Risk Factor Associated Severity Disease and Hospitalized in COVID-19 Patients

Lisa Anggriani Susanto [a*#] and Dogi Gokma Asina Girsang [a#]

[a] *Naibonat Regional Hospital, Naibonat, East Nusa Tenggara, Indonesia.*

Authors' contributions

This work was carried out in collaboration between both authors. Both author made substantial contributions to conception and design, acquisition of data, analysis and interpretation of data; took part indrafting the article or revising it critically for important intellectual content, gave final approval of the vision to be published, and agree to be accountable for all aspects of the work. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Background: In December 2019, Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) occurred in Wuhan City of Hubei Province of China, a worldwide pandemic. To describe clinical characteristics and length of stay of COVID-19 patients.
Methodology: This was observational analytic using medical record data. Study participants were adults (age $\geq$ 18 years) with a positive results on real-time reverse transcription polymerase chain reaction (RT-PCR) for the presence of SARS-CoV-2. All confirmed cases of COVID-19 at Naibonat Regional General Hospital in East Nusa Tenggara, Indonesia between 2020 June and 2021 May were included the analysis. We excluded COVID-19 patients death were still hospitalized.
Results: In this study, a total of 38 participants are analyzed. we found that significant association statistically of length of stay patients (p value <0.05) are age (p=0.003), cough symptom (p=0.017).
Conclusion: In Conclusion, this study has shown that age and cough associated with length of stay.

Keywords: COVID-19; observational analytic; comorbid; risk factor.

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[#] *General Practitioner,*
Corresponding author: Email: anggriani.lisa25@gmail.com;

1. INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is rapidly spreading from its origin in Wuhan City of Hubei Province of China in late December 2019 [1]. Coronavirus disease 2019 (COVID-19), the highly contagious viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a catastrophic effect on the world's demographics resulting in more than 3.8 million deaths worldwide and an enormous burden on health authorities. On March 11, 2020, the World Health Organization (WHO) declares COVID-19 as a global pandemic [2]. The typical clinical features of COVID-19 are varied: respiratory symptoms (sore throat, cough, shortness of breath), fever, malaise, headache, muscle pain, nausea, vomiting, diarrhea, anosmia, or dysgeusia. In severe cases, infection causes pneumonia, acute respiratory failure, septic shock, multiple organ dysfunction, and death [3].

On November 22, 2021, the pandemic resulted in 256,966,237 confirmed cases, and the disease has spread rapidly throughout at least 2015 countries, including Indonesia. Indonesia reported 4,249,323 confirmed cases and 143,592 death-related COVID-19 on November 10, 2021 [4].

As the pandemic progressed, severe outcomes of COVID-19 have been implicated as a potential risk factor for severe COVID-19 illness (hospitalization) including, hypertension, diabetes, cardiovascular disease, chronic kidney disease, chronic respiratory disease, and obesity. Patient characteristics, specifically older age, and male sex, were associated with increased risk factors for severe COVID-19 illness [5].

This purpose of this study, we have discussed the risk factors, base on age, sex, comorbidities (hypertension, diabetes mellitus), fever, cough, anosmia, shortness of breath of COVID-19 patients affect the length of stay COVID-19 patients at Naibonat Regional General Hospital in Naibonat, East Nusa Tenggara.

2. METHODOLOGY

2.1 Study Population and Design

This was an observational analytic using medical record data. Study participants were adults (age > 18 years) with positive results on real-time reverse transcription-polymerase chain reaction (RT-PCR) for the presence of SARS-CoV-2. All confirmed cases of COVID-19 at Naibonat Regional General Hospital in East Nusa Tenggara, Indonesia, between 2020 June and 2021 May have included in the analysis. We excluded COVID-19 patients death were still hospitalized.

2.2 Data Collection

Data were collected from the COVID-19 patient medical record regarding SARS-CoV-2 PCR testing and outcomes (hospitalization) along with age, sex, symptoms, and comorbidities. Fever was defined as axillary temperature at least 38°C. In case patients were hospitalized, the start and end date of hospitalization were recorded together, and clinical outcomes data were collected.

2.3 Statistical Analysis

The data were collected and analyzed using Statistical Package for Social Sciences (SPSS). Statistics for windows version 25.0. The categorical variables sex, age, fever, cough, shortness of breath, anosmia, hypertension, diabetes mellitus, and length of stay were analyzed by bivariate chi-square test (*P- value <0.05*) and were considered statistically significant.

3. RESULTS

3.1 Characteristics of the Study Samples

This study aims to assess we have discussed the risk factors, based on age, sex, comorbidities (hypertension, diabetes mellitus), fever, cough, anosmia, shortness of breath of COVID-19 patients affect the length of stay COVID-19 patients at Naibonat Regional General Hospital in Naibonat, East Nusa Tenggara, in 2020 June and 2021 May. In this study, a total of 38 participants were analyzed. In Table 1, we found that 21 (55.3%) are male, 17 (44.7%) are female, 15 (39.5%) are age ≤ 45 years old, 23 (60.5%) are age > 45 years old. There are 11 (28.9%) participants being fever, 8 (21.1%) participants being cough, 15 (39.5%) participants being anosmia, 16 (42.1) participants being dyspnea. In 38 participants, there are 14 (36.8%) participants with hypertension and 6 (15.8%) participants with diabetes. The length of hospital

stay > 10 days 24 (49.0) participants and ≤ 10 days 25 (51.0) participants.

Table 1. Characteristic of the study samples

Characteristic patients	N (%)
Sex	
Male	21 (55.3)
Female	17 (44.7)
Age	
≤ 45	15 (39.5)
> 45	23 (60.5)
Fever	
Yes	11 (28.9)
No	27 (71.1)
Cough	
Yes	8 (21.1)
No	30 (78.9)
Anosmia	
Yes	15 (39.5)
No	23 (60.5)
Dyspnea	
Yes	16 (42.1)
No	22 (57.9)
Hypertension	
Yes	14 (36.8)
No	24 (63.2)
Diabetes	
Yes	6 (15.8)
No	32 (84.2)
Length of stay	
≤ 10	25 (51.0)
>10	24 (49.0)

In table 2, we found that significant association statistically of length of stay patients (p value <0.05) are age (p=0.003), cough symptom (p=0.017).

4. DISCUSSION

In this study, we discussed risk factors for a prolonged length of stays in patients hospitalized with COVID-19. In the previous studies we have reported from Chen J et al. the length of stay patients was 11 days after onset symptoms of the disease progressed into week two symptoms began to relieve in most of patients [6].

For the patient with the laboratory-confirmed COVID-19, we found many patients characteristic underlying medical conditions to be associated with the hospitalization. We found factors associated with hospitalization due to COVID-19 (sex, age, fever, cough, anosmia, dyspnea, hypertension, diabetes). In addition, we did not see significant association between hospitalization or other indicators of severe COVID-19, including sex [5].

Elderly patients with concurrent conditions have suffered due to their weak immunity as a result of infection with COVID-19, and previous studies have described advanced ages and pre-existing conditions as the factor of the severity COVID-19 [7]. In the present study, older age is associated with prolonged hospitalization and an increased risk of developing complications. Older age is a significant predictor of unfavorable outcomes (length of stay). Elderly patients may be a proxy for a deficiency to control the viral replication and less-robust immune responses, potentially leading to adverse clinical outcomes [8]. The age-dependent defects in T-cell and B-cell function and the excess production of type 2 cytokines could lead to deficiency in viral replication and prolonged proinflammatory responses, potentially leading to poor outcomes [9].

We found that fever has been used widely as an indicator for assessing disease severity in COVID-19; the study suggests patients who received having fever at the early stage of infection require longer hospitalization, with is in contrast with this studies [10].

One of the symptoms appeared was a cough, as it was reported from China, and the mean duration of symptoms before ICU admission was one week [11]. Cough mechanisms in viral respiratory infection and ARDS include inflammation, epithelial damage, mucus impaction, and neuro-modulatory changes (heightened cough reflex sensitivity)[12].

According to Shishi et al. hypertension is a risk factor for COVID-19 and unsatisfactory prognosis or length of stay. One explanation could be that the virus is binding to angiotensin-converting enzyme 2 (ACE2), thus affecting the ACE2 signaling pathways and leading to acute cardiac injury. Also, that critical systemic inflammatory response caused by the uncontrolled release of pro-inflammatory cytokines may affect the cardiovascular system as pro-inflammatory cytokines were among severe patients COVID-19, in contrast with data [10].

Table 2. Bivariate Analitic of the Length of Stay and Risk Factor

Variable	≤ 10 days		>10 days		Bivariate P value
	n	%	n	%	
Sex					
Male	10	26.3	11	28.9	0.327
Female	13	34.2	4	10.5	
Age					
≤ 45	9	23.7	6	15.8	0.003
> 45	14	36.9	9	23.7	
Fever					
Yes	6	15.8	5	13.2	0.232
No	17	44.7	10	26.3	
Cough					
Yes	5	13.1	3	7.9	0.017
No	18	47.4	12	31.6	
Anosmia					
Yes	7	18.4	8	21.0	1.993
No	16	42.1	7	18.4	
Dyspnea					
Yes	11	28.9	5	13.1	0.782
No	12	31.6	10	26.3	
Hypertension					
Yes	9	23.7	5	13.1	0.131
No	14	36.8	10	26.3	
Diabetes					
Yes	5	13.2	1	2.6	1.551
No	18	47.4	14	36.8	

5. CONCLUSION

In Conclusion, this study has shown that age and cough are associated with length of stay.

6. LIMITATIONS OF STUDY

The limitations of this study included its small sample size. Analysis was conducted at Naibonat Regional General Hospital in East Nusa Tenggara. Laboratory studies have limited.

ETHICAL APPROVAL

The study research was approved by the ethical committee of Naibonat Regional General Hospital in East Nusa Tenggara, Indonesia. We collect the data from the medical records at Naibonat Regional General Hospital, East Nusa Tenggara, Indonesia.

ACKNOWLEDGMENTS

We would like to thank the Director of Naibonat Regional General Hospital in East Nusa Tenggara, Indonesia, staff, and our colleagues who supported this study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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