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Profile Comorbid Factors, Age, and Gender Relationship with Severity of Pulmonary Infection Caused by COVID-19 Pulmonary Infection for the Period of June to August 2021 at Sidoardjo Regional General Hospital

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KEY WORDS
Age, Gender, Comorbid Factors, Severity of COVID-19 pulmonary infection

ABSTRACT
COVID-19 transmission has three main mechanisms, namely host conditions, viral virulence, and environmental factors. Transmission is higher in individuals with weakened immune systems and those in vulnerable groups, especially those with comorbidities. This study aims to determine the profile and role of comorbid factors, age, and gender relationship with the clinical severity of covid-19 pulmonary infection for the periode of june to august 2021 at sidoardjo regional general hospital Comorbidities such as diabetes mellitus and cardiovascular disease have been shown to be significant risk factors for death in COVID-19 patients. Previous results have shown that men, advanced age, as well as the presence of comorbidities such as diabetes and hypertension, increase the risk of death from COVID-19. This study uses secondary data from the medical records of COVID-19 patients to evaluate patient profiles based on age, gender, and comorbidities. The results of this study are expected to provide a deeper understanding of the influence of these factors on the severity and risk of death from COVID-19, as well as support future disease prevention and control efforts.

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INTRODUCTION

Coronavirus infection also has three transmission mechanisms, namely according to the host, virulence, and environmental conditions (Elrashdy et al., 2020; Kirubananthan et al., 2021; Zhu et al., 2020). Host is defined as the ability of the immune system that occurs in the body of each individual, the weaker and included in the vulnerable group, the higher the transmission in the community (Louten, 2016; VanderWaal & Ezenwa, 2016). The need for clean and healthy living behavior, it is necessary to provide information continuously so that it can increase the knowledge of all levels of society to apply PHBS in daily life (Astutik et al., 2025; Maulidah, 2023; Purba & Gusar, 2020; Yasin et al., 2025). In addition, comorbid diseases are a risk factor for death due to COVID-19 at Bhakti Dharma Husada Hospital Surabaya (Misbah et al., 2022; Suardi & Aresti, 2022). The results showed that 358 patients were infected with COVID-19 and confirmed by nasal and throat swabs. Sixty-six patients (18%) died from COVID-19. 60.6% were male (OR 1.87, P 0.041), 22.7% were old> 64 years (OR 2.097, P 0.041), and 83.3% of them were co-risk factors. Diabetes mellitus (30.3%) (OR 4,348, P 0.000), and cardiovascular disease (10.6%) (OR 4,319, P 0.016) are the highest risk factors for death in COVID-19 including male gender, advanced age, diabetes, and hypertension are risk factors for death in COVID-19.

The expert team of the Covid-19 handling task force has conducted an analysis of the deaths of Covid-19 patients based on age and history of comorbidities or comorbidities (Fathi et al., 2021; Garibaldi et al., 2021; Hendren et al., 2021). The results of the expert team's analysis over the last 5 months, based on the age aspect, patients aged 31 - 45 years are at a 2.4 times risk of death, respectively (Joly et al., 2018; Ketelaers et al., 2019). and those who are in the vulnerable age group of 46 - 59 years, have an 8.5 times risk of death. "This risk will increase in the elderly, over 60 years old, which is 19.5 times. Positive Covid-19 deaths in Yogyakarta are dominated by cases with comorbidities (comorbidities). Spokesperson for Covid-19 Handling for Yogyakarta, Berty Murtiningsih, said that the most comorbidities experienced by Covid-19 patients who died in Yogyakarta were hypertension and diabetes mellitus (DM). What about reinfection in Comorbidities The above problems make researchers interested in knowing Profile Comorbid factors, Age and Gender Relationship with The Clinical Severity of Covid-19 Pulmonary Infection for the Periode of June to August 2021 at Sidoardjo Regional General Hospital.

Previous studies by Huang et al. (2020) revealed that COVID-19 patients with comorbidities such as hypertension, diabetes mellitus, and cardiovascular diseases had significantly higher mortality risks compared to those without comorbidities. Similarly, Chen et al. (2020) emphasized that elderly males with a history of chronic illnesses were among the most vulnerable to severe infections and death due to COVID-19. However, these studies did not specifically examine the simultaneous relationship between comorbid factors, age, and gender on the clinical severity of pulmonary COVID-19 infection in regional hospital settings. This study fills that gap by analyzing the profile of comorbidities, age, and gender in relation to the clinical severity of COVID-19-related lung infections at Sidoarjo Regional General Hospital during the peak pandemic period of June to August 2021. The novelty of this research lies in its localized hospital-based context and critical timing, offering empirical insights that can support clinical decision-making and public health policies at the regional level (Karlsen, 2025; Tenbensel, 2015).

The objective of this study is to determine the relationship between comorbid factors, age, and gender with the clinical severity of COVID-19 pulmonary infection among patients treated at Sidoarjo Regional General Hospital during the period of June to August 2021. This study aims to describe the patient profiles based on underlying health conditions, age distribution, and gender and analyze how these three factors affect disease progression, especially regarding pulmonary complications that may lead to severe clinical outcomes. The findings are expected to provide evidence-based insights for hospital-level clinical management of COVID-19 and support the development of preventive strategies for vulnerable population groups.

METHODS

This study employs a quantitative observational design using secondary data obtained from medical records. The rationale for using secondary data lies in its availability, cost-effectiveness, and ability to capture real-world clinical conditions over a defined period. Utilizing existing patient records allows researchers to examine patterns and associations in a natural setting without intervention. To ensure data quality and reliability, data were collected only from complete, verified patient records that had been documented by licensed medical personnel at Sidoarjo Regional General Hospital. All records included were reviewed for consistency and completeness by a clinical documentation specialist prior to analysis.

The study population comprises all patients diagnosed with confirmed COVID-19 infection during the period of June to August 2021 at Sidoarjo Regional General Hospital. A total sampling technique was used, meaning all eligible records during the study period were included, provided they met the inclusion criteria: (1) a confirmed diagnosis of COVID-19 by PCR swab, and (2) a complete clinical documentation of comorbid conditions, age, gender, and clinical severity classification.

The collected data were coded and inputted into SPSS software version 25 for statistical analysis. Data analysis consisted of univariate analysis to summarize patient demographics and comorbidity profiles in the form of frequencies, percentages, tables, and graphs. For bivariate analysis, the relationship between comorbidities, age, and gender with the clinical severity of COVID-19 pulmonary infection was tested using the Chi-square test for categorical variables. Additionally, to examine the strength and direction of association between variables such as age and severity, Pearson or Spearman correlation coefficients were calculated depending on the data distribution. The Kappa correlation test was used where agreement between categorical data (e.g., clinical severity and comorbidity status) needed to be assessed. A significance level of $p < 0.05$ was applied to determine statistical significance in all analyses.

RESULTS AND DISCUSSION

This study analyzed Comorbid Factors, Age and Gender on the clinical severity of Covid-19 Lung Infection treated at Sidoarjo Regency Hospital during the period from June to August 2021.

Sex Relationship with Clinical Severity of Covid-19 Lung Infection

The results of the analysis showed that there was a significant relationship between the gender of Covid-19 Lung Infection patients and the clinical severity of Covid-19 Lung Infection. Of the 330 patients, those who were male were more likely to experience severe symptoms ($p = 0.018$).

50.9% were men (27.3% with Critical Clinical Severity, 22.7% with Moderate Clinical Severity, 0.9% Severe Clinical Severity). Meanwhile, in the female gender as much as 49.1% (30.3% with Moderate Clinical Severity, 27.3% Critical Clinical Severity and 0.9% Severe Clinical Severity). Critical Clinical Severity was dominated by male sex with 27.3% compared to female sex with 17.3%. Moderate and Severe Clinical Severity were dominated by Female sex with 30.3% and 1.5% compared to Male sex 22.7% and 0.9%. This can be seen in Table 1 and Figure 1 Below.

Table 1. Research Result

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sex * Severity	330	100.0%	0	0.0%	330	100.0%

			Severity			
			Keep	Heavy	Critical	Total
Sex	Woman	Count	100	5	57	162
		Expected Count	85.9	3.9	72.2	162.0
		% within sex	61.7%	3.1%	35.2%	100.0%
		% within severity	57.1%	62.5%	38.8%	49.1%
		% of Total	30.3%	1.5%	17.3%	49.1%
	Man	Count	75	3	90	168
		Expected Count	89.1	4.1	74.8	168.0
		% within sex	44.6%	1.8%	53.6%	100.0%
		% within severity	42.9%	37.5%	61.2%	50.9%
		% of Total	22.7%	0.9%	27.3%	50.9%
Total		Count	175	8	147	330
		Expected Count	175.0	8.0	147.0	330.0
		% within sex	53.0%	2.4%	44.5%	100.0%
		% within severity	100.0%	100.0%	100.0%	100.0%
		% of Total	53.0%	2.4%	44.5%	100.0%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.374a	2	.003
Likelihood Ratio	11.452	2	.003
Linear-by-Linear Association	10.682	1	.001
N of Valid Cases	330		

2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.93.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate Tb	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.183			.003
Interval by Interval	Pearson's R	.180	.054	3.318	.001c
Ordinal by Ordinal	Spearman Correlation	.180	.054	3.306	.001c
Measure of Agreement	**Kappa**	**.054**	**.020**	**2.624**	**.009**
N of Valid Cases		330			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

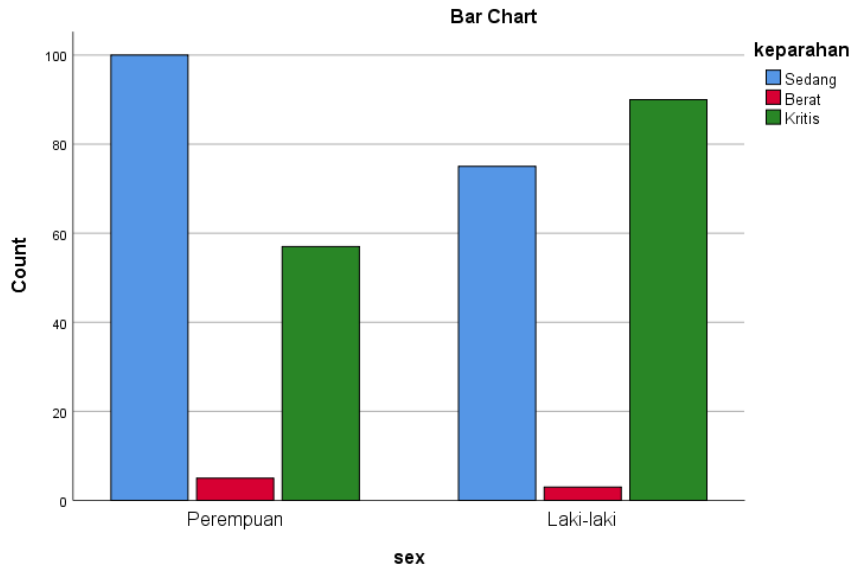

Figure 1. Research Result

Relationship of Age to Clinical Severity of Covid-19 Lung Infection

The results of the analysis showed that there was no significant relationship between the age of > 60 years of Covid-19 Lung Infection and the clinical severity of Covid-19 Lung Infection. Of the 330 patients, patients showed < age of 60 years (79.7%) compared to patients > 60 years old (20.3%) (p = 0.018).

From the age group < 60 years, 41.8% showed moderate clinical severity, 35.8% were clinically critical and 2.1% were severe clinical severity. The dominance of clinical severity with age was found at the age of < 60 years. showed patients < age 60 years (79.7%) compared to > 60-year-old (20.3%) (This can be seen in Table 2 and Figure 2 Below

Table 2. Research Result

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Usia_nomin* severity	330	100.0%	0	0.0%	330	100.0%

Usia_nomin * Severity of Crosstabulation

			Severity			
			Keep	Heavy	Critical	Total
Usia_nomin	Age < 60 years old	Count	138	7	118	263
		Expected Count	139.5	6.4	117.2	263.0
		% within Usia_nomin	52.5%	2.7%	44.9%	100.0%
		% within severity	78.9%	87.5%	80.3%	79.7%
		% of Total	41.8%	2.1%	35.8%	79.7%
	Age >= 60 years	Count	37	1	29	67
		Expected Count	35.5	1.6	29.8	67.0
		% within Usia_nomin	55.2%	1.5%	43.3%	100.0%
		% within severity	21.1%	12.5%	19.7%	20.3%
		% of Total	11.2%	0.3%	8.8%	20.3%
Total		Count	175	8	147	330
		Expected Count	175.0	8.0	147.0	330.0
		% within Usia_nomin	53.0%	2.4%	44.5%	100.0%
		% within severity	100.0%	100.0%	100.0%	100.0%
		% of Total	53.0%	2.4%	44.5%	100.0%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.407a	2	.816

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Likelihood Ratio	.443	2	.801
Linear-by-Linear Association	.103	1	.748
N of Valid Cases	330		

a. 1 cell (16.7%) have expected count less than 5. The minimum expected count is 1.62.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate Tb	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.035			.816
Interval by Interval	Pearson's R	-.018	.055	-.321	.748c
Ordinal by Ordinal	Spearman Correlation	-.018	.055	-.328	.743c
Measure of Agreement	**Kappa**	**-.011**	**.021**	**-.525**	**.600**
N of Valid Cases		330			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

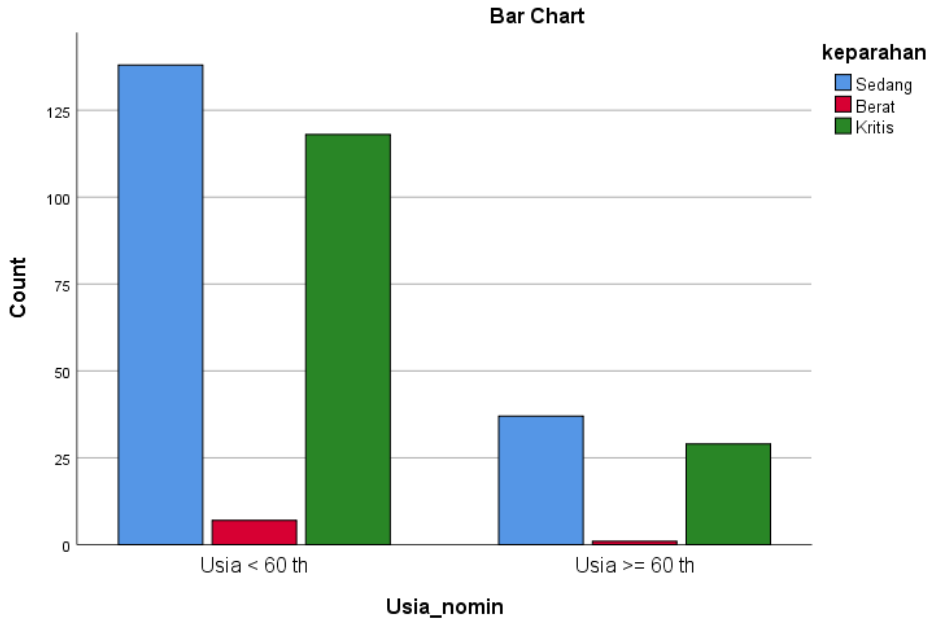

Figure 2. Research Result

Comorbid Relationship with Clinical Severity of COVID-19 Lung Infection

The results of the analysis showed that there was no significant relationship between the Comorbid Factors of people with COVID-19 lung Infection and the clinical severity of COVID-19 lung Infection. Of the 330 patients, patients without comorbidities were more likely to suffer from COVID-19 lung Infection with 55.2% compared to 44.8%. The group without comorbidities showed 29.4% of Moderate clinical severity, 24.8% of Critical clinical severity, and 0.9% of Severe clinical severity. The group with Comorbidities showed 23.6% Moderate clinical severity, 19.7% Critical clinical severity and 1.5% Severe clinical severity. This can be seen in Table 3 and Figure 3 below.

Table 3. Research Result

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Comorbidity * severity	330	100.0%	0	0.0%	330	100.0%

comorbidities * severity of crosstabulation

			Severity			
			Keep	Heavy	Critical	Total
comorbidities	No Comorbidities	Count	97	3	82	182
		Expected Count	96.5	4.4	81.1	182.0
		% within comorbid	53.3%	1.6%	45.1%	100.0%
		% within severity	55.4%	37.5%	55.8%	55.2%
		% of Total	29.4%	0.9%	24.8%	55.2%
	There are comorbidities	Count	78	5	65	148
		Expected Count	78.5	3.6	65.9	148.0
		% within comorbid	52.7%	3.4%	43.9%	100.0%
		% within severity	44.6%	62.5%	44.2%	44.8%
		% of Total	23.6%	1.5%	19.7%	44.8%
Total		Count	175	8	147	330
		Expected Count	175.0	8.0	147.0	330.0
		% within comorbid	53.0%	2.4%	44.5%	100.0%
		% within severity	100.0%	100.0%	100.0%	100.0%
		% of Total	53.0%	2.4%	44.5%	100.0%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.037a	2	.595

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Likelihood Ratio	1.033	2	.596
Linear-by-Linear Association	.002	1	.960
N of Valid Cases	330		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.59.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate Tb	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.056			.595
Interval by Interval	Pearson's R	-.003	.055	-.050	.960c
Ordinal by Ordinal	Spearman Correlation	-.002	.055	-.036	.971c
Measure of Agreement	**Kappa**	**.008**	**.022**	**.384**	**.701**
N of Valid Cases		330			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

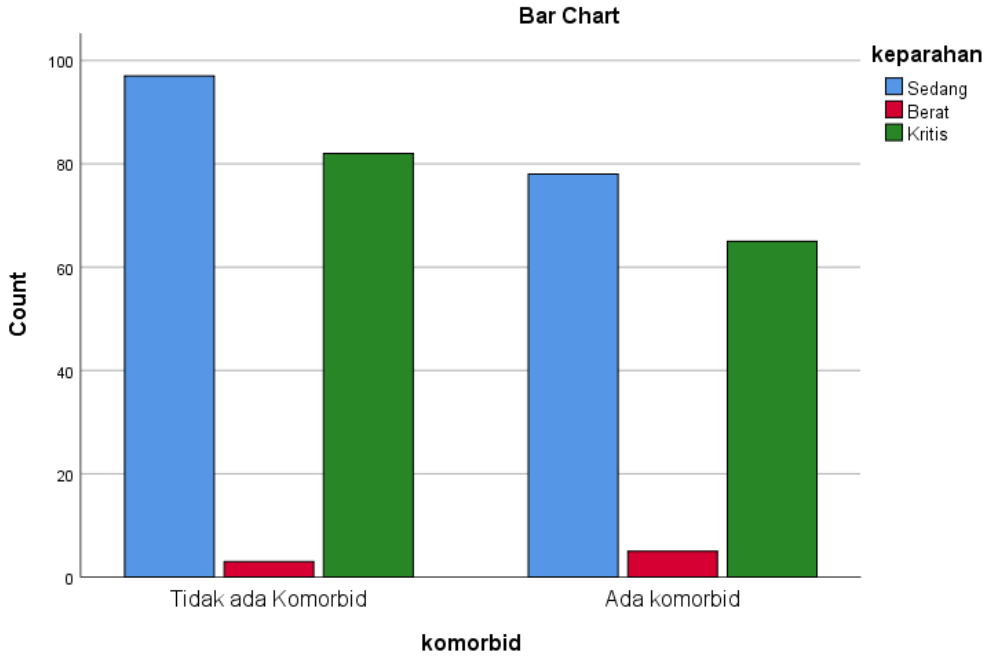

Figure 3. Research Result

Crosstabs

[DataSet1] D:\PIC INFECTIONS\COVID SDA DATA\Analytical profile data covid.sav

Table 4. Research Result

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
komorbid_2 * severity	330	100.0%	0	0.0%	330	100.0%

komorbid_2 * Severity of Crosstabulation

			Severity			
			Keep	Heavy	Critical	Total
komorbid_2	No comorbidities	Count	96	3	86	185
		% within komorbid_2	51.9%	1.6%	46.5%	100.0%
		% within severity	54.9%	37.5%	58.5%	56.1%
		% of Total	29.1%	0.9%	26.1%	56.1%
	Diabetes Mellitus	Count	60	4	43	107
		% within komorbid_2	56.1%	3.7%	40.2%	100.0%
		% within severity	34.3%	50.0%	29.3%	32.4%
		% of Total	18.2%	1.2%	13.0%	32.4%
	Hypertension	Count	9	0	4	13
		% within komorbid_2	69.2%	0.0%	30.8%	100.0%
		% within severity	5.1%	0.0%	2.7%	3.9%
		% of Total	2.7%	0.0%	1.2%	3.9%
	DM & Hypertension	Count	10	1	14	25
		% within komorbid_2	40.0%	4.0%	56.0%	100.0%
		% within severity	5.7%	12.5%	9.5%	7.6%
		% of Total	3.0%	0.3%	4.2%	7.6%
Total		Count	175	8	147	330
		% within komorbid_2	53.0%	2.4%	44.5%	100.0%
		% within severity	100.0%	100.0%	100.0%	100.0%
		% of Total	53.0%	2.4%	44.5%	100.0%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.404a	6	.493
Likelihood Ratio	5.673	6	.461
Linear-by-Linear Association	.029	1	.866
N of Valid Cases	330		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .32.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate Tb	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.127			.493
Interval by Interval	Pearson's R	.009	.055	.169	.866c
Ordinal by Ordinal	Spearman Correlation	-.020	.055	-.371	.711c
Measure of Agreement	Kappa	.022	.020	1.098	.272
N of Valid Cases		330			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

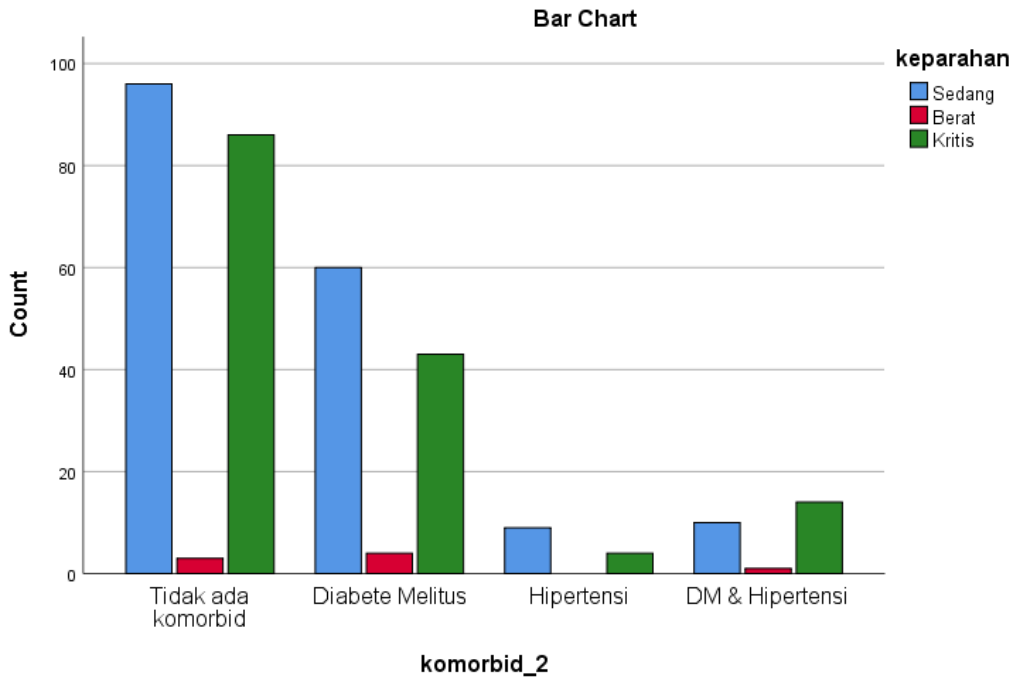

Figure 4. Research Result

COVID-19 patients over 60 years old tend to experience greater disease severity, due to a decrease in the body's immune response and the body's ability to fight infection along with the decline in the function of body organs, especially lung function related to the port d entry microorganism that causes Covid-19 Pneumonia. This study proves that the age factor is related to the clinical severity of Pneumonia due to Covid 19. Critical Clinical Severity was dominated by male sex with 27.3% compared to female sex with 17.3%. Moderate and Severe Clinical Severity were dominated by Female sex with 30.3% and 1.5% compared to Male sex 22.7% and 0.9%.

Men tend to experience higher clinical severity and mortality rates than women. The hormone estrogen in women provides protection against infection, while the hormone testosterone in men can increase susceptibility to infection. In this study, it could not be proven that gender factors are related to the clinical severity of Pneumonia due to Covid 19. A total of 330 patients with < age 60 years (79.7%) compared to patients with > age 60 years (20.3%) ($p = 0.018$). The age group < 60 years showed 41.8% of Moderate Clinical Progress, 35.8% of Critical Clinical Severity and 2.1% Severe Clinical Severity. The dominance of clinical severity with age was found at the age of < 60 years.

Comorbid factors such as hypertension, diabetes mellitus, heart disease, chronic obstructive pulmonary disease (COPD), obesity, and chronic kidney disease can increase the risk of pneumonia severity due to COVID-19. In this study, it could not be proven that Comorbid factors are related to the Clinical Severity of Covid-19 Lung Infection. A total of 330 patients showed that patients without comorbidities were more common with a figure of 55.2% compared to Komobid with a figure of 44.8%. The group without comorbidities showed 29.4% of Moderate clinical severity, 24.8% of Critical clinical severity and 0.9% of Severe clinical severity. The group with Comorbidities showed 23.6% Moderate clinical severity, 19.7% Critical clinical severity and 1.5% Severe clinical severity.

CONCLUSION

This study concludes that gender is a significant factor associated with the clinical severity of COVID-19-related pneumonia, with male patients exhibiting a higher proportion of critical clinical

severity (27.3%) compared to females (17.3%). These findings are consistent with global literature suggesting biological and immunological differences between sexes may influence disease progression. However, contrary to expectations and prior studies, this research did not find a statistically significant relationship between age over 60 or comorbidity status and clinical severity. In fact, the highest proportion of critical and moderate severity was observed in the <60 years age group, with 35.8% classified as critical and 41.8% as moderate, indicating that younger individuals are not immune to severe disease progression. Additionally, patients without comorbidities showed a slightly higher rate of COVID-19 lung infection (56.1%) compared to those with comorbidities (44.8%), which may suggest that factors beyond comorbidity—such as viral load, genetic susceptibility, or delays in seeking treatment—could contribute to disease severity.

These findings highlight the complexity of COVID-19 progression and underscore the need for further research exploring other contributing factors such as inflammatory biomarkers, viral variants, and access to care. Future studies should utilize larger datasets, incorporate multivariate analysis, and consider longitudinal follow-ups to assess changes in clinical outcomes over time. Understanding these variables will be vital for refining risk stratification models and enhancing patient management strategies in future respiratory pandemics.

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