

How to Cite:

Kahar, F., & Wikandari, R. J. (2022). Knowledge and COVID-19 prevention behavior: A case study of medical laboratory technology students in Indonesia. *International Journal of Health Sciences*, 6(S1), 7428–7442. <https://doi.org/10.53730/ijhs.v6nS1.5015>

Knowledge and COVID-19 prevention behavior: A case study of medical laboratory technology students in Indonesia

Fitriani Kahar

Poltekkes Kemenkes Semarang, Semarang, Indonesia

Corresponding author email: fitriani kahar888@gmail.com

Ririh Jatmi Wikandari

Poltekkes Kemenkes Semarang, Semarang, Indonesia

Abstract--The COVID-19 pandemic is still engulfing several parts of the world. This pandemic has an impact on all spheres of people's lives such as health, economy, education and others. The COVID-19 pandemic has caused behavioral changes in society which have made people more concerned about hygiene and health. New habits that occur include wearing masks, washing hands and avoiding crowds. The knowledge possessed by students is often not in line with the student's life behavior or vice versa. During this pandemic, the learning carried out is distance learning so that students cannot see directly the activities carried out by students. Therefore, the purpose of this study was to determine the correlation between knowledge and COVID-19 prevention behavior applied by students. This type of research is a quantitative research with a cross sectional design. The sample in this study were students of Medical Laboratory Technology Expert, Department of Health Analyst, Poltekkes Kemenkes Semarang, totaling 323 people. In this study, an online questionnaire was used as a data collection tool, with the data analyzed descriptively (univariate analysis) followed by a bivariate analysis with the person correlation test which was presented in the form of a frequency table accompanied by a narration. The results showed that there was a significant positive correlation between knowledge and behavior of preventing COVID-19 in students with a p-value of 0.004.

Keywords--Knowledge, Behavior, COVID-19.

Introduction

The COVID-19 pandemic is not over. Various mutations of the corona virus variants that take turns in infecting humans ranging from alpha, beta, mu, delta variants, and the variant that is endemic today is omicron. COVID-19 is a new

virus that has spread to several parts of the world with a fast transmission process (Kementerian Dalam Negeri, 2020). This virus is an RNA type virus with a positive single strain that attacks the respiratory tract with symptoms such as flu, fever, cough, or shortness of breath (PDPI, 2020). Coronavirus (CoV) is a virus with disease symptoms ranging from mild symptoms to severe symptoms and can cause death. This virus is still in the same family as the Middle East respiratory syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV) (Kementerian Kesehatan RI, 2020a). Patients with COVID-19 have no age limit and can occur in all age ranges from infants, toddlers, teenagers to the elderly group. The elderly group is an age group that is susceptible to comorbidities such as hypertension, heart disease, diabetes mellitus, etc., so they have a large risk factor for infection and have the potential to transmit COVID-19 (Saqlain *et al.*, 2020).

The latest data globally on March 9, 2022, based on WHO (2022) there have been reported cases of COVID-19 in 228 countries with 448,313,293 confirmed cases, 6,011,482 reported deaths. As for cases in Indonesia, the Government of the Republic of Indonesia has reported 5,826,589 people with confirmed COVID-19. There were 151, 135 reported deaths related to COVID-19 (Kementerian Kesehatan RI, 2022). The data shows that COVID-19 cases are still a pandemic that has not ended.

Various efforts have been made by the government in an effort to break the chain of transmission of COVID-19. Some of the government's efforts during the COVID-19 pandemic were the use of masks, physical distancing, social distancing, stay at home, work from home for workers, quarantine for patients with COVID-19 symptoms and the implementation of large-scale social restrictions (PSBB). As an implementation of COVID-19 prevention efforts on campus so that a distance learning distance learning system is applied (Kemenkes-RI, 2020b). To ensure the success of this government program, community compliance is very important in supporting the program. This is also greatly influenced by the knowledge, attitudes and behavior applied to COVID-19 efforts.

This COVID-19 case has caused changes in attitudes and behavior in the community. People are becoming more concerned about health and wearing masks is an obligation (Fitriani Kahar, Dirawan, Samad, Qomariyah, & Purlinda, 2020). The results of previous studies indicate that there is a relationship between knowledge, attitudes and behavior at Kotagede Market traders with $p\text{-value} < 0.05$ (C. K. Sari, 2021). Kahar (2021) mentioned that traders are also at risk of being infected with COVID-19 if they have comorbid risk factors for hypertension and diabetes mellitus (Fitriani Kahar, Devi Etivia Purlinda, Djoko Priyatno, Ichsan Hadipranoto, & Rachmad Bayu Kuncara, 2021). Furthermore, it is also supported by research on the community in Perdana Kusuma Village which shows that attitudes are related to the behavior of preventing COVID-19 transmission (Chadaryanti & Muhafilah, 2021). Likewise, Desti (2021) shows that there is a relationship between knowledge and behavior in implementing health protocols (Desty, Arumsari, & Rohmah, 2021). However, it is different from the research conducted on the Student Association of Hermina Manggala Husada, Winarti (2020) which stated

that there were still 43.5% of students who had poor knowledge (Winarti & Hartati, 2020).

According to B. Bloom, there are 3 domains of a person's behavior, namely knowledge, attitudes and actions of a person. Knowledge is someone's understanding of the topic presented. Knowledge is an ability to receive, use information, retain information that is influenced by experience and skills. In general, this knowledge comes from formal and informal education, personal experience, other people, the environment and the mass media. Attitude is defined as a tendency towards an object to act, which may or may not support an object. Attitude is a predisposing factor in a behavior. Attitude consists of 3 components, namely the components of cognition, affection, and connection (Notoatmodjo, 2014).

Campus as an educational environment for the younger generation and a gathering place for groups of productive age and become agents of change who can contribute to various innovations in efforts to control COVID-19, so that the campus community can utilize all available resources to develop various systems in controlling COVID-19. 19. Universities (PT) can play a role in controlling COVID-19, and dozens of universities in Indonesia have agreed to establish a healthy campus or health promotion-based campus (Health Promoting University) (Direktorat Promosi Kesehatan dan Pemberdayaan Masyarakat, 2020). Medical Laboratory Technology Students (ATLM) are health students who will become prospective health workers in the future who play a role as role models for the general public in implementing good and exemplary health behavior patterns. Behavior itself is a series of learning processes from experience, habituation and reinforcement received by students.

Based on the description above regarding knowledge and attitudes that affect a person's behavior, and as the unpredictable increase in COVID-19 cases with varied case variants, it is important to conduct research on the correlation between knowledge and COVID-19 prevention behavior in ATLM students, Department of Health Analyst, Poltekkes Kemenkes Semarang. It is important to measure the knowledge and description of student behavior as an effort to carry out a follow-up plan on the results obtained, so as to suppress the occurrence of COVID-19 cases in students. The spread of COVID-19 cases at the education level can be prevented through increasing knowledge so that students are able to make positive behavioral changes so as to prevent the transmission of COVID-19.

This article aims to determine the correlation between knowledge and COVID-19 prevention behavior in health students so that it becomes an effort to prevent COVID-19 disease in students. It is hoped that this article can be a source of reference for COVID-19 literature in Indonesia

Method

This research is a type of quantitative research with analytical descriptive design. The population in this study were all students of the Department of Health Analyst, Poltekkes Kemenkes Semarang. Research participants are students of the Medical Laboratory Technology Expert Study Program,

Department of Health Analyst. The variables in this study were student knowledge about COVID-19 and student behavior. The measuring instrument used is an online questionnaire distributed via google form about knowledge and behavior with 15 questions each. Before being tested, this questionnaire has been tested for validation and reliability with a validation value of r arithmetic $> r$ table and Cronbach's Alpha reliability value of 0.73 so that it is considered feasible to be a research measuring instrument. For the determination of the research score, a knowledge questionnaire with a gutmen scale with true and false choices. For positive questions, a true score is given a score of 1 and a wrong score is 0, and vice versa for a negative statement. Behavioral questionnaire with Likert scale. Behavioral questionnaire scores for positive statements are: always a score of 5, often a score of 4, sometimes a score of 3, once a score of 2, and never a score of 1, and vice versa for negative statements.

These results were analyzed univariately to see an overview of students' knowledge about COVID-19 and COVID-19 prevention behavior. Presentation of data in descriptive form with frequency distribution accompanied by tables, graphs and narration. Furthermore, a bivariate test with person correlation analysis was carried out because the data had met the validation and reliability tests and were normally distributed.

Result and Discussion

Table 1
Characteristics of Respondents Based on Sociodemographic Characteristics

No	Sociodemographic Characteristics	F	%
1	Gender		
	1. Women	273	84.5
	2. Men	50	15.5
	Total	323	100
2	Age		
	1. 16-17 Years old	8	2.5
	2. 18-19 Years old	132	40.9
	3. 20-21 Years old	183	56.7
	Total	323	100
3	Study program		
	1. D3 TLM	237	73.4
	2. D4 TLM	86	26.6
	Total	323	100
4	History COVID-19		
	1. Yes	51	15.8
	2. No	272	84.2
	Total	323	100

5	Current Condition		
1.	Cough	4	1.2
2.	Fever	7	2.2
3.	Flu	8	2.5
4.	Dizzy	13	4.0
5.	Healthy	291	90.1
	Total	323	100

Table 1 shows the sociodemographic characteristics of students based on gender, age, study program, history of COVID-19 and the current condition of students. Based on table 1, the results of the descriptive analysis based on the sociodemographic characteristics of students show that the majority of students are female as many as 273 (84.5%), age 20-21 years as many as 183 (56.7%), DIII study programs as many as 273 (73.4 %), did not have a history of COVID-19 as many as 272 (84.2%), and as many as 291 (90.1%) the current condition of the students was in good health.

Table 2
Frequency distribution of student knowledge about COVID-19

Question	Correct answer		Wrong answer	
CONCEPT	F	%	F	%
1. The disease COVID-19 is caused by a corona virus that originated from the Wuhan animal market in China which is nothing to worry about	271	83.9	52	16.1
2. COVID-19 makes people care about environmental hygiene and health	321	99.4	2	.6
3. This COVID-19 can spread through direct or indirect contact	284	87.9	39	12.1
4. The emergence of symptoms of COVID-19 is God's destiny that cannot be avoided	159	49.2	164	50.8
5. The government's PPKM program has succeeded in reducing the incidence of COVID-19	310	96.0	13	4.0
FACT				
6. Symptoms of COVID-19 are like normal flu and do not cause diarrhea	162	50.2	161	49.8
7. Contact tracing is an attempt to trace contact history with patients who are confirmed positive for Covid 19.	318	98.5	5	1.5
8. Talking to people who can't transmit COVID-19	274	84.8	49	15.2
9. Quarantine efforts for COVID-19 patients are a mandatory step in protecting patients and preventing transmission to the surrounding community	321	99.4	2	.6
10. Rapid Test and TCM examination is a screening examination of samples of patients or people under supervision	307	95.0	16	5.0
PROSEDURAL				
11. The use of herbal medicines such as empon-empon is proven to be able to ward off viruses to treat Covid 19 reactive patients	128	39.6	195	60.4
12. The transmission of Covid 19 can be prevented simply by using a face shield without a mask, hand sanitation and social restrictions	266	82.4	57	17.6

13. Frequently washing hands or using hand sanitizer can prevent contracting COVID-19	298	92.3	25	7.7
14. Regular exercise is enough to avoid COVID-19 disease	64	19.8	259	80.2
15. Early detection of COVID-19 disease can prevent transmission of COVID-19.	317	98.1	6	1.9

Table 3
Frequency Distribution of Student Behavior during the COVID-19 Pandemic

Question	Always		Often		Seldom		Once		Never	
	F	%	F	%	F	%	F	%	F	%
COVID-19 PREVENTION BEHAVIOR										
1. I am disciplined to apply the protocol every day	188	58.2	119	36.8	13	4.0	1	.3	2	.6
2. I keep my distance from other people when I'm outside the house	110	34.1	152	47.1	54	16.7	3	.9	4	1.2
3. Once a week I go to the mall for refreshing	10	3.1	11	3.4	64	19.8	92	28.5	146	45.2
4. Drink herbal medicine to increase immunity to avoid COVID-19	21	6.5	27	8.4	94	29.1	73	22.6	108	33.4
5. If invited, I attend a friend's birthday.	16	5.0	26	8.0	86	26.6	104	32.2	91	28.2
6. I study in groups at the warkop with friends while studying online	13	4.0	11	3.4	51	15.8	70	21.7	178	55.1
7. After I finish my activities outside, I immediately take a shower.	102	31.6	94	29.1	98	30.3	22	6.8	7	2.2
8. I accidentally touched my face before washing my hands or using Hand Sanitizer	16	5.0	60	18.6	139	43.0	74	22.9	34	10.5
9. Wear a mask when leaving the house or traveling	281	87.0	30	9.3	0	0	5	1.5	5	1.5
10. During the COVID-19 Pandemic, I exercise regularly at least 3x a week	36	11.1	46	14.2	148	45.8	80	24.8	13	4.0
11. If I meet a friend, I shake hands/shake hands	10	3.1	25	7.7	113	35.0	99	30.7	76	23.5
12. Open the door or press the elevator button with the elbow	81	25.1	83	25.7	82	25.4	49	15.2	28	8.7
13. Wash your hands or use hand sanitizer when you are finished handling any object	130	40.2	103	31.9	73	22.6	13	4.0	4	1.2
14. Bring hand sanitizer every time you travel	169	52.3	92	28.5	45	13.9	9	2.8	8	2.5
15. Drink at least 2 liters of water to avoid COVID-19	134	41.5	118	36.5	64	19.8	3	.9	1.2	1.2

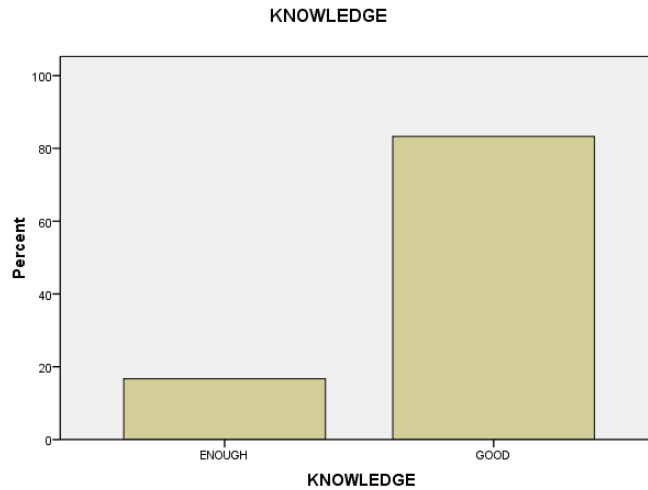


Figure 1. Graph of Student Knowledge Category about COVID-19 (n=323)

Based on figure 1, it is known that the highest category of student knowledge is in the high category, as many as 269 respondents (83.3%).

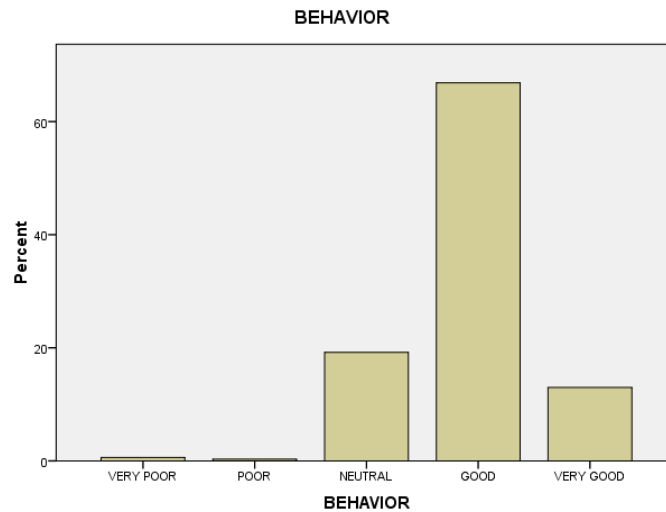


Figure 2. Graph of Preventive Behavior Category about COVID-19 in Students (n=323)

Based on figure 2 shows a graph of the category of COVID-19 prevention behavior in students with the highest category being good behavior, which is 216 (66.9%).

Table 4
Correlation Test between Knowledge and Student Behavior during the COVID-19
Pandemic (n=323)

Correlations			
		Knowledge	Behavior
Knowledge	Pearson Correlation	1	.162**
	Sig. (2-tailed)		.004
	N	323	323
Behavior	Pearson Correlation	.162**	1
	Sig. (2-tailed)	.004	
	N	323	323

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4 shows the correlation test between knowledge and student behavior during the COVID-19 pandemic using person correlation analysis which shows a significant relationship with a p-value of 0.004 in a positive direction. It can be concluded that by increasing knowledge about COVID-19, it will have a positive effect on COVID-19 prevention behavior in students. This is expected to prevent the transmission of COVID-19 to students

Table 1 shows the sociodemographic characteristics of the respondents. The majority of respondents are female. This is in line with research conducted in Jakarta in 2020 (Linawati et al., 2021). The education level of the respondents who are students is included in the high category so that the results can lead to the knowledge of students in the high category. This result is also in line with research conducted in Indonesia in 2020. Furthermore, it is stated that the age factor and education level have a significant effect on a person's knowledge (Sulistiyawati et al., 2021). However, someone with a low level of education does not guarantee low knowledge, because in this era there are so many technologies that can make it easier to find data and information. This result is also supported by research that has been done in Bali (Putra et al., 2020). Furthermore, the results of other studies show that sociodemographic factors (age, gender and age) do not affect the knowledge of the trading community regarding COVID-19 (Fitriani Kahar & Qomariyah, 2021). The distribution of each question for the variable of student knowledge about COVID-19 is described in table 2, while for the variable of COVID-19 prevention behavior is described in table 3.

Knowledge has an important role in determining one's behavior, because with knowledge it will form beliefs which will then be perceived to be true, and become the basis for making decisions and determining one's behavior on certain objects (Notoatmodjo, 2012). Green's theory in Notoatmodjo (2007) shows that there are various factors that can influence a person's health behavior, namely predisposing factors (knowledge, attitudes, beliefs, beliefs and values), reinforcing factors (family support, attitudes and behavior of health workers), and factors enabling (physical environment and availability of facilities) (Notoatmodjo, 2007). It is necessary to increase knowledge through education because education through the sensing process after receiving information about how to prevent COVID-19 disease, a person will be able to remember the material

which in turn can have the ability to explain and apply it in everyday life (Notoatmodjo, 2012).

The graph of the category of student knowledge about COVID-19 can be seen in Figure 1. In the graph it can be seen that the category of student knowledge is mostly in the high category, namely as many as 269 respondents (83.3%), and there are no students with low knowledge. The graph of the category of COVID-19 prevention behavior in students can be seen in Figure 2 which shows that the highest category is good behavior, which is 216 (66.9%). This shows that the knowledge and behavior of students are in the good category. These results are in line with research conducted in Nigeria (Adenubi et al., 2021). Likewise, the results of research in Karang Rejo Village which show the knowledge and behavior of the community are in the good category (Fata & Soares, 2021). However, this is different from the results of research conducted on students at SMPN 13 Pesawaran which showed that the majority of students' knowledge, attitudes and behavior were less than optimal in preventing COVID-19 (Farich, Wahyudi, & Ernita, 2021). Likewise, the results of research in Central Kalimantan which show the knowledge and behavior of COVID-19 patients are in the sufficient category (Suryagustina & Wibowo, 2021). Research on students in the United States shows that respondents' knowledge is still in a very low category, namely only 18% recognize the indications of COVID-19 and less than 18% know the implications of COVID-19 (Chesser, Ham, & Woods, 2020). This shows that students only understand COVID diseases in general, such as coughing, fever and shortness of breath (Alzoubi et al., 2020).

The results of this research indicate that in general the respondents have good behavior. COVID-19 prevention behavior is an effort that must be done in breaking the transmission of COVID-19. Behavior is a form of response to an object which will then become a habit because it is considered a value and believed. Behavior is also the act of responding to stimuli with the environment that can be observed or not observed. Various information about preventing COVID-19 which is a recommendation for health promotion has spread to various media, both print and electronic, such as using masks, washing hands and avoiding crowds (Hakim, 2021). Researchers assume that this knowledge is a source of confidence so that it can have an impact on COVID-19 prevention behavior.

Table 4 shows the bivariate analysis with the person correlation test which shows that there is a significant relationship with a p-value of 0.004 in a positive direction. It can be concluded that increasing knowledge about COVID-19 will have a positive effect on good behavior in preventing COVID-19 in students. This is expected to prevent the transmission of COVID-19 to students. The results of this study are in line with research in the city of Semarang which shows that there is a relationship between the level of knowledge with the attitudes and behavior of the community in efforts to prevent COVID-19 (Sutiningsih, 2021). These results are also in line with research conducted on students in Jakarta which concluded that knowledge and attitudes have an influence on a person's behavior in preventing COVID-19 (Linawati et al., 2021). Likewise, the results of research at the Ganesha Market in Semarang City, which showed that the knowledge of the trading

community was high and it was seen that people's behavior was implementing health protocols such as wearing masks and maintaining social distance (Fitriani Kahar, Surati, Priyatno, Setyowatiningsih, & Purlinda, 2021). From this it is suspected that there is a relationship between knowledge and community behavior. These results are also in line with existing research in Ngronggah which states that there is a relationship between knowledge and adherence to the use of masks in the community (D. P. Sari & Nabila Sholihah 'Atiqoh, 2020).

However, different results were found by Gunawan (2021) who stated that good knowledge about COVID-19 did not show a significant relationship to positive attitudes and good behavior as a form of COVID-19 prevention (Gunawan, Sinsin, & Zani, 2021). Different results were also mentioned by Mundakir which showed that the knowledge of nursing students about COVID-19 was in the low category, related to negative attitudes and perceptions, so the importance of government support to provide policies through educational institutions in an effort to increase knowledge, attitudes and perceptions about COVID -19 (Mundakir, Efendi, & Susanti, 2021). Likewise, research conducted in Bangladesh and Indonesia showed that students in these countries had low knowledge regarding the signs, symptoms and modes of transmission of COVID-19 (Saefi *et al.*, 2020; Wadood *et al.*, 2020).

Knowledge about COVID-19 has a very important role to have an impact on a person's attitude or behavior, because if someone has knowledge it can lead to real action as an effort to prevent COVID-19 transmission so as to minimize the potential for COVID-19 transmission (Law, Leung, & Xu, 2020). Knowledge that must be possessed by the community during this pandemic as an effort to prevent the spread of COVID-19 is knowledge about the definition, causes, signs and symptoms, prevention methods, modes of transmission and ways of treating COVID-19, which are very important as mitigation efforts in the future. pandemics like this. Good knowledge and receipt of correct information about COVID-19, then this level of knowledge will affect student practice in preventing COVID-19 (Saputra & Simbolon, 2020). Knowledge and obedience have a positive bond. The term compliance used is something that reflects behavior (D. P. Sari & Nabila Sholihah 'Atiqoh, 2020).

Table 2 describes the distribution of student knowledge which consists of concepts, facts and procedural components. The results of the analysis of knowledge about COVID-19 disease, the majority of knowledge shows in Figure 1 is in the high category, namely 83.3%, meaning that students already have knowledge related to concepts, facts and procedures related to Covid-19 such as signs, symptoms, or ways to prevent the disease. This is supported by the research of Putra et al (2020) which states that the knowledge of the people of Gulingan Village is in a good category, which is 51.8%. This has a relationship with the education level of the majority of respondents at the high school level. At this level of education has been able to absorb knowledge related to COVID-19 (Hossain et al., 2020). However, it is different from the research conducted on the Student Academy of Nursing Hermina Manggala Husada, Winarti (2020) which stated that there were still 43.5% of students who had poor knowledge. Good knowledge is mandatory in warding off the COVID-19 disease. It is important that

COVID-19 materials are used as teaching materials on campus in order to increase student knowledge regarding COVID-19 (Winarti & Hartati, 2020)

Increased knowledge of students can be done through education both formally and informally. Notoadmojo said that there are several forms of education that function to increase health knowledge such as counseling, FGDs, advertising, and installing banners/billboards (Notoatmodjo, 2012). Furthermore, it is stated that knowledge has a positive relationship with compliance, and obedience describes behavior (Saputra, 2020). Increased knowledge is needed to improve COVID-19 prevention behaviour (Mujiburrahman, Riyadi, & Ningsih, 2020).

In Table 3 it can be seen that some of the ways that respondents did in preventing COVID-19 were by implementing health protocols, namely using masks, washing hands frequently, avoiding crowds, not doing group work outside, always carrying hand sanitizers, keeping a distance, exercising regularly, and drinking herbal medicine to increase immunity. This is also emphasized by the statement that the transmission of COVID-19 can be suppressed by implementing good and correct social distancing. The WHO guidelines on preparedness for COVID-19 explain that the management that must be done is to wear a mask, maintain a minimum distance of 2 meters, no direct contact, wash hands, bring hand sanitizer and other healthy behaviors (Liu et al., 2020). Compliance with health protocols is everyone's obligation to prevent the transmission of COVID-19. Meanwhile Putra, et al (2020) stated that with local wisdom that applies to the Balinese traditional framework community can prevent the corona virus.

In an effort to prevent COVID-19 in students, students can apply the health belief model because there are 3 components that have a relationship with COVID-19 prevention behavior in students, namely components perceived susceptibility, severity, and perceived benefit (Hepilita, Handi, Demang, & Mariati, 2021). Good behavior to prevent COVID-19 is not to eat together (Corvol et al., 2022). Because we know that students have a tradition of eating with friends, so this needs to be a concern in order to avoid COVID-19.

During the COVID-19 pandemic, it is important to always maintain the cleanliness of the physical environment of the house and environmental sanitation, in order to avoid infectious diseases such as respiratory disease, tuberculosis, acute respiratory infections, and others (F Kahar, Dirawan, Samad, Qomariah, & Purlinda, 2021). Various efforts to socialize and promote health on an ongoing basis are also needed so that changes occur in the cognitive, affective, and psychomotor components of students in efforts to prevent COVID-19 (Saqlain et al., 2020). Apart from that, from the perspective of student knowledge, it can be seen that students still need to be given guidance regarding methods of preventing or transmitting COVID-19 so that they are more aware of the importance of knowledge in warding off the virus.

The implications of the results of this study are to provide an overview of students' knowledge and behavior in the effort to prevent COVID-19, and to be able to find out that the level of knowledge has a positive correlation to student behavior so that it is important to carry out education and health promotion on

an ongoing basis to students to be motivated and apply health protocols regularly. strict efforts to prevent COVID-19.

Conclusion

From the results of the study, it can be concluded that there is a significant positive correlation between knowledge and behavior of preventing COVID-19 in Medical Laboratory Technology students, Poltekkes Kemenkes Semarang. The higher the knowledge of students, the better their behavior will be. Based on these findings, it is necessary to make efforts to increase knowledge through continuous education through education and health promotion programs in an effort to support COVID-19 prevention practices as a form of controlling the COVID-19 pandemic.

Acknowledgments

Thank you to the Head of the Health Analyst Department, Poltekkes Semarang who has given permission to carry out this research, to the research team who have helped the research process to completion and to research respondents who have contributed to this research.

References

- Adenubi, O., Adebowale, O., Adesokan, H., Oloye, A., Bankole, N., Fadipe, O., ... Akinloye, A. (2021). Knowledge, Attitude and Perception towards COVID-19 Pandemic among Veterinary Professionals and Impacts: A Cross-Sectional Nationwide-Based Survey. *Covid*, 1(3), 645–665. <https://doi.org/10.3390/covid1030053>
- Alzoubi, H., Alnawaiseh, N., Al-Mnayyis, A., Abu-Lubad, M., Aqel, A., & Al-Shagahin, H. (2020). Covid-19 - Knowledge, attitude and practice among medical and non-medical university students in Jordan. *Journal of Pure and Applied Microbiology*, 14(1), 17–24. <https://doi.org/10.22207/JPAM.14.1.04>
- Chadaryanti, D., & Muhafilah, I. (2021). Relationship of Knowledge and Behavioral Attitudes to Prevent Covid-19 Transmission in Halim Perdana Kusuma Village. *Jurnal Ilmiah Kesehatan*, 13(September), 192–198.
- Chesser, A., Ham, A. D., & Woods, N. K. (2020). Assessment of COVID-19 Knowledge Among University Students: Implications for Future Risk Communication Strategies. *Health Education & Behavior*, 47(4), 540–543. <https://doi.org/10.1177/1090198120931420>
- Corvol, A., Charras, K., Prud'homm, J., Lemoine, F., Ory, F., Viel, J. F., & Somme, D. (2022). Structural and Managerial Risk Factors for COVID-19 Occurrence in French Nursing Homes. *International Journal of Health Policy and Management*, 2019(July 2020), 1–8. <https://doi.org/10.34172/ijhpm.2022.6741>
- Desty, R. T., Arumsari, W., & Rohmah, S. (2021). Knowledge, Attitudes and Behavior of Preventing COVID-19 on Traders at Sampangan Market, Semarang City. *Indonesian Journal of Health Community*, 2(1), 19–27.
- Direktorat Promosi Kesehatan dan Pemberdayaan Masyarakat. (2020). COVID-19 Alert Campus Handbook. In *Direktorat Promosi Kesehatan dan Pemberdayaan Masyarakat* (Vol. 1). Jakarta: Kementerian Kesehatan RI.
- Farich, A., Wahyudi, W. T., & Ernita, C. (2021). Relationship between Knowledge

- and Attitude with COVID-19 Prevention Behavior in Students at SMPN 13 Pesawaran. *Manuju: Malahayati Nursing Journal*, 3(4), 529–537.
- Fata, U. H., & Soares, H. D. C. (2021). Knowledge, Attitude and Behavior to Prevent the Transmission of COVID-19. *Jurnal Keperawatan Silampari*, 5(2), 633–640.
- Gunawan, S., Sinsin, I., & Zani, A. Y. P. (2021). The Relationship Between Knowledge and Attitude with COVID-19 Prevention Behavior in Participants of the Rafflesia STIKes Online Seminar 7 April 2020. *Perilaku Dan Promosi Kesehatan: Indonesian Journal of Health Promotion and Behavior*, 3(1), 47–57. <https://doi.org/10.47034/ppk.v3i1.4553>
- Hakim, A. L. (2021). Health Promotion and Physical Distancing Policies on COVID-19 Prevention Behavior. *KELUWIH: Jurnal Kesehatan Dan Kedokteran*, 2(2), 75–81. <https://doi.org/https://doi.org/10.24123/kesdok.v2i2.3985>
- Hepilita, Y., Handi, H., Demang, F. Y., & Mariati, L. H. (2021). Health Belief Analysis of Covid-19 Prevention Behavior Models in Health Students. *Jurnal Kesehatan Terpadu*, 12(2), 85–92.
- Hossain, M. A., Jahid, M. I. K., Amran Hossain, K. M., Walton, L. M., Uddin, Z., Haque, M. O., ... Hossain, Z. (2020). Knowledge Attitudes and fear of COVID-19 during the Rapid Rise Period in Bangladesh. *PLoS ONE*, 15(9 September). <https://doi.org/10.1371/journal.pone.0239646>
- Kahar, F., Dirawan, G. D., Samad, S., Qomariah, N., & Purlinda, D. E. (2021). Relationship Analysis of Physical Environmental Health Conditions With the Event of Upper Respiratory Tract Infection (Uri) Maros District. *Annals of the Romanian Society for Cell Biology*, 7735–7745-, 25(4), 7735–7745. Retrieved from https://scholar.google.com/citations?view_op=view_citation&hl=en&user=7zLmDFMAAAAJ&pagesize=100&citation_for_view=7zLmDFMAAAAJ:9vf0nzSNQJEC
- Kahar, Fitriani, Devi Etivia Purlinda, Djoko Priyatno, Ichsan Hadipranoto, & Rachmad Bayu Kuncara. (2021). Socialization Of Clean And Healthy Living Behaviors And Screening Of Non-Communicable Diseases In Efforts To Prevent The Pandemic Covid-19. *International Journal Of Community Service*, 1(1), 42–54. <https://doi.org/10.51601/ijcs.v1i1.6>
- Kahar, Fitriani, Dirawan, G. D., Samad, S., Qomariyah, N., & Purlinda, D. E. (2020). The Epidemiology of COVID-19, Attitudes and Behaviors of the Community During the Covid Pandemic in Indonesia. *International Journal of Innovative Science and Research Technology*, 5(8), 1681–1687. <https://doi.org/10.38124/ijisrt20aug670>
- Kahar, Fitriani, & Qomariyah, N. (2021). Evaluation Of Sociodemographic Characteristics With Knowledge Of Traders' Community About COVID-19 Disease. *Turkish Journal of Physiotherapy and Rehabilitation*, 32(3), 24332–24342. Retrieved from www.turkjphysiotherrehabil.org
- Kahar, Fitriani, Surati, Priyatno, D., Setyowatiningsih, L., & Purlinda, D. E. (2021). Survey on Knowledge of Merchants About COVID-19 in Semarang City. *Jurnal Sulolipu: Media Komunikasi Sivitas Akademika Dan Masyarakat*, 21(1), 32–42.
- Kemenkes-RI. (2020). Permenkes RI KMK No. HK.01.07/MENKES/382/2020. *Regulation of the Minister of Health of the Republic of Indonesia*, pp. 2–6. Retrieved from <http://jurnalrespirologi.org/index.php/jri/article/view/101>
- Kementerian Dalam Negeri. (2020). *General Guidelines for Facing the Covid-19*

- Pandemic for Local Governments Prevention, Control, Diagnosis, and Management*. Jakarta.
- Kementerian Kesehatan RI. (2020). *Guidelines for Prevention and Control of Coronavirus Disease (COVID-19) Revisi 3*. Jakarta: Kemenkes RI Dirjen P2P.
- Kementerian Kesehatan RI. (2022). Data Sebaran COVID-19. Retrieved March 10, 2022, from Kemenkes-RI website: <https://covid19.go.id/peta-sebaran>
- Linawati, H., Helmina, S., Intan, V., Oktavia, W., Rahmah, H., & Nisa, H. (2021). Knowledge, Attitudes, and Behavior of Students' COVID-19 Prevention. *Media Penelitian Dan Pengembangan Kesehatan*, 31(2), 125–132. Retrieved from <http://ejournal2.litbang.kemkes.go.id/index.php/mpk/article/view/3456>
- Liu, F., Wang, W., Yu, H., Wang, Y., Wu, W., Qin, X., & Zhao, Y. (2020). Prevention and control strategies of general surgeons under COVID-19 pandemic. *Surgery in Practice and Science*, 1(April), 100008. <https://doi.org/10.1016/j.sipas.2020.100008>
- Mujiburrahman, Riyadi, M. E., & Ningsih, M. U. (2020). Knowledge Related to Improving COVID-19 Prevention Behavior in Society. *Jurnal Keperawatan Terpadu*, 2(2), 130–140.
- Mundakir, M., Efendi, F., & Susanti, I. A. (2021). Study of Knowledge, Attitude, Anxiety, and Perception of Mental Health Needs Among Nursing Students in Indonesia During COVID- 19. *Indonesian Nursing Journal of Education and Clinic (INJEC)*, Volume 6,(59). <https://doi.org/10.24990/injec.v6i1.366>
- Notoatmodjo. (2012). *Health Promotion and Health Behavior*. Jakarta: PT Rineka Cipta.
- Notoatmodjo. (2014). *Health Behavioral Science (2nd ed.)*. Jakarta: Rineka Cipta.
- Notoatmodjo, S. (2007). *Behavioral health and behavioral science*. Jakarta: Rineka Cipta.
- PDPI. (2020). *Patient Management COVID-19* (pp. 19–21). pp. 19–21.
- Putra, A. I. Y. D., Pratiwi, Made Sindy AstriYani, M. V. W., Danang, G. R., Gunawan, Ganesha, Ghaniy Muhammad Aminawati, Agnes Maria Aprilia EvelynWibhawa, I. P. G. D., Aryana, & Suryawati, I. G. A. A. (2020). Description of the Characteristics of Knowledge, Attitudes and Behavior of Covid-19 Risks in the Framework of a Traditional Village in Gulingan Village, Mengwi, Bali. *Jurnal Kesehatan Andalas*, 9(3), 313–319.
- Saefi, M., Fauzi, A., Kristiana, E., Adi, W. C., Muchson, M., Setiawan, M. E., ... Ramadhani, M. (2020). Survey data of COVID-19-related knowledge, attitude, and practices among indonesian undergraduate students. *Data in Brief*, 31, 105855. <https://doi.org/10.1016/j.dib.2020.105855>
- Saputra, A. W., & Simbolon, I. (2020). The Relationship between Knowledge Levels about COVID-19 and Compliance with the Lockdown Program to Reduce the Spread of COVID-19 Among Indonesian Adventist University Dormitory Students. *Nutrix Jurnal*, 4(No. 2), 1–7.
- Saqlain, M., Munir, M. M., Rehman, S. U., Gulzar, A., Naz, S., Ahmed, Z., ... Mashhood, M. (2020). Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross-sectional survey from Pakistan. *Journal of Hospital Infection*, 105(3), 419–423. <https://doi.org/10.1016/j.jhin.2020.05.007>
- Sari, C. K. (2021). Knowledge of Covid-19 Prevention Attitudes and Behaviors in Market Traders. *Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, 11(4), 661–670.
- Sari, D. P., & Nabila Sholihah 'Atiqoh. (2020). The Relationship Between Public Knowledge And Compliance With The Use Of Masks As An Effort To Prevent

- Covid-19 In Ngronggah. *Infokes: Jurnal Ilmiah Rekam Medis Dan Informatika Kesehatan*, 10(1), 52–55. <https://doi.org/10.47701/infokes.v10i1.850>
- Sulistiyawati, S., Rokhmayanti, R., Aji, B., Wijayanti, S. P. M., Hastuti, S. K. W., Sukesu, T. W., & Mulasari, S. A. (2021). Knowledge, attitudes, practices and information needs during the covid-19 pandemic in indonesia. *Risk Management and Healthcare Policy*, 14, 163–175. <https://doi.org/10.2147/RMHP.S288579>
- Suryagustina, & Wibowo, D. (2021). Knowledge, Attitudes and Behavior of Covid-19 Patients at the COVID-19 Expansion Hospital of Central Kalimantan Province. *Dinamika Kesehatan Jurnal Kebidanan Dan Keperawatan*, 12(1), 32–46. <https://doi.org/10.33859/dksm.v12i1.685>
- Sutiningsih, D. (2021). The Relationship between Knowledge Levels and Attitudes towards COVID-19 Prevention Practices in Internet User Communities in Semarang City. *Epidemiologi Kesehatan Komunitas*, 6(2), 300–306.
- Wadood, A., Mamun, A., Rafi, A., & Md kamru, I. (2020). Knowledge, attitude, practice and perception regarding COVID-19 among students in 2 Bangladesh: Survey in Rajshahi University. *Survey in Rajshahi University*, *BMJ*. <https://doi.org/https://doi.org/10.1101/2020.04.21.20074757>
- Winarti, R., & Hartati, S. (2020). Study of Knowledge of Akper Hermina Manggala Husada Students About Covid 19 and How to Prevent It. *Jurnal Ilmiah Keperawatan Altruistik (JIKA)*, 3(2), 1–9.