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PREDICTORS OF LENGTH OF CARE FOR COVID-19 PATIENTS BASED ON PATIENT CHARACTERISTICS AT THE NORTH ACEH CUT MUTIA HOSPITAL IN 2020-2021

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ABSTRACT

According to the data released by the Indonesian Ministry of Health on November 22, 2021, Indonesia has confirmed that COVID-19 cases have reached 4,253,598 cases and 143,744 deaths, occupying the first position in the highest cases among countries in ASEAN region. One of the areas confirmed by COVID-19 is Aceh. The purpose of this study was to find out predictors of the length of care for covid-19 patients based on the characteristics of COVID-19 patients at Cut Mutia Hospital, North Aceh. This type of research is cross-sectional with secondary data. The population was all patients treated for COVID-19, both recovered and died in the COVID-19 treatment room at Cut Mutia Hospital, North Aceh, in 2020-2021, totaling 467 people with a sampling technique using proportions with a total of 200 respondents. The data used were secondary data. The data were analyzed using bivariate and multivariate approaches. The research found that there were no mean differences of length of stay between Covid-19 patients with low and higher education (p value= 0.39), with clinical symptoms and without clinical symptoms (p value= 0.686), with comorbidities and without comorbidities (p value = 0.006), female and male (p value= 0.038). The results obtained that the predicting variables of length of stay of the Covid-19 patients at Cut Meutia Hospital, North Aceh in 2020-2021, were gender (p value= 0.038, p< 0.05) and comorbidities (p value= 0.006, p< 0.05). It is suggested that Cut Mutia Hospital could conduct more intensive counseling and health promotion to achieve shorter length of care.

Keywords: *Age, gender, education, symptoms, comorbidities, and length of stay*

BACKGROUND

COVID-19 is currently a serious world problem with the number of cases increasing every day, attacking everyone regardless of age or gender and has been categorized as a global pandemic. COVID-19 is a type of a new virus so that many parties do not know and do not understand how to deal with the virus. The symptoms caused by COVID-19 are almost similar to flu in general. Currently, the spread of SARS-CoV-2 from human to human became the main source of transmission so that the spread became more aggressive (Ministry of Health, 2021).

Corona Virus Desease 2019 (COVID-19) was first reported in Wuhan, Hubei Province, China and then spread to other regions of China and 37 countries, including the United States, Japan, Australia and

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France. SARSCoV-2, identified as a viral pathogen coronavirus disease 2019 (COVID-19) in January 2020 (1). On January 30, 2020, the World Health Organization (WHO) has declared it as Public Health Emergency of International Concern (KKMMD/PHEIC). The increase in the number of COVID-19 cases is happening quite quickly and has spread between countries. On March 12, 2020, WHO declared COVID-19 a pandemic (World Health Organization 2020).

COVID-19 is a disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV-2). According to Li et al. (2020), SARS-CoV-2 has more than 85% homology with coronaviruses such as bat SARS (bat-SL-COVZC45). By WHO, this disease was later renamed to Severe Respiratory Corona Virus 2 (SARS-CoV-2) and the disease is referred to as Corona Virus Disease 2019 (COVID-19) (Ami Fini, 2021).

Several countries in the world such as Japan, China, and the United States have reported a second surge. The first recorded case of COVID-19 was in Wuhan Province, China in December 2019 which has infected more than 12 million people in China worldwide and caused more than half a million people to die. Southeast Asia accounts for more than 1 million cases with over 28,000 deaths. This places enormous health, social and economic pressures on the whole world (Minuljo et al. 2020).

As of November 22, 2021, more than 133 countries have been exposed to COVID-19, bringing the total number of COVID-19 cases worldwide to 257,079,463 cases and 5,152,382 deaths or 5.3% worldwide due to COVID-19. By geography, the incidence of cases COVID-19 in America was in the 10 countries with the highest confirmed cases, reaching 47.4 million cases; in Europe with 11.5 million, then in Southeast Asia with 9.3 million, followed by the East Mediterranean region with 3.1 million, Africa with 1.3 million, and the Western Pacific region as many as 774 thousand cases and the overall number of deaths worldwide has reached 1,204,208. Meanwhile, in Southeast Asia, there were 4,689,943 confirmed cases, 83,400 cases died with a percentage of 1.8%. Indonesia alone has 194,109 confirmed cases, 8,025 cases died with a percentage of 4.1% and 138,575 (71.4%) cases recovered (Ministry of Health of the Republic of Indonesia 2021). Based on the data from the COVID-19 Task Force on November 26, 2021, it was confirmed that Indonesia ranked 23rd with the highest number of COVID-19 cases in the world (Minuljo et al. 2020).

According to the data released by the Indonesian Ministry of Health on November 22, 2021, Indonesia has confirmed that COVID-19 cases have reached 4,253,598 cases and 143,744 deaths, occupying the first position in the highest cases in Asean countries. This virus has also very spread throughout Indonesia. One of the areas confirmed by COVID-19 is Aceh. (Ministry of Health of the Republic of Indonesia 2021).

Based on the COVID-19 Monitoring Data from the Aceh Province, it was confirmed that on March 5, 2022, it was confirmed that it had reached 105,987 cases and 2,889 deaths and 4,449 recovered cases, where North Aceh was the region with the largest distribution of cases; number 8 out of 15. Districts in Aceh are 1,144 confirmed cases, 952 recovered cases, 82 people in treatment and 104 deaths (Almanzani, Rahman, & Rassanjani, 2022).

Cut Meutia Hospital in North Aceh is one of the referral centers for COVID-19 treatment in Aceh Province. The total

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number of COVID-19 patients who had been treated at the Cut Meutia Hospital since the corona virus fever pandemic took place reached 598 patients. Of the total number of patients, 80 percent or 479 patients were declared cured and 119 were died. (Aceh Health Office, 2020).

It is known that Cut Meutia Hospital in North Aceh is a health service institution which provides COVID-19 isolation rooms. The length of treatment for COVID-19 is varied, 7 days, 10 days and up to 14 days. Therefore, it is necessary to conduct a study to identify the predictors of the length of stay of COVID-19 patients at the Cut Meutia Hospital, North Aceh.

RESEARCH METHOD

This study was an analytic study using a cross-sectional design. Cross-sectional design is a study that studies the correlation between exposure or risk factors (independent) and effects (dependent), with customary collection carried out simultaneously at the same time between risk factors and their effects (point time approach). In other words, all variables, both independent and dependent variables, are observed at the same time (Masturoh & Nauri 2018). The data used in the study were from the medical records of Covid-19 patients at Cut Meutia Hospital, North Aceh. The population in the present study was all Covid-19 patients who received treatment at Cut Meutia Hospital, North Aceh, including those who had been declared cured and dead, totaling 467 people. The number of samples was calculated using Lemeshow formula, resulting in the selection of 200 patients as the research samples. The data, then, were analyzed by performing univariate and bivariate analyses. Univariate analysis was performed to determine frequency distribution of independent and dependent variables, while bivariate analysis was to analyze whether or not there is correlation between independent and dependent variables.

RESULTS

Results of Univariate Analyses

Table 1. Frequency Distribution of Length of Hospitalization for COVID-19 Patients by Age of Patients at Cut Meutia Hospital, North Aceh in 2022 (n=200)

Variable	N	Mean	Std. Deviasion	Std. Error Mean
Age	200	41.49	18.683	1.321

Data in Table 1 shows the average age of Covid-19 confirmed patients at Cut Meutia Hospital, North Aceh. From the table, it can be seen that in average, the patients were 41.49 years of age.

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Table 2. Frequency Distribution of Length of Hospitalization for COVID-19 Patients by Gender of Patients at the Cut Mutia Hospital, North Aceh in 2022 (n=200)

Gender	N	Mean	Std. Deviasion	Std. Error Mean
Woman	97	6.89	4.514	0.458
Man	103	8.28	4.942	0.487

Based on the data in Table 2, it can be seen that there were 97 female patients with an average length of stay of 6.89 days. On the other hand, the length of stay of male COVID-19 patients was 103 people with an average length of stay of 8.28 days.

Table 3. Frequency Distribution of Length of Hospitalization for COVID-19 Patients by Patient Education at Cut Meutia Hospital, North Aceh in 2022 (n=200)

Education	N	Mean	Std. Deviasion	Std. Error Mean
Higher Educatoin	184	7.71	4.840	0.357
Low Education	16	6.44	3.949	0.987

Data in Table 3 shows the length of stay of Covid-19 patients at Cut Meutia Hospital based on the education background. It can be seen that 184 people had low education with an average length of stay of 7.71 days. While the number of Covid-19 patients with higher education is 16, and the average length of stay is 6.44 days.

Table 4. Frequency Distribution of Length of Hospitalization for COVID-19 Patients by Clinical Symptoms Upon Admission at Cut Meutia Hospital, North Aceh in 2022 (n=200)

Clinical symptoms upon admission	N	Mean	Std. Deviasion	Std. Error Mean
with clinical symptoms	115	7.49	4.637	0.432

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Without clinical symptoms	85	7.76	4.987	0.541

Data in Table 4 shows that there were 115 patients with clinical symptoms upon the admission at Cut Meutia Hospital with an average length of stay of 7.49 days. Meanwhile, the length of stay for COVID-19 patients without clinical symptoms as many as 85 people with an average length of stay of 7.76 days.

Table 5. Frequency Distribution of Length of Hospitalization for COVID-19 Patients by Comorbid Disease of Patients at Cut Meutia Hospital, North Aceh in 2022 (n=200)

Comorbid Disease	N	Mean	Std. Deviasion	Std. Error Mean
with comorbid disease	123	8.34	4.940	0.445
without comorbid disease	77	6.43	4.281	0.488

Based on the data in Table 5, it can be seen that there were 123 comorbidities with an average length of stay of 8.34 days. Meanwhile, the length of stay for COVID-19 patients with no comorbidities was 77 people with an average length of stay of 6.43 days.

Results of Bivariate Analysis

Table 6. Mean Significance of Age to the Length of Care for COVID-19 Patients at Cut Meutia Hospital, North Aceh in 2020-2021 (n=200)

Varible		Age
Length of Patient Hospitalized	R	0,135
	p.value	0,57
	N	200

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According to the results of the statistical test, the p value = 0.57, which is greater than 0.05. It indicates that there is no relationship between age and length of stay of COVID-19 patients at the Cut Meutia Hospital, North Aceh in 2020-2021.

Table 7. Mean Difference of Length of Stay between Female and Male Covid-19 Patients at Cut Meutia Hospital, North Aceh in 2020-2021 (n=200)

	Gender	**Mean**	**SD**	**SE**	***P Value***
Length of Patient Hospitalized	Female	6.89	4.514	0.458	0,038
	Male	8.28	4.942	0.487	

According to the results of statistical tests, p value = 0.038 was obtained. This value is greater than 0.05, indicating that there was a difference in the average length of stay based on gender. Male patients were hospitalized one day longer than female patients.

Table 8. Mean Difference of Length of Stay between Covid-19 Patients with Low and Higher Education at Cut Meutia Hospital, North Aceh in 2020-2021 (n=200)

	Education	**Mean**	**SD**	**SE**	***P Value***
Length of Patient Hospitalized	Low Education	7.71	4.840	.357	0,39
	Higher Education	6.44	3.949	.987	

According to the results of statistical tests obtained p value = 0.39, which is greater than 0.05. This value indicates that there is no difference in the average length of stay based on education. Even though patients with low education are hospitalized for one day longer than patients with higher education, the statistical analysis shows that the difference was not significant.

Table 9. Mean Difference of Length of Stay between Covid-19 Patients with Clinical Symptoms and Without Clinical Symptoms upon Admission at Cut Meutia Hospital, North Aceh in 2020-2021 (n=200)

	Clinical Symptoms upon Admission	**Mean**	**SD**	**SE**	***P Value***
Clinical	With clinical symptoms	7.49	4.637	0.432	0,686

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Symptoms upon Admission	Without clinical symptoms	7.76	4.987	0.541	

According to the results of statistical tests, the p value = 0.686. This value is greater than the negligible 0.05 which indicates that there is no difference in the average length of stay based on the patient's clinical symptoms when admitted to the hospital. Despite the fact that the patients without clinical symptoms upon the admission to the hospital stayed one day longer in hospital compared to the patients who had complaints, yet the difference was found not significant.

Table 10. Mean Difference of Length of Stay between Covid-19 Patients with and without Comorbid Disease at Cut Meutia Hospital, North Aceh in 2020-2021 (n=200)

	Comorbid Disease	**Mean**	**SD**	**SE**	***P Value***
Length of Patient Hospitalized	With comorbid disease	8.34	4.940	0.445	0,006
	Without comorbid disease	6.43	4.281	0.488	

According to the results of statistical tests, the value of p = 0.006 is obtained, which is greater than the alpha 0.05. This value indicates that there is a significant difference in the average of length of stay based on comorbid disease. Patients with co-morbidities were hospitalized two days longer than their counterparts.

Results of Multivariate Analysis

Table 11. Predictors of Length of Stay of Covid-19 Patients Based on Characteristics of Covid-19 Patients at Cut Mutia Hospital, North Aceh in 2020-2021 (n=200)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std Eror			
Constanta	7.969	2.345	-	3.398	0.001
Age patient	0.019	0.018	0.073	1.022	0.308
Gender	1.626	0.667	0.170	2.439	0.016
Education	-1.699	1.219	-0.097	-1.394	0.165
Clinical Symptoms upon Admission	0.719	0.672	0.075	1.070	0.286
Comorbid disease	-2.020	0.703	-0.206	-2.871	0.005

- The gender variable has a sig value (p value) of 0.016 and a comorbid disease of 0.005 (<0.05).

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- The patient's age variable has a sig value (p value) of 0.308 and patient education of 0.165 and patient complaints at first arrival of 0.286 (> 0.05)

DISCUSSION

Predictors of Length of Care of Covid-19 Patients at Cut Meutia Hospital, North Aceh

Based on the results obtained in the study, it was found that among the five variables (age, gender, education, clinical symptoms, and comorbidities) of Covid-19 patients, comorbidities and gender were the predictors of length of care for Covid-19 patients at Cut Meutia Hospital, North Aceh. The other variables (age, education, and clinical symptoms) were not associated with the length of stay of the Covid-10 patients at Cut Meutia Hospital, despite the means difference they obtained.

The results of this study are in line with the results of Shiddiq's study in 2020 studying the relationship of length of hospitalization with age and comorbidity of COVID-19 Patients at Semen Padang Hospital from March to July 2020. There were 6 patients in the age group 0-18 years (10%), 38 patients in the age group 19-59 years (63.3 %), and 16 patients in the age group 60 years (26.7 %). Based on bivariate analysis, p = 0.009 (p = 0.05). There were 17 patients with comorbidities (28.3%) and 43 patients without comorbidities (71.7%). The results obtained p= 0.013 (p = 0.05) (Shiddiq et al., 2022).

Francesca et al. (2020) studied the early predictors of clinical outcomes of COVID-19 outbreak in Milan, Italy. Of the 500 patients admitted to the Emergency Unit, 410 patients were hospitalized and analyzed. The median age was 65 (IQR 56–75) years, and the majority of patients were male (72.9%). Median (IQR) days from COVID-19 symptoms onset was 8 (5–11) days. Upon the hospital admission, fever (≥ 37.5 °C) was present in 67.5% of patients. Median oxygen saturation (SpO2) was 93% (range 60–99), with median PaO2/FiO2 ratio, 267 (IQR 184–314). Median Radiographic Assessment of Lung Edema (RALE) score was 9 (IQR 4–16). More than half of the patients (56.3%) had comorbidities, with hypertension, coronary heart disease, diabetes and chronic kidney failure being the most common. The probability of overall survival at day 28 was 66%. Multivariable analysis showed older age, coronary artery disease, cancer, low lymphocyte count and high RALE score as factors independently associated with an increased risk of mortality.

Another research by Vekaria et al. (2021) studying the hospital length of stay for COVID-19 patients. Data-driven methods for forward planning. All methods produced similar overall estimates of LoS for overall hospital stay, given a patient is not admitted to ICU (8.4, 9.1 and 8.0 days for AFT, TC and MS, respectively). Estimates differ more significantly between the local and national level when considering ICU. National estimates for ICU LoS from AFT and TC were 12.4 and 13.4 days, whereas in local data the MS method produced estimates of 18.9 days.

Astia et al. (2021) reports that older patients, particularly those age 65 years onwards with comorbidities are likely to have higher risks admitted to the Intensive Care Unit (ICU) and of mortality rate compared to their counterparts. Furthermore, Patients with chronic disease may

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experience more severe symptoms of COVID-19. Patients with comorbidities may also have more severe symptoms and an increased mortality rate when compared to patients without comorbidities. Research in Fangcang found that patients who have a fever before entering the hospital have a longer stay compared to patients who do not have a fever. In the study, it was found that bilateral diabetes and pneumonia from CT scan results led to a longer stay (Astia 2021, Jamini, 2021).

COVID-19 patients with comorbidities may have a worse outcome in the course of the disease than patients without comorbidities. Some literature shows that patients with a history of diseases such as diabetes mellitus (DM), obesity, hypertension, cardiovascular disease, and chronic respiratory disease are strongly associated with adverse outcomes such as ARDS and pneumonia or even death (Alkautsar, 2021, Cahyaningsih, 2021).

Among the 5 variables related to the length of stay of COVID-19 patients, namely the presence of comorbidities at the Cut Meutia Hospital, North Aceh, where comorbidities are the most severe variables associated with the length of stay of COVID-19 patients, this is because patients with comorbidities require intensive care so that it takes a long time in the treatment period. Patients with comorbidities have more severe symptoms and an increased mortality rate when compared to patients without comorbidities.

CONCLUSION

The research found that there were no mean differences of length of stay between Covid-19 patients with low education (mean = 7.71) and higher education (mean= 6.44) where p value= 0.39, with clinical symptoms (mean= 7.49) and without clinical symptoms (mean= 7.76) where p value= 0.686, with comorbidities (mean= 8.34) and without comorbidities (mean= 6.43) where p value = 0.006, female (mean= 6.89) and male (mean= 8.28) where p value= 0.038. The results of this study also found that predicting variables of length of stay of the Covid-19 patients at Cut Meutia Hospital, North Aceh in 2020-2021, were gender (p value= 0.038, p< 0.05) and comorbidities (p value= 0.006, p< 0.05). Therefore, this study suggests the management and health officers of Cut Meutia Hospital in North Aceh should improve their services and organize more comprehensive health promotions to patients, so that the length of stay of Covid-19 patients will be shorter.

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