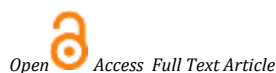


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Research Article

Factors Affecting Covid-19 Infection in Clinical Students at the Indonesian Christian University in 2022

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Abstract

COVID-19 or Coronavirus Disease is an acute respiratory disease caused by a new RNA virus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). This virus is rapidly spreading around the world. There are several risk factors for COVID-19 infection. This study aims to determine the factors that influence the incidence of COVID-19 in UKI Medical Faculty clinical students in 2022. The research design was a cross-sectional analytic using primary data by google form questionnaire involving 164 samples of clinical students FK UKI analyzed by univariate and bivariate. The results of this research were five people (3.1%) infected with COVID-19 2 times, 95 people (57.9%) clinical students FK UKI who had been exposed to COVID-19. There was a relationship between the use of masks ($p=0.008$), washing hands ($p=0.000$), keeping a distance ($p=0.014$), avoiding crowds ($p=0.005$), mobility limitations ($p=0.002$), and contact with COVID-19 patients ($p=0.010$). However, there was no relationship between gender ($p=0.393$), smoking ($p=0.581$), complete vaccination ($p=0.136$), and comorbid disease ($p=0.641$) on the incidence of COVID-19 in clinical students FK UKI in 2022. The conclusion is that the implementation of the 5M protocol (Using masks, washing hands, Keeping a distance, Avoiding crowds, and Mobility limitations) and contact with COVID-19 patients proved to affect the incidence of COVID-19 in FK UKI clinic students in 2022.

Keywords: Gender, wearing a mask, washing hands, keeping a distance, avoiding restrictions, limiting mobility, contact with patients, vaccination, smoking, comorbidities, COVID-19.

INTRODUCTION

COVID-19, or Coronavirus Disease 19, is an acute respiratory disease caused by a new RNA virus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) ^{1; 2; 3}. This disease was first discovered in December 2019 in Wuhan, China. On 11 March 2020, COVID-19 was declared a pandemic by the World Health Organization (WHO). COVID-19 is still a problem today, not only in the health sector but also in the economy and education ^{4; 5}. In general, the percentage of reported cases of COVID-19 infection by WHO as of 27 February 2022 in America is 44% with a mortality percentage of 48%, in Southeast Asia, it is 12% with a mortality percentage of 8%, while in Indonesia it is 2.06% with a percentage of 2.6% mortality. As of 08 March 2022, the number of cases of COVID-19 infection in DKI Jakarta was 21.1% ^{6; 7}.

The incidence of COVID-19 is influenced by several factors, namely comorbid diseases such as hypertension and Diabetes Mellitus, demographic factors such as gender and age, and lifestyles such as smoking and the implementation of the 5M health protocol. According to Wang et al. (2020), the percentage of men infected with COVID-19 is 28%, while women are 6%. In addition, the percentage of people aged 60 years who are infected with COVID-19 is 16%. Although this age group was not the most infected, people aged 60 were ranked first in mortality by 43.6% ^{8; 9}. People with a history of hypertension have a 3.3 times greater risk of getting COVID 19

than patients who do not suffer from hypertension ^{10; 11}. People with diabetes mellitus have a 1.31 times risk of developing COVID-19 than those without diabetes mellitus. According to data from the Task Force for the Acceleration of Handling COVID-19, the percentage of COVID-19 cases in patients with hypertension and Diabetes Mellitus was 52.4% and 33.6%, respectively ^{12; 13}.

Smoking may contribute to COVID-19 infection due to increased expression of the ACE2 gene in smokers, but how exactly this matches the initiation or progression of COVID-19 in smokers has not been demonstrated ¹⁴. Other literature says that smoking is not directly correlated with COVID-19 infection but increases the risk of a poor prognosis for people with COVID-19 ¹⁵. One of the preventive steps that the Indonesian government has taken to overcome the spread of COVID-19 cases is by socializing the 5M health protocol, namely wearing masks, maintaining distance, washing hands, avoiding crowds, and reducing mobility ¹⁶. Vaccination can provide immunity for the human body against the SARS-CoV-2 virus. Natural immunity diminishes after one year in the unvaccinated population but remains consistently higher than 90% in those subsequently vaccinated, even in persons infected more than 18 months earlier ¹⁷.

Health workers are at the forefront when the spread of COVID-19 is high. International studies estimate that healthcare workers are at a higher risk of reporting COVID-19 events than people living in the general population, adjusting for the

likelihood of receiving tests and consistent re-exposure in healthcare workers' work environments such as hospitals or clinics. Lack of personal protective equipment, exposure to infected patients, poor infection control, and pre-existing medical conditions were identified as risk factors for Covid-19 among healthcare workers^{18; 19}. With the exposure of FK UKI clinic students to COVID-19, the student's academic activities can be hampered due to limited mobility and activities that can be carried out. It can cause losses because it can hinder the clerk's activities and increase the cost of the clerk if the student finally has to take a temporary leave.

Based on the author's explanation above, the author is interested in researching the factors that influence COVID-19 infection in clinical students at the Indonesian Christian University in 2022.

RESEARCH METHOD

The research design used was a cross-sectional analytic study, with the independent variables being gender, 5M behavior, contact with COVID-19 patients, vaccination, smoking, and comorbid diseases conducted using a questionnaire distributed online to students of the UKI Medical Faculty clinic. This research was conducted at the Indonesian Christian University Hospital from 28 February - to 02 April 2022. The population in this study was all 277 clinical students of the Faculty of Medicine, Christian University of Indonesia. The sample in this study was 164 clinical students of the Faculty of Medicine, Christian University of Indonesia, which was

determined by the Slovin formula. Sampling using a simple random sampling technique. Samples were taken based on the criteria defined by the researcher. The inclusion criteria for this study were clinical students of the Faculty of Medicine, the Christian University of Indonesia, who were active and willing to be respondents. The exclusion criteria for this study were clinical students of the Faculty of Medicine, the Christian University of Indonesia who did not fill out the questionnaire completely, clinical students of the Faculty of Medicine, the Christian University of Indonesia who were on leave, and clinical students of the Faculty of Medicine, the Christian University of Indonesia who filled out the questionnaire more than once (double data). The independent variables of this study were gender, 5M behavior, contact with COVID-19 patients, vaccination, smoking, and comorbid disease.

RESULT AND DISCUSSION

Table 1 shows the characteristics of the respondents in this study. Most of the respondents in this study were 16-25 years old, 154 clinical students (93.9%) were male, and 108 clinical students were female (65.9%). In this study, 95 clinical students had experienced COVID-19 infection (57.9%) for respondents who smoked and 21 clinical students (12.8%). Table 2 shows the characteristics of the respondents in this study. Most of the respondents in this study were 16-25 years old, 154 clinical students (93.9%) were male, and 108 clinical students were female (65.9%). In this study, 95 clinical students had experienced COVID-19 infection (57.9%).

Table 1: Characteristics of Respondents

Characteristics	Frequency	%
Age		
16-25 Years	154	93.9
26-35 years old	10	6.1
Gender		
Woman	108	65.9
Man	56	34.1
COVID-19 infection		
Have you ever had a COVID-19 infection?	95	57.9
Never had a COVID-19 infection	69	42.1
Repeated Covid-19 Infections		
Never Infected	95	57.9
1 Time Infected	64	39.0
2 Times Infected	5	3.1

Table 2: Distribution of COVID-19 Incidence in UKI Medical Faculty Clinic Students in 2022 by Age

Variable (Age)	Never Experienced COVID-19		Have Experienced COVID-19		Total	
	n	%	n	%	n	%
17 - 25 Years	87	56.5%	67	43.5%	154	100%
26 - 35 Years	8	80%	2	20%	10	100%

Table 3: The Relationship between Gender and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Gender)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Man	21	37.5	35	62.5	56	100	0.393	0.750	0,39 - 1,45
Woman	48	44.4	60	55.6	108	100			

Table 3 above shows that most of the UKI Medical Faculty clinic students infected with Covid-19 were female, where there were 60 people (55.6%) who had never been infected with Covid-19 and 48 people (44.4%) had been infected. Covid-19. The table above shows that the statistical analysis results obtained are $P_{\text{Value}} > 0.05$ for gender. These results show that H_0 is accepted and H_a is rejected, so the gender variable does not have a significant relationship with the incidence of Covid-19 in clinical students at the Indonesian Christian University. Although there is no relationship, the OR results show 0.75, which means that the male sex is a protective factor against COVID 19.

Table 4: The Relationship between the Use of Masks and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Using Mask)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Always Use Mask	88	62.0	54	38.0	142	100	0.008	3.942	1,34 - 9,11
Don't Always Use a Mask	7	31.8	15	68.2	22	100			

Table 4 above shows that the number of clinical students who do not always use masks is more significant in the UKI FK clinic students infected with COVID-19, namely 15 people (68.5%) of a total of 21 students who do not always use masks. The table above shows that the statistical analysis results obtained are $P_{\text{Value}} < 0.05$ for the use of masks. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable use of masks had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who does not always wear a mask has a 3.94 times greater risk of being infected with COVID-19 than someone who wears a mask.

Table 5: The Relationship between Handwashing and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Wasing hands)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Always wash your hands	45	34.9	84	65.1	129	100	0.000	4.073	1,83 - 9,07
Not Always Washing Hands	24	68.6	11	31.4	35	100			

Table 5 above shows that 45 clinical students (34.9%) who constantly wash their hands have been infected with Covid-19. Thirty-five students did not wash their hands, with 24 people (68.6%) whose members had been infected with Covid-19 and 11 people who had never been infected with Covid-19. In other words, the highest number of clinic students who always washed their hands never experienced COVID-19 infection, while the highest number of clinic students who did not always pass their hands had COVID-19 disease. The table above shows that the statistical analysis results obtained are $P_{\text{Value}} < 0.05$ for hand washing. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable hand washing had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who does not always wash their hands has a 4.07 times greater risk of being infected with COVID-19 than someone who washes their hands.

Table 6: The Relationship between Keeping Distance and the Incidence of COVID-19 in Clinical Students in 2022

Variable (social distancing)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Always Keep Your Distance	23	31.5	50	68.5	73	100	0.014	2.222	1,17 - 4,23
Don't Always Keep Your Distance	46	50.5	45	49.5	91	100			

Table 6 above shows that most clinical students who always keep their distance, 50 (68.5%) are students who have never been infected with Covid-19, and 23 people (31.5%) have been infected with Covid-19. The table above shows that the statistical analysis results are $P_{\text{Value}} < 0.05$ to maintain distance. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable of social distancing had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who does not always keep their distance has a 2.22 times greater risk of being infected with COVID-19 than someone who keeps his distance.

Table 7: The Relationship between Avoiding Crowds and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Avoiding crowds)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Always Avoiding Crowds	33	33.3	66	66.7	99	100	0.005	2.483	1,31 - 4,72
Doesn't Always Avoid Crowds	36	55.4	29	44.6	65	100			

Table 7 above shows that for most clinical students who always avoid crowds, 66 people (66.7%) have never been infected with Covid-19, and 33 people (33.3%) have been infected with Covid-19. The table above shows that the statistical analysis results are $P_{\text{Value}} < 0.05$ to avoid crowds. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable avoiding crowds had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who doesn't always avoid crowds has a 2.48 times greater risk of getting infected with COVID-19 than someone who always avoids crowds.

Table 8: The Relationship between Limiting Mobility and the Incidence of COVID-19 in Clinical Students in 2022

Variable (restricting mobility)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Always Restricting Mobility	26	30.6	59	69.4	85	100	0.002	2.710	1,43 - 5,14
Doesn't Always Restrict Mobility	43	54.4	36	45.6	79	100			

Table 8 above shows that in most clinical students who limit their mobility, 59 people (69.4%) have never been infected with Covid-19, and 26 people (30.6%) have been infected with Covid-19. The table above shows that the statistical analysis results are p-value < 0.05 to limit mobility. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable limiting mobility had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who does not always limit mobility has a 2.71 times greater risk of being infected with COVID-19 than someone who always limits mobility.

Table 9: The Relationship between Contacts with COVID-19 Patients and the Incidence of COVID-19 in Clinical Students in 2022

Variable	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Have contact with a COVID-19 patient	62	47.0	70	53.0	132	100	0.010	3.163	1,28 - 7,82
Never contact with COVID-19 patient	7	21.9	25	78.1	32	100			

Table 9 above shows that most clinical students who have been in contact with confirmed Covid-19 patients are 70 people (53%) who have never been infected with Covid-19, and 47 people (47%) have been infected with Covid-19. The table above shows that the statistical analysis results are $P_{\text{Value}} < 0.05$ for contacts with confirmed Covid-19 patients. From these results, it can be concluded that H_a is accepted and H_0 is rejected. Bivariate analysis showed that the variable of close contact with COVID-19 patients had a significant relationship ($P_{\text{Value}} < 0.05$) with the incidence of Covid-19. Thus, someone who has had close contact with a COVID-19 patient has a 3.16 times greater risk of being infected with COVID-19 than someone who has never had close contact with a COVID-19 patient.

Table 10: The Relationship between Smoking and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Smoker)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Active smoker	10	47.6	11	52.4	21	100	0.581	1.294	0,52 - 3,24
Not an Active Smoker	59	41.3	84	58.7	143	100			

Table 10 above shows that in most of the clinical students who are active smokers, 11 people (52.4%) have never been infected with Covid-19, and ten people (47.6%) have been infected with Covid-19. The table above shows that the statistical analysis results are $P_{\text{Value}} > 0.05$ for smoking. From these results, it can be concluded that H_0 is accepted and H_a is rejected. Bivariate analysis showed that the smoking variable did not have a significant relationship ($P_{\text{Value}} > 0.05$) with the incidence of Covid-19. Thus, someone who actively smokes has a 1.29 times greater risk of being infected with Covid-19 compared to someone who does not actively smoke

Table 11: The Relationship between Complete Vaccination and the Incidence of COVID-19 in Clinical Students in 2022

Variable (Vaccination)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		p Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
Complete Vaccination	69	42.9	92	57.1	161	100	0.136	0.571	0,00
Incomplete vaccination	0	0	3	100	3	100			

Table 11 above shows that for most clinical students who have received complete vaccinations, 92 people (57.1%) have never been infected with Covid-19, and 69 people (42.9%) have been infected with Covid-19. The table above shows that the statistical analysis results are $P_{\text{Value}} > 0.05$ for complete vaccination. From these results, it can be concluded that H_0 is accepted and H_a is rejected. Bivariate analysis showed that the whole vaccination variable did not have a significant relationship ($P_{\text{value}} > 0.05$) with the incidence of Covid-19. Thus, someone who received a complete vaccination had a protective factor of 0.57 times greater than someone who had not received full immunization.

Table 12: The Relationship between Comorbid Diseases and the Incidence of COVID-19 in Clinical Students in 2022

Variable (comorbid)	Have experienced COVID-19 infection		Never experienced COVID-19 infection		Total		P Value	Odds Ratio	CI 95%
	N	%	N	%	N	%			
No Comorbid Disease	65	41.7	91	58.3	156	100	0.641	1.400	0,34 - 5,80
There are Comorbid Diseases	4	50.0	4	50.0	8	100			

Table 12 above shows that most clinical students who have comorbid diseases are four people (50.0%) who have never been infected with Covid-19, and four people (50.0%) have been infected with Covid-19. The table above shows that the statistical analysis results are PV value > 0.05 for comorbid diseases. From these results, it can be concluded that H0 is accepted and Ha is rejected. Bivariate analysis showed that the comorbid disease variable did not have a significant relationship ($P_{\text{value}} > 0.05$) with the incidence of Covid-19. Thus, someone who has a comorbid disease has a 1.4 times greater risk of being infected with Covid-19 than someone who does not have a comorbid condition.

The relationship results between gender and the incidence of COVID-19 in clinical students in 2022 are similar to the results of a study conducted by Putri et al. (2021) that there is no relationship between gender characteristics and the incidence of COVID-19 where the P_{value} value is 0.485. However, the research results obtained contradict the theory which states that men are more at risk of COVID 19 due to chromosomal factors and hormonal factors ²⁰. Women are more protected from COVID 19 than men because they have an x chromosome and sex hormones such as progesterone which play an essential role in innate and adaptive immunity, and men usually, because of the demands of work they, leave the house more often than women, so they are susceptible to this disease. The results of the relationship between the use of masks and the incidence of COVID-19 in clinical students in 2022 are similar to the research which states that population compliance with the use of masks universally in public places is effective by 70% with contact tracing with sufferers proven to be effective in reducing the spread of the virus ²¹. It is also similar to the study results which showed that the use of masks effectively reduced the number of COVID-19 cases with a P_{value} of 0.013.52 ²². The use of masks can limit the spread of Covid-19, which is part of a comprehensive series of prevention and control measures. Masks can be used to protect healthy people when in contact with infected people to prevent further transmission. Then, it is recommended to use a comprehensive masks in all facilities for everyone, both health workers and the general public, regardless of the activities carried out.

The results of the relationship between hand washing and the incidence of COVID-19 in clinical students in 2022 are similar to the results of a study conducted by Karout et al., who stated that patients with positive RT-PCR results were significantly less likely to wash and use hand sanitizer (never: 48.7%; sometimes: 31.6%; always: 19.7%) than with patients with negative RT-PCR results (never: 0%; occasionally: 79.7%; and always: 21.3%) ($p < 0.001$) ²³.

The results of the relationship between maintaining distance and the incidence of COVID-19 in clinical students in 2022 are similar to the results of a study which stated that patients with positive RT-PCR results were significantly less likely to keep their distance (never: 85.5%; sometimes: 13.2%; and always: 1.3%) compared to patients with positive results. RT-PCR was negative (never: 85.3%; sometimes: 6.3%; and always: 8.4%) ($p < 0.001$) ²⁴. Research The weekly COVID-19 incidence rate per 100,000 people for the most populous English Upper Tier Local Authorities (UTLA) fell from the highest to the lowest

within four weeks after social distancing measures were introduced ²⁵.

The relationship results between avoiding crowds and the incidence of COVID-19 in clinical students in 2022 are similar to the study which stated that the spread of infection in Japan was decreasing due to reducing the time spent in crowds by less than 4 hours [26]. If, on the other hand, do not avoid crowded areas, the incidence of COVID-19 infection will still occur. It is also similar to the study which showed that social distancing behaviors such as avoiding public spaces or crowds, both risk perceptions were significant for the risk of infection and the risk of death from Covid-19 disease with a p-value of <0.001 ²⁷.

Viella states that prolonged time and close contact in confined and crowded spaces are strongly associated with the highest risk, with a lower chance of infection (20 times less) than casual contact in open spaces ²⁸. Symptomatic patients produce the majority of conditions. It is now clear that there may be an infection from asymptomatic patients and even from persons in the disease's incubation period (pre-symptomatic patients). The results of the relationship between limiting mobility and the incidence of COVID-19 in clinical students in 2022. The level of correlation between the level of spread of Covid-19 and the behavior of community mobility is relatively low (the correlation coefficient ranges from 0.03 to 0.33).

The results of the relationship between contact with COVID-19 patients and the incidence of COVID-19 in clinical students in 2022 are similar to research that shows an effect of close contact on confirmed cases of covid-19 with a PV value = 0.00 ²⁹. It means that close contact is a risk factor for Covid-19. Exposure to close contacts increases the risk of being confirmed COVID-19 6.802 times compared to those without exposure to close contacts. The results of the relationship between smoking and the incidence of COVID-19 in clinical students in 2022 are similar to the effects of research which states that there is no definite relationship between smoking and COVID-19 (HR 0.559 95% CI 0.344-0.909) ³⁰.

The results of the relationship between complete vaccination and the incidence of COVID-19 in clinical students in 2022 are different from the results of a study which stated that vaccination with three doses of COVID-19 mRNA vaccine, compared to those who were not vaccinated and received two doses was associated with protection against the Omicron and Delta variants with a P_{value} value < 0.001 ³¹. Results of the Relationship Between Comorbid Diseases and COVID-19

Incidence in Clinical Students in 2022 In contrast to research which stated that comorbid diseases such as diabetes mellitus, kidney disease, liver disease, and heart disease affect the incidence of Covid-19 with $P_{\text{Value}} < 0.001$ ³². People who have physiological problems from various types of illnesses have serious exacerbating effects as they increase the chances of being infected by the new coronavirus due to a weak immune system, which is prone to infection.

CONCLUSION

This study found that not all of the variables studied were related to COVID-19 infection in UKI Medical Faculty clinical students. The use of masks, washing hands, maintaining distance, avoiding crowds, limiting mobility, and contact with COVID-19 patients had a significant relationship. However, there was no significant relationship between gender, smoking, complete vaccination, and comorbid disease against COVID-19 infection in students of the UKI FK clinic in 2022. Based on the results of this study, there is an effect of 5M on COVID-19 condition in UKI FK clinic students. It is recommended that an evaluation of the implementation of the 5M protocol (Using a mask, washing hands, maintaining distance, avoiding crowds, limiting mobility) be carried out by students of the UKI FK clinic. In addition, it was also found that contact with COVID-19 patients on COVID-19 infection in FK UKI clinic students in 2022, so it can be considered that FK UKI clinic students in 2022 to increase the use of PPE. Both of these aim to reduce the risk of COVID-19 infection.

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