. Further regarding the data on Covid-19 deaths in Indonesia, the Covid-19 Handling Task Force also noted that the sex percentage of survivors of Covid-19 which resulted in more deaths were men. The details are 55.7 percent men and 44.3 percent women. Meanwhile, regarding age, elderly people (elderly) aged 60 years are the biggest contributor to deaths, with a total of 50 % of deaths. That means, approximately 27,797 elderly people died from Covid-19 (Satgas Covid-19, 2021). This is because a viral infection will be more susceptible to older people. Concomitant diseases in elderly patients are more susceptible and at risk of experiencing serious infections that lead to a high risk of death (Lithander et al., 2020). The author conducted a study to describe the prevalence of death in geriatric COVID-19 patients with hypertension and/or diabetes mellitus in the hospital. More specifically, it is important to protect groups at high risk of being infected with COVID-19.

2. Materials and Methods

This study uses a non-experimental type of observational research through a descriptive research design. Observational non-experimental design because the test subjects did not receive any previous treatment. The design of this study used a cross-sectional approach using retrospective data.

The population used in this study was death in geriatric COVID-19 patients with the elderly (elderly, old, and very old) (WHO, 2020) with comorbid hypertension and/or diabetes

mellitus at the Samarinda City Hospital in March 2020-December 2021. The inclusion of this study were geriatric patients over 60 years old and with a diagnosis of Covid 19 with comorbid hypertension and/or diabetes mellitus at the Samarinda City Hospital in March 2020-December 2021. These criteria will be excluded from the study if the medical records are incomplete or damaged or unreadable.

Sample collection was carried out using simple random sampling where all members of the unit from the population had an equal chance of being selected as a sample (Notoatmodjo, 2012). Simple random sampling can be done through systematically randomized. The minimum sample size for each group obtained from the results of the sample calculation is 70 patients with a value of N (number of population) as much as 225 and measurable (absolute) error/degree of accuracy 10%.

Medical record data processing techniques to determine the prevalence of death in geriatric COVID-19 patients with comorbid hypertension and/or diabetes mellitus. The data that has been collected is then analyzed in a descriptive way, with a table that will be displayed for a quantitative description of the data and a description will be displayed to visualize the qualitative data. presentation of mortality prevalence profile in geriatric COVID-19 patients with comorbid hypertension and/or diabetes mellitus in percentage form using Microsoft Excel.

3. **Results and Discussion**
   a) **Patient characteristics**

Characteristics of research respondents consists of gender and age. In this study the characteristics of the patients used can be seen in table 1.

Table 1. Patient Characteristics

Characteristics	Frequency	Percentage
Gender		
Man	43	61%
Woman	27	39%
Age		
Elderly (60-74)	56	80%
Elderly Old (75-90)	14	20%
Very Old Elderly (>90)	0	0%

This research has gone through an ethical eligibility test with an ethical eligibility approval letter No. 376/KEPK-AWS/XII/2021. In this study, 70 samples of medical records of geriatric COVID-19 patients for the period March 2020-December 2021 were obtained with comorbid hypertension and diabetes mellitus. The sample consisted of live and died patients. Based on gender, the number of confirmed COVID-19 patients with the most comorbidities was male, namely 43 patients (61%) while women were 27 patients (39%). This is in line with Illah's research in 2021 which stated that patients with confirmed COVID-19 with comorbidities were mostly found in male patients with a percentage

(61.9%). This shows that the immunity level of men is lower than that of women and an unhealthy lifestyle is smoking . Women are more protected from Covid-19 than men, this is because women have an X chromosome and sex hormones such as progesterone that affect innate and adaptive immunity. In addition, women generally have a higher level of understanding than men, especially the epidemiology and risk factors of COVID-19 (Illah, 2021).

Based on age, the number of confirmed COVID-19 patients with comorbidities is the most found with the elderly 60-74 years, which is 80%. Physical and psychological changes can occur in the elderly as a result of the degenerative process. Aging is the process by which tissue slowly loses the ability to repair or change it self and maintain normal function, making it unable to survive infection and repair damage. The aging process is a continuous (naturally occurring) step. So far, the coronavirus appears to be causing more serious infections and deaths in the elderly. The total number of patients infected with the corona virus and deaths among the elderly are constantly increasing every day while immunity is decreasing among the elderly age range (Adisasmito, 2020).

b) Comorbidities

Co-morbidities are co-morbidities or congenital diseases that can exacerbate a condition in cases of COVID-19 infection and can also reduce the body's resistance. The Indonesian Ministry of Health has said that one of the groups that can be at risk of exposure to COVID-19 are people with comorbid conditions, this group also has a higher risk of death (Ministry of Health of the Republic of Indonesia, 2020). Geriatric covid 19 patients with comorbidities can be seen in the following table.

Table 2. Comorbidities of Patient Covid 19

Comorbidities of Covid 19	Frequency	Percentage
Diabetes Mellitus :	33	47.14%
Hipertensi :	19	27.15%
Hipertensi and/or diabetes mellitus :	18	25.72%
Total	**70**	**100%**

Based on medical records of geriatric patients at the Samarinda City Hospital, it showed that the most confirmed patients with COVID-19 with comorbidities were found in patients with diabetes mellitus, namely 33 patients (47.14%). So that the data obtained from the study is in accordance with the phenomenon that occurs that diabetes mellitus is the most common comorbid disease in COVID-19 patients, this shows that diabetes mellitus patients are very closely related to COVID-19 patients, where patients with these comorbidities experience worsening condition to death. This is in accordance with Nurul's research in 2021 on the prevalence of comorbidities in COVID-19 patients which stated that

diabetes mellitus was the most common comorbid disease, namely 35 patients (34.5%) of the total cases. This shows that COVID-19 patients with comorbid diabetes mellitus have a severe inflammatory response. Blood glucose in COVID-19 patients with comorbid diabetes mellitus should be monitored to avoid hyperglycemic or hypoglycemic states that can trigger a cytokine storm.

Hypertension occupies the second position as the most comorbid with a percentage of 17 patients (24.9%). This is in line with research conducted by Oktaviani et al. in 2021 regarding the relationship between diabetes mellitus and hypertension which stated that the second most common comorbid disease was hypertension, namely 23 patients (16.9%). Theoretically, the processes that underlie the relationship between hypertension and COVID-19 cannot be known with certainty , however, given the important role of RAS (renin-angiotensin system)/ACE-2 in the pathophysiology of hypertension, dysregulation of this system could be an important role. Based on this, the concept is also proposed that high blood pressure therapy with RAS inhibitors can transmit the SARS-CoV-2 binding system to ACE-2 and thus aids the infection process (Oktaviani *et al*., 2021).

c) **Prevalence of Death**

From the number of samples used in this study, the results obtained were 28 patients are live and 42 people died. The mortality rate of Covid 19 patients in the geriatric group with comorbid diabetes mellitus and hypertension can be seen in the following table.

Table 3. Prevalence of Death

Comorbidities of Covid 19	Frequency	Percentage
Diabetes mellitus	18	42.85%
Hipertension	10	23.80%
Hipertension and diabetes mellitus	14	33.33%
Total	**42**	**100%**

Based on the comorbidities found in patients with confirmed COVID-19, the patient's status can be seen from 70 patients with the highest number of deaths with comorbidities, namely 18 patients (42.85%) with comorbid diabetes mellitus. This is in accordance with the research conducted by Satria *et al* ,. in 2020 which showed that diabetes mellitus was associated with the highest risk of death in patients infected with COVID-19, especially in 20 patients (30.3%) (Satria *et al*., 2020). This research is also in line with the research conducted by Nanda et al and the results obtained were 106 patients who had hypertension patients (73.8%) and who had a history of DM as many as 74 patients (18.3%)Patients with diabetes mellitus are more susceptible to infection because of the reduced capacity of phagocytic cells. In addition, there are many other factors that increase the risk of COVID-19 in diabetic patients, namely an increase in

ACE-2. Receptor levels (Rao *et al*., 2020). The type of diabetes most at risk for COVID-19 is type 2 diabetes mellitus, meanwhile type 1 diabetes has limited cases and data. Patients with comorbid diabetes mellitus may develop infections due to sudden increases in blood glucose levels and hyperglycemia, leading to an increased risk of death by cytokine storm . which can worsen the infection and can range from acute respiratory distress syndrome (ARDS) to respiratory distress. failure in diabetic patients. People infected with COVID -19 should check their blood sugar more often and give insulin in appropriate doses (Nanda *et al*., 2021).

Hypertension occupies the second position as the most comorbid disease, namely 8 patients (11.43%). The risk of death from high blood pressure in Covid-19 patients is due to the fact that high blood pressure has a large number of ACE-2 receptors and is present in the lungs, arteries, heart, and other organs. ACE-2 as a receptor for the corona virus, so that the corona virus is more susceptible to infiltrating host cells and then starting to reproduce by mutating genes in host cells, an increase in ACE-2 in tissues is associated with the severity of the disease resulting in alveolar cell damage. , which triggers various systemic reactions and even causes death (Schiffrin *et al*., 2020). Why not cause the highest mortality rate in comorbidities of hypertension and diabetes mellitus even though it has more than two comorbidities that can cause the severity of Covid-19, namely because the indications for hospitalization in hospitals for COVID-19 patients are difficult to compare. therefore, it depends on the prevalence of group testing and acceptance criteria which vary from country to country. However, it can be estimated that 1 in 5 to 10 adults has a disease of relative severity and criteria for hospitalization. Most of the patients admitted had severe acute respiratory infection or severe acute respiratory syndrome based on WHO case definitions. Criteria for intensive care also vary, for example older age, chronic disease, male gender, all of which are associated with higher mortality (Docherty *et al* ., 2020).

4. Conclusion

From the number of samples used in this study, the results obtained were 28 patients are live and 42 people died. It can be concluded that the prevalence of death in geriatric COVID-19 patients with comorbid diabetes mellitus is 47.83%, hypertension 27.14% and the geriatric group with hypertension and diabetes mellitus 25.71%.

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