

Analysis of Factors Affecting the Knowledge with COVID-19

¹Eui-young Cho, ²Jungae Kim

¹Associate Professor, Department of Nursing, Paichai University, Korea

²Assistant Professor, Department of Nursing, Chodang University, Korea
echo@pcu.ac.kr, jjosha6615@naver.com

Abstract

This study was a cross-sectional reaserch that analyzed the factors that most affect COVID-19 knowledge in nursing college students who are relatively at high risk for recent prevalence of COVID-19 exposure in relation to clinical practice of nursing college students. A total of 249 nursing students participated in this study, 93 male students and 156 female students. The period for collecting data from structured questionnaires was from October 1 to October 20, 2021. The collected data were frequency analysis, Pearson correlation analysis, simple regression analysis, and hierarchical regression analysis using SPSS 18.0. As a result of the analysis, infection prevention behavior($\beta=0.06$, $p=0.006$) had the most influence on COVID-19 knowledge, and the second was professional intuition($\beta=-.162$, $p=0.018$). Based on the results of this study, in order to improve the knowledge of COVID-19 among nursing students, it is proposed to develop an infection prevention behavior education program and a professional intuition improvement program.

Keywords: COVID-19, Nursing students, Preventive infection behavior

1. INTRODUCTION

SARS-CoV-2, which was first identified in Wuhan, Hubei Province, China in 2019, is COVID-19, which is currently prevalent worldwide [1]. WHO declared an international public health emergency in January 2020, declared a global pandemic in March, and WHO reported more than 4.68 million deaths as of September 19, 2021[2]. According to the Korea Centers for Disease Control and Prevention's COVID-19 incidence report, 27.4% of confirmed patients aged 20 to 29 years old showed the relatively highest incidence among college students [3]. In particular, nursing students are more likely to be exposed to infection than college students in other departments as practical departments in which clinical practice is mandatory in the curriculum. COVID-19 spots are caused by breathing and droplet contact of infected people, and can be infected not only when they are close to the infected person but also when in doors where ventilation is not available. In addition, infected people can spread the virus even before symptoms appear. As a countermeasure, all efforts are made to prevent physical or social distancing, isolation, ventilation hand washing, and wearing a mask, and recently vaccination is recommended. In particular, hand hygiene is the most effective way to prevent infection alone [4]. Nevertheless, according to a recent report, the recognition rate of proper hand washing practice among adults decreased slightly from 88.5% in 2013 to 88.3% in 2020[5]. Nursing students are exposed to the risk of hospital infection because they have many opportunities to contact patients while observing and performing

Manuscript received: November 29, 2021 / revised: December 2, 2021 / accepted: December 7, 2021

Corresponding Author: jjosha6615@naver.com

Tel: +82-61-450-1818, Fax: +82-61-450-1801

Assistant Professor, Department of Nursing, Chodang University

nursing techniques such as measuring patients' vital signs, medication nursing, and mobility assistance during clinical practice. Therefore, nursing college professors are obligated to protect nursing students in clinical practice from hospital infection. However, the reality is that nursing education currently lacks connection with clinical sites.

Nursing professional intuition is a concept that combines a vocational view with a nursing center, which means how to view and think of nursing, and can be said to be a professional view of the nursing process in charge of nursing, and the position itself. Since nursing professional intuition is based on values, it provides standards for personal behavior and provides a framework of concepts for evaluating behavior [6].

Nursing professional intuition consists of five aspects: socialization factors, thinking and concepts, professional images, professional self-concepts, and actions, which are largely divided into the process of recognition and behavior. The recognition process refers to the formation of individual thoughts and beliefs (psychological and social characteristics, experiences) under the influence of socialization factors. Professional self-concept and professional image are formed based on the thoughts and beliefs formed in this way, and these factors appear as actions according to nursing decision-making by interaction, cognition, and mental action between individuals and society. Ultimately, nursing professionals can affect the quality of nursing. Establishing the right values of respect for life as a nurse in the future and growing nursing capabilities to protect patients and their safety are considered necessary not only for COVID-19 infectious disease but also for nursing unpredictable new infectious disease in the future.

Based on previous studies, inaccurate knowledge, negative attitudes, and low infection prevention behaviors currently experienced by nursing students could lead to vague fears of infectious disease and negative perceptions and attitudes toward patients with new infectious disease, which could affect nursing professionals. Therefore, it is essential to establish accurate knowledge of COVID-19 and a positive attitude toward preventing COVID-19 infection, accurate awareness of infection prevention practices, and nursing professionals who should provide nursing to patients with new infectious disease directly or indirectly after graduation. Therefore, this study aims to provide nursing students with evidence for nursing education programs by grasping nursing students' knowledge of COVID-19 infection control, attitudes toward COVID-19 prevention, infectious disease prevention behavior, and nursing professionals.

2. METHODS

The research was a cross-sectional research to analyses the factors that the most affect COVID-19 knowledge in nursing college students who are relatively at high risk for recent prevalence of COVID-19 exposure in relation to clinical practice. A total of 249 nursing students participated in this study, 93 male students and 156 female students. The period of collected data from structured questionnaires was from October 1 to October 20, 2021. The collected data were frequency analysis, Pearson correlation analysis, simple regression analysis, and hierarchical regression analysis using SPSS 18.0.

2.1 Research Tools

2.1.1 Knowledge of COVID-19 infection

It is 23 questions developed by SR Yoon, which refers to theoretical knowledge of COVID-19, and is measured by answering "yes" or "no", and the higher the score, the higher the degree of knowledge [7].

2.1.2 Preventive Attitude toward infection

Attitudes toward infection prevention refer to the subject's mindset or attitude toward personal hygiene, information search, education of others, and discomfort to prevent infection. The attitude toward infection prevention in this study refers to the score measured with a tool developed by MJ Kim, which is a 10-point tool, and the higher the score on a 5-point scale, the more positive it is for infection prevention. In this study, Cronbach's alpha was 0.81 [8].

2.1.3 Preventive Behavior toward Infection

Preventive Infection behavior is a comprehensive infectious disease prevention act that is not limited to hand washing and cough etiquette as a questionnaire on the practice of infectious disease prevention rules in the community. It was measured using a tool developed by HS Kim and JH Park to measure MERS prevention behavior. The research tool for preventing infectious diseases is a total of 10 questions, and the lower the score on a four-point scale, the more preventive actions are practiced. In this study, Cronbach's alpha was 0.888 [9].

2.1.4 Professional intuition

Nursing professional intuition was measured using the nursing professional intuition tool developed by EJ Yoon, YM Kwon and OH Ahn [10]. This tool consists of a total of 29 questions, consisting of five sub-areas: professional self-concept (9 questions), social awareness (8 questions), nursing expertise (5 questions), nursing practice trade (4 questions), and nursing independence (3 questions). 'Nursing Uniqueness' is a reverse conversion question and consists of three questions that contain the subjectivity, uniqueness, and independence of nursing in the medical system, and 'Nursing Room Trade' consists of four questions that mean performing roles as skilled experts in nursing professional needs. 'Nursing expertise' consists of 5 questions with views on the characteristics of nursing as a professional, 'social awareness' is 8 questions to understand the degree of social awareness of nursing and nurses, and 'professional self-concept' is 9 items to confirm the feelings and views of nurses themselves and nursing work. Each question is on a Likert 5-point scale ('very not' = 1 point, 'very much' = 5 points), the higher the score, the higher the nursing professional intuition. The three questions of 'nursing identity' are negative questions, which were scored in reverse. In this study, Cronbach's alpha was 0.888.

3. RESULTS

3.1 General Characteristics

Frequency analysis was conducted to confirm the general characteristics of the study participants (Table 1). As a result of the analysis, 18.9% were aged 19, 16.9% were 20 years old, 7.2% were 21 years old, 37.3% were 22 years old, 7.2% were 23 years old, and 12.4% were 24 years old. Male students accounted for 37.3% and female students 62.7%. The first grade was 25.3%, the second grade 28.1%, the third grade 21.7%, and the fourth grade 24.9%. 39.4% of club activities and 60.6% of non-club activities. As for religion, protestant was 9.6%, Catholic was 6.4%, Buddhism was 5.6%, Other was 3.6, and None was 74.7%. In terms of major satisfaction, the average was 22.5%, the high was 46.6%, and the very high was 30.9%. As for the type of residence, 25.3% of those living with their parents, 54.6% of those living in dormitories, and 20.1% of those living alone. 42.6% of those with opposite sex friends and 57.4% of those without sex friends. As for the economic level, the high level was 42.6%, the middle level was 78.7%, and the low level was 6.0%. In clinical practice, 43.0% were one student and 57.0% were not.

3.2 Differences in COVID-19 knowledge according to preventive infection factors

An independent sample t-test was conducted to confirm the difference in infection-related factors according to the presence or absence of clinical practice (Table 2). As a result of the analysis, there was a difference in the presence or absence of clinical practice in the knowledge of COVID-19 infection ($t=-6.897, p=.000$) and infection prevention behavior ($t=-3.610, p=.000$).

Table 1. General Characteristics

N=249					
Variable	Type	N(%)	Variable	Type	N(%)
Gender	Male	93(37.3)	Residence type	With parents	63(25.3)
	Female	156(62.7)		Dormitory	136(54.6)
Grade	1st	63(25.3)	Economic level	Living alone	50(20.1)
	2nd	70(28.1)		High	38(15.3)
	3rd	54(21.7)		Middle	196(78.7)
	4th	62(24.9)		Low	15(6.0)
Club activities	Yes	98(39.4)	Opposite sex friend	Yes	103(42.6)
	No	151(60.6)		No	143(57.4)
Religion	Protestant	24(9.6)	Age	19	47(18.9)
	Catholic	16(6.4)		20	42(16.9)
	Buddhism	14(5.6)		21	18(7.2)
	Others	9(3.6)		22	93(37.3)
	None	186(74.7)		23	18(7.2)
Major satisfaction	Average	56(22.5)	Clinical practice	24	31(12.4)
	High	116(46.6)		Yes	107(43.0)
	Very high	77(30.9)		No	142(57.0)

Table 2. Differences on COVID-19 according to preventive infection factors

Variable	Levene equal variance	Mean		S.D.		t	p
		Yes	No	Yes	No		
COVID-19 knowledge	F=14.034, p=.000	13.79	15.21	1.29	1.94	-6.897	.000
Professional intuition	F=9.213, p=.003	4.01	4.05	.30	.49	-.902	.368
Prevention attitude	F=.774, p=.380	4.36	4.43	.33	.41	-1.533	.127
Prevention behavior	F=23.022, p=.000	1.34	1.62	.29	.87	-3.610	.000

*p<0.05, **p<0.01

3.3 Corelation between professional intuition, COVID-19 knowledge, infection prevention attitude, and infection prevention behavior

Pearson correlation analysis was conducted to confirm the correlation between professional intuition, infection prevention attitude, infection prevention behavior, and corona knowledge (Table 3). As a result of the analysis, it was found that professional intuition was correlated with preventive attitude ($r=.335$, $p<0.01$), preventive behavior ($r=-.283$, $p<0.01$), and COVID-19 knowledge ($r=.187$, $p<0.05$).

Table 3. Relationship between professional intuition, COVID-19 knowledge, infection prevention attitude and infection prevention behavior

	1	2	3	4
1. Professional intuition	1	.335**	-.283**	-.163**
2. Preventive attitude		1	-.096	-.078
3. Preventive behavior			1	.187*
4. COVID-19 knowledge				1

*. The correlation coefficient is significant at 0.05 level (both sides).

** . The correlation coefficient is significant at 0.01 level (both sides).

3.4 Factors influencing knowledge of COVID-19 infection

A simple regression analysis was performed to analyze the factors influencing the knowledge of COVID-19 infection (Table 4). As a result of the analysis, it was found that professional intuition ($t=-4.066$, $p=.000$), preventive attitude ($t=-2.958$, $p=.003$), and preventive behavior ($t=50.607$, $p=.000$) had a significant effect.

Table 4. Factors influencing knowledge of COVID-19 infection

Independent variable	Dependent variable	Non-standardization coefficient		β	t	p	Statistics
		B	SD				
Professional intuition	Constant	19.040	1.097	-	17.352	.000	$R^2=.063$, Modified $R^2=.059$, $F=116.529$, $p=.000$
	COVID-19	-1.101	.271	-.250	-4.066	.000	
Preventive attitude	Constant	18.559	1.34	-	13.821	.000	$R^2=.034$, Modified $R^2=.030$, $F=8.747$, $p=.003$
	COVID-19	-.900	.304	-.185	-2.958	.003	
Preventive behavior	Constant	13.677	.270	-	50.607	.000	$R^2=.054$, Modified $R^2=.051$, $F=14.219$, $p=.000$
	COVID-19	.616	.163	.233	3.771	.000	

*, $p<0.05$, **, $p<0.01$

3.5 Hierarchical regression analysis affecting knowledge of COVID-19

Hierarchical regression analysis was conducted to identify the factors that most affect corona knowledge (Table 5). As a result of the analysis, it was found that the explanatory power of Model 1 increased to 6%, Model 2 to 9.2%, and Model 3 to 10%, so hierarchical regression analysis is reliable. In addition, the Durbin-Watson value is close to 2, which is recognized as the independence of the residual. As a result of ANOVA, for both models 1, 2, and 3, the significance probability was less than 0.05, so the regression equation was suitable for analysis. The absolute value of the standardized coefficient (beta) value of Model 3 was the highest

in preventive behavior ($\beta=0.06$, $p=0.006$), and the prevention behavior had the most influence on the level of COVID-19 knowledge, and the second was professional intuition ($\beta=-.162$, $p=0.018$).

Table 5. Hierarchical regression analysis affecting knowledge of COVID-19

I.F	Model 1			Model 2			Model 3			Tperance limit
	SE	β	t(p)	SE	β	t(p)	SE	β	t(p)	
(constant)	1.097	-	17.352(.000)	1.222	-	14.287(.000)	1.551	-	12.170(.000)	1.000
PI	.271	-.250		.278	-.201	-3.169(.002)	.300	-.162	-2.376(.018)	
(constant)						14.287(.000)	1.551	-	12.287(.000)	.738
PI				.278	-2.1	-3.169(.002)	.300	-.201	-3.169(.002)	
PB				.167	.167	2.793(.006)	.167	.177	2.793(.006)	
(constant)							1.551	-	12.170(.000)	.921
PI							.300	-.162	-2.376(.018)	
PB							.167	.175	2.771(.006)	
PA							.322	-.098	-1.478(.141)	
Statistics		$R^2=.063$, Modified, $R^2=.059$, $F=16.529$, $p=.000$			$R^2=.092$, Modified, $R^2=.084$, $F=12.392$, $p=.000$			$R^2=.100$, Modified, $R^2=.089$, $F=9.030$, $p=.000$, durbin-Watson=1.861		

$p<0.05$, $P<0.01$

I.F=Independent factor, PI=Professional intuition, PB=Preventive behavior, PA=Preventive attitude

4. CONCLUSION

This study was conducted to prepare basic data for programs to protect nursing students from infection after conducting a survey on COVID-19 knowledge to protect nursing students who have to practice clinical practice and fear of infection due to the recent epidemic of COVID-19. In order to secure the reliability of the data, students who had already performed clinical practice and students who had already performed clinical practice were included as study participants.

As a result of the analysis, it was found that the presence or absence of clinical practice was not related to COVID-19 knowledge. It was found that no knowledge of special infection prevention was acquired through clinical practice, so it could be said that it is urgent to develop and apply appropriate programs for nursing college students exposed to the risk of infection during clinical practice. As a result of the analysis, it was found that infection prevention behavior had the most influence on COVID-19 knowledge, and other influences were nursing professionals intuition, and it can be said that it is necessary to develop a program based on this.

According to a recent study, the need for care guidance in managing COVID-19 patients has been emphasized [11]. Infection management at the national level should be vaccinated against Vaccines, and professors at nursing colleges should develop and apply programs as a way to protect nursing students as soon as possible.

REFERENCES

- [1] <https://ko.wikipedia.org/wiki/%EC%BD%94%EB%A1%9C%EB%82%98%EB%B0%94%EC%9D%B4%9F%AC%EC%8A%A4%EA%B0%90%EC%97%BC%EC%A6%9D19>
- [2] <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- [3] Korea disease control and prevention agency. Current status of COVID-19 in Korea, 2020.

-
- [4] Pittet, D., Allegranzi, B., Sax, H., Dharan, S., Pessoa-Silva, C. L., Donaldson, L., et al., Evidence-based model for hand transmission during patient care and the role of improved practices. *Lancet Infectious Disease*, Vol. 6, pp. 641-652. 2006.
 - [5] Report on the results of a survey on the prevention of infectious disease in the community (hand washing and cough etiquette, KDCA, 2020.
 - [6] Darlene Weis, Mary Jane Schank, Development and Psychometric Evaluation of the Nurses Professional Values Scale-3, *J Nurs Meas*, Vol. 25, No. 3, pp. 400-410, 2017. doi: 10.1891/1061-3749.25.3.400.
 - [7] SR Yoon, Correlation between nurse's knowledge of COVID-19, infection control, resilience, and social and psychological health. Chung-Ang University, Master's thesis, 2020.
 - [8] MJ Kim, A convergent study of nursing college students' knowledge, attitude, and performance of infection prevention activities against MERS. The paper of the Korean Society of Convergence Society of Convergence, Vol. 8, No. 4, pp.149-157, 2017.
 - [9] HS Kim, JH Park, The effect of hand hygiene education programs on nursing college students' knowledge of hand hygiene, recognition of hand hygiene, collection of yellow staphylococcus in the nasal cavity, and implementation of hand hygiene, *Journal of the Basic Nursing Natural Science*, Vol. 14, No. 3, pp. 156-165, 2012.
 - [10] EJ Yoon, YM Kwon and OH Ahn, Development of measuring tools for nursing professional intuition. *Journal of the Korean Nursing Society*, Vol. 35, No. 6, pp. 1091-1100, 2005.
 - [11] Clinical nursing care guidance for management of patient with COVID-19. Sharma SK, Nuttall C, Kalyani V; Hemlata.Sharma, *J Pak Med Assoc*. Vol. 70, No. 5, pp. 118-123. 2020, doi: 10.5455/JPMA.29.