

IR – PERPUSTAKAAN UNIVERSITAS AIRLANGGA

THESIS

**The Correlation between the Predictive Factors of COVID-19
and the Outcome of Intensive Care Unit Patients with COVID-19
at Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021**



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INTERNATIONAL CLASS OF MEDICAL PROGRAM

FACULTY OF MEDICINE

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Thesis

To fulfil the requirements for the undergraduate stage of the Medical Studies Program

Faculty of Medicine Universitas Airlangga

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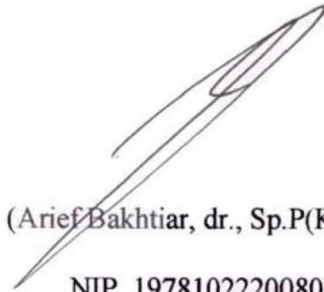
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APPROVAL SHEET

This research thesis has been approved for testing

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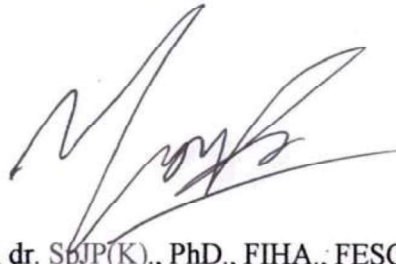
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**The Correlation between the Predictive Factors of COVID-19 and the Outcome
of Intensive Care Unit Patients with COVID-19 at Rumah Sakit Universitas
Airlangga, Surabaya from January to June 2021**

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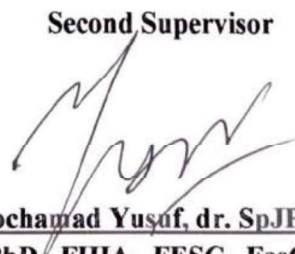
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STATEMENT OF ORIGINALITY

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NOTE OF GRATITUDE

Praise and gratitude I pray to God Almighty for all His graces so that the thesis entitled “The Correlation between the Predictive Factors of COVID-19 and the Outcome of Intensive Care Unit Patients with COVID-19 at Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021” can be finished properly. I would like to express my deepest gratitude and appreciation to my supervisor, Arief Bakhtiar, dr., Sp.P(K), FAPSR, and Mochamad Yusuf, dr. SpJP(K)., PhD., FIHA., FESC., FasCC. who has sacrificed their time and energy to guide me with attention, patience and sincerity since the first idea was created until the completion of this scientific paper. My deepest respect and gratitude goes to the honourable:

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The author realizes that the writing of this thesis still needs improvement, therefore the writer expects positive suggestions and criticisms from the readers. With this thesis, the writer hopes that it can provide benefits for all parties in need.

Surabaya, 01 September 2022



Vindy Vanessa Wennas

SUMMARY

Coronavirus disease (COVID-19) is a highly transmissible disease with a high number of positive and death cases that pose a significant problem to the world. Declared a global pandemic by WHO on March 15, 2020, COVID-19 led to a dramatic loss of human life. COVID-19 cases have been increasing gradually day by day. Indonesia was reported to place fourth among Asian countries with the greatest number of COVID-19 cases. One of the efforts in the health sector to reduce the number of deaths is through knowing the predicting factors of the outcome in COVID-19 patients.

Numerous studies about factors affecting COVID-19 outcomes have been conducted. No reports reported the same predictive factor that affects the outcome of COVID-19 patients. This situation puts clinicians in a dilemma as disease progression could not be predicted as soon as possible. In addition, no study analyzed the predictive factors for the outcome of COVID-19 patients in Indonesia. Hence, this research intends to analyze and find the main predictive factors associated with the outcome of intensive care unit (ICU) patients with COVID-19 at Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021.

This study is an analytical observational retrospective study using secondary data from non-electrical medical records of ICU patients diagnosed with COVID-19 at Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021. Total consecutive sampling was conducted from medical records of ICU patients with a confirmed COVID-19 infection from a positive RT-PCR result from January to June 2021. The medical records obtained were selected by meeting the inclusion and exclusion criteria. A total of 116 samples were obtained. This research analyzed: patient's demographic, lifestyle, symptoms presented during hospital admission, co-morbidities, laboratory results, nutritional status, IMPROVE-DD RAM for VTE, length

of ICU stay, and the virus strain with mortality. The research has obtained ethical clearance and approval from the committee of ethics of Rumah Sakit Universitas Airlangga and has implemented the ethical principles. The data were analyzed in several ways. The univariate analysis was conducted to obtain general characteristics of the research. The chi-square test was done to determine the relationship between possible factors that affect mortality and the outcome of ICU patients with COVID-19. The logistic regression test was done to determine the magnitude of risk. All data were collected using Microsoft Excel 2016 software and analyzed using IBM SPSS Statistics Version 26 with a significance value of $p < 0.05$.

The results showed a statistically significant association between the length of ICU stay, random blood glucose (RBG), hypoxia, fever, dyspnea with mortality. The univariate logistic regression reported dyspnea (Odds Ratio (OR): 4.187), hypoxia (OR: 3.111), RBG (OR: 2.816), fever (OR: 2.393), fatigue (OR: 0.435), length of ICU stay (OR: 0.294), and anosmia (OR: 0.192) towards the likelihood of mortality. To determine the variable that has the most significant role in increasing the likelihood of mortality of ICU patients with COVID-19, the multivariate logistic regression is conducted from variables with a p-value of < 0.25 from the univariate logistic regression. The multivariate logistic regression found the RBG was the main predictive factor that affects the mortality of ICU patients with COVID-19 at Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021 (adjusted OR: 7.531; p-value: 0.001).

Based on the study's results, it was found that the predictive factors affecting the mortality of COVID-19 patients admitted to the ICU include dyspnea, hypoxia, increase of RBG, fever, fatigue, length of ICU stay of more than 7 days, and anosmia. We suggest clinicians to make use of the four predictive factors that increase the likelihood of mortality as warning signs in a clinical setting namely: dyspnea, hypoxia,

the increase of RBG, and fever. In addition, the main predictive factor of mortality in COVID-19 patients admitted to the ICU is an increase in RBG, in which mortality is 7.531 times more likely to occur. Hence, we suggest to tightly and regularly monitoring the blood glucose of COVID-19 patients.

ABSTRACT

Background: Coronavirus disease (COVID-19) is a highly transmissible disease with a high number of positive and death cases that pose a significant problem to the world. Previous studies have mentioned numerous factors that affect the outcome of COVID-19 patients. Hence, an aim to reduce the number of deaths is to know the predictive factors of the outcome of COVID-19 patients.

Method: This study is an analytical observational retrospective study conducted using data from COVID-19 patients in the ICU of Rumah Sakit Universitas Airlangga, Surabaya from January to June 2021. This research analyzed data: patient's demographic, lifestyle, symptoms presented during hospital admission, co-morbidities, laboratory results, nutritional status, IMPROVE-DD RAM for VTE, length of ICU stay, and the virus strain with mortality.

Result: The study found a statistically significant association between the length of ICU stay, random blood glucose (RBG), hypoxia, fever, and dyspnea with mortality. Univariate logistic regression reported dyspnea (OR: 4.187), hypoxia (OR: 3.111), RBG (OR: 2.816), fever (OR: 2.393), fatigue (OR: 0.435), length of ICU stay (OR: 0.294), and anosmia (OR:0.192) towards the likelihood of mortality. Multivariate logistic regression found increasing RBG as the main predictive factor that affects mortality (adjusted OR: 7.531; p-value: 0.001).

Conclusion: The predictive factors that affect the mortality of patients include dyspnea, hypoxia, RBG, fever, fatigue, length of ICU stay, and anosmia. In addition, the main predictive factor of mortality is an increase of RBG, in which mortality is 7.5 times more likely to occur.

Keywords: COVID-19 patients in the ICU, predictive factor, mortality

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ABBREVIATIONS

ACE2	: Angiotensin-Converting Enzyme 2
ALT	: Alanine Aminotransferase
APTT	: Activated Partial Thromboplastin Time
ARDS	: Acute Respiratory Distress Syndrome
AST	: Aspartate Aminotransferase
BMI	: Body Mass Index
CAD	: Coronary Artery Disease
cDNA	: Complementary Deoxyribonucleic Acid
CI	: Confidence Interval
CKD	: Chronic Kidney Disease
COPD	: Chronic Obstructive Pulmonary Disease
COVID-19	: Corona Virus Disease 19
CRP	: C-reactive Protein
CT	: Computed Tomography
CVD	: Cardiovascular Disease
DNA	: Deoxyribonucleic Acid
eGFR	: Estimated Glomerular Filtration Rate
G-CSF	: Granulocyte-Colony Stimulating Factor
GGO	: Ground-Glass Opacities
ICU	: Intensive Care Unit
IMPROVE-DD	: International Medical Prevention Registry on Venous Thromboembolism and D-Dimer
IP-10	: Interferon Gamma-Induced Protein 10
LDH	: Lactate Dehydrogenase

LFT	: Liver Function Test
MCP-1	: Monocyte Chemoattractant Protein-1
MERS-CoV	: Middle East Respiratory Syndrome Coronavirus
MIP-1	: Macrophage Inflammatory Protein-1
NAAT	: Nucleic Acid Amplification Tests
NPS	: Nasopharyngeal Swab
NSTEMI	: Non-ST Segment Elevation Myocardial Infarction
NTD	: N-Terminal Domain
OPS	: Oropharyngeal Swab
OR	: Odds Ratio
ORFs	: Open Reading Frames
PLR	: Platelet to Lymphocyte Ratio
PPE	: Personal Protective Equipment
PT	: Prothrombin Time
RAM	: Risk Assessment Model
RBD	: Receptor Binding Domain
RBG	: Resting Blood Glucose
RDTs	: Rapid Diagnostic Test
RFT	: Renal Function Test
rRT-PCR	: Real Time Reverse Transcription Polymerase Chain Reaction
RT-PCR	: Real time Polymerase Chain Reaction
SARS-CoV	: Severe Acute Respiratory Syndrome
SARS-CoV-2	: Severe Acute Respiratory Syndrome Coronavirus 2
SARSr-CoV	: Severe Acute Respiratory Syndrome-related Coronavirus
SGOT	: Serum Glutamic Oxaloacetic Transaminase

SGPT	: Serum Glutamic Pyruvic Transaminase
SpO2	: Oxygen Saturation
ss-RNA	: Single-Stranded Ribonucleic Acid
STEMI	: ST-Segment Elevation Myocardial Infarction
TMPRSS2	: Transmembrane Protease Serine 2
TNF-a	: Tumour Necrosis Factor Alpha
VAP	: Ventilator-Associated Pneumonia
VTE	: Venous Thromboembolism
WHO	: World Health Organization