The Factors Affecting the Face Mask Use Preventive Behaviors of Korean University Students: Focusing on Knowledge, Risk Perception, and Anxiety of COVID-19

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Abstract

This research is the descriptive study for verifying the factors affecting the face mask use preventive behaviors of Korean university students. From April 30 to May 30, a survey was conducted in colleges and universities located in four regions such as D-City, C-Province, G-Province, and G-Province. The total number of research subjects was 206 (female: 73.8% Male: 26.2%). This research is a quantitative and descriptive study for verifying the factors affecting the face mask use preventive behaviors of Korean university students. This study conducted a survey using a structured questionnaire. In the results of this research, the factors affecting the face mask use preventive behaviors were anxiety and experience of receiving education on COVID-19. When the anxiety was higher (B=0.28) and when they had experience of receiving education on COVID-19 (B=0.16), they performed better face mask use preventive behaviors. The explanatory power of the model was about 11% (adjusted R2=.108). Even after the COVID-19 pandemic comes to an end in the future, the use of face mask could be helpful for the prevention of respiratory diseases and also reduce the reinfection rate of COVID-19. Based on the results of this study, it is necessary to develop a program related to COVID-19.

Keywords: COVID-19, Students, Masks, Anxiety, Knowledge.

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BACKGROUND

COVID-19 is a infectious virus that first has occurred in China in December 2019, and the infection is spreading around the world[1]. Since the first case of COVID-19 happened in Korea on January 2020, the secondary infection through close contacts has rapidly spread. Since then, interest in the prevention and management of COVID-19 has increased. In response to COVID-19, Korea thoroughly implemented individual quarantine. Wearing a mask has been suggested as an important method of quarantine. Wearing a mask can block the air or droplet transmission of COVID-19. Therefore, this is an important action to prevent infection[2].

As the respiratory syndrome by the infection of SARS-CoV-2, the pathogen of COVID-19 is RNA virus belonging to SARS-CoV-2: Coronaviridae[3]. The transmission through droplets or contacts is known as the route of infection so far, but the definite route of infection has not been revealed yet. The cause of transmission may be direct contact with a confirmed person. In addition, exposure to the same space as a confirmed person for more than 1 hour can lead to infection. In hospitals, it can also be spread through medical personnel or medical devices that have come in contact with patients with symptoms[4]. The incubation period is about 14 days, and it shows various symptoms of respiratory infection from mild case to severe case such as high body temperature, fatigue, headache, cough, shortness of breath, and inflammation in lung, hoarsness, hemoptysis and Gastrointestinal symptoms[5]. According to the WHO announcement in March 2020, the fatality rate was 3.4%. The severe cases and deaths are mostly shown in the old age, person with a disease[6]. The vaccines or medicines with verified effects have not been developed yet, so the symptomatic treatment is applied. The symptomatic treatment includes conservative treatment such as IV and fever reducer, specific antiviral drug, and plasma treatment, and the effectiveness of such treatments cannot be guaranteed. There is no definite treatment until a vaccine is developed[6].

To prevent the COVID-19, the handwashing and face mask use are recommended in the whole world, and the Korean government is educating how to prevent it including the correct method of coughing[6] Currently, the Korean government is concentrating on the pan-governmental prevention of epidemics by raising the infectious disease crisis stage to the severe level, and operating the Central Disaster and Safety Countermeasures Headquarters[6] Also, due to social distancing, the classes for university, and elementary/middle/high school are performed online[7]

Currently, the handwashing, face mask use, and social distancing are the only methods to prevent the COVID-19, so the correct knowledge and attitude to fulfill are important in reality.

The confirmed cases of COVID-19 tend to be gradually increasing in Korea[8]. Actually, due to the MERS in Korea of 2015, the perception of infection has been a lot improved. Also, according to the researches on the knowledge about MERS targeting domestic nursing students after the infection of MERS, when the knowledge was high, the preventive behaviors got also higher[9], [10]. Preventive behavior are important to minimize the spread of COVID-19[11]. Preventive behavior of COVID-19 includes wearing a mask and washing hands[11]. In previous MERS-related studies similar to COVID-19, the preventive behavior of nursing students was significantly correlated with MERS-related knowledge, infection risk perception, infection prevention potential, anxiety, and age[12], [13]. And the risk of infection, depression, anxiety, gender, age, and marital status were major influencing factors in the prevention of COVID-19[15],[16],[17]. In addition, in other previous studies, anxiety, depression, and academic background were factors that influenced preventive behaviors of using face mask in adults [18],[19]. So far, there have been no studies that have looked at the relationship between COVID-19-related knowledge and mask wearing practices. Therefore, this study confirmed that there was the correlation between knowledge related to COVID-19 and preventive actions. Even though the researches on the COVID-19 are continuously performed, there are not many researches that suggest the necessity of education or targeting the whole university students. In order to draw out the infectious disease preventive behaviors through the face mask use, it would be necessary to understand the risk perception, knowledge and anxiety of COVID-19. also to verify the main factors affecting the face mask use.

COVID-19 infection is a very important issue for college students who are engaged in various activities for academic, part-time, and other self-development. However, there are few studies so far on whether university students are wearing masks well to prevent infection. Also, there was no study that looked at university students' knowledge, infection risk perception, and anxiety related to COVID-19.

However, at this point, it is important whether college students are wearing masks properly. And it is necessary to identify the factors that influence it and provide related education. Therefore, this study investigated the areas that were not confirmed in previous studies.

The purpose of this study is to verify the factors affecting the face mask use prevention behaviors of Korean university students focusing on knowledge, risk perception, and anxiety of COVID-19. The concrete goals of this study are as follows.

(1) This study determined the degree of knowledge related to COVID-19 of research subjects.

(2) This study determined the degree of face mask use preventive behaviors of research subjects.

(3) This study determined the degree of risk perception in research subjects.

(4) This study determined the degree of anxiety of COVID-19 in research subjects.

(5) This study determined the risk perception of COVID-19, anxiety, and mask use prevention behaviors according to general characteristics of research subjects.

(6) This study determined the correlations of risk perception of COVID-19, anxiety, and face mask use preventive behaviors of research subjects.

(7) This study determined the factors affecting the face mask use preventive behaviors of research subjects.

RESEARCH METHODS

1. Research Design

This research is a quantitative and descriptive study for verifying the factors affecting the face mask use preventive behaviors of Korean university students. From April 30 to May 30, a survey was conducted in colleges and universities located in four regions such as D-City, C-Province, G-Province, and G-Province. There are no special exclusion criteria. However, subjects who do not wish to participate in the research may discontinue participation at any time. If a study participant cannot participate in the study due to physical or mental problems, it may be excluded. The number of research subjects was calculated by G-power. [11]. Setting up the 1-β=.95, effect size=.15, and predictive factor as 15, the minimum number of samples was 199. Considering some dropouts, the survey was conducted targeting total 221 people. The research subjects were the people who understood the goal of this research, could communicate, and agreed to participate in this study among Korean university students enrolled in colleges and universities located in four regions. The final research subjects were 206 students after excluding 15 subjects whose survey contents were not sufficient.

2. Research Tools

- **General Characteristics**

For the general characteristics, total six items were surveyed such as age, gender, grade, living type, cold symptoms, and regular lung exam.

- **Knowledge related to COVID-19**

This study used the tool for knowledge related to COVID-19, risk perception of COVID-19, and prevention behaviors developed by Taghri et al.[14]. This tool was developed based on the tool frame of MERS-related knowledge, risk perception, and preventive behaviors by Kim & Choi [13], which was modified/complemented by Lee, Kim, & Lee[20]. The tool was composed of total 15 items. A correct answer is given 1 point, and incorrect answer or 'do not know' is given

0 points. The research by Taghri et al.[12], the reliability of COVID-19 knowledge shown as the Cronbach' α was .80 while the reliability in the research by Lee[14] was .76. In this study, the Cronbach' α was .69.

- **Risk Perception of COVID-19**

The risk perception was composed of total two items using the 4-point Likert scale like 4 points for 'Very much likely', 3 points for 'Yes', 2 points for 'No', and 1 point for 'Not at all'. When the sum of each item is calculated, the higher score means the higher level of risk perception. In the research by Taghri et al.[12], the reliability of risk perception of COVID-19 shown as the Cronbach' α was .79[5] while the Cronbach' α was .69 in the research by Lee[14]. In this study, the Cronbach' α was .51.

- **Anxiety**

This study used the Coronavirus Anxiety Scale(CAS) translated by Lee[21]. This tool is a self-reported mental health checkup tool on maladjustment and fear related to the coronavirus. Composed of total five items, each item of CAS is evaluated on the basis of experiences for last two weeks such as 0 point(Not at all) and 4 points(Almost every day). This scaling form accords with the cross-cutting symptom scale of DSM-5. The total score of CAS(≥ 9) means the severe anxiety disorder related to the coronavirus. In case the score of a specific item is high or the total score is high (score 9), it shows the problematic symptom of subjects, which works as a basis for the necessity of additional evaluation and/or treatment. In the research by Lee[21], the reliability of the CAS was Cronbach's α = .83. while the Cronbach's α was .95 in this study.

- **Face Mask Use Scale Prevention Behaviors**

Regarding the face mask use, this study used the Korea Face Mask Use Scale(K-FMUS) which was translated and verified for the validity and reliability by Shin, Lee, & Kang[18] based on the face mask use tool developed by Ho [22], and then modified and verified for the validity and reliability by Lam et al.,[23]. Divided into mask wearing in society and use of mask at home, this tool is based on a 4 point Likert scale(0 to 3 points). When the sum of each item is calculated, the higher score is interpreted as wearing a face mask well. It is composed of total six items. In the research by Lam et al.[23], the reliability of the CAS was Cronbach's α = .83. [23] while the Cronbach's α was .94 in this study.

3. Data collection / ethics in research

Data collection was conducted by using a self-report questionnaire to provide the subjects with information on the study description and consent form, and then collect the completed questionnaire. Research data were anonymized and no personally identifiable information was collected. Collected data were marked with symbols and statistically processed, and then stored in a locked research box in the research director's laboratory to prevent data from being exposed. Research data will be discarded one year after the end of the study. For ethical consideration of the subject, the study was conducted after obtaining IRB approval (IRB No. HS22-04-02).

4. Analysis methods

The Research data were analyzed by IBMSPSS 25.0 program.

(1) Participants' characteristics and COVID-19 knowledge were analyzed using frequency analysis.

(2) The level of face mask use preventive behaviors, risk perception of COVID-19 and anxiety of research subjects was analyzed through the mean and standard deviation.

(3) The level of risk perception, anxiety, and face mask use prevention behaviors related to the participants' characteristics was analyzed through the t-test, ANOVA and Scheffé test.

(4) The correlations of face mask use prevention behaviors, risk perception and anxiety of participants were analyzed through the Pearson's correlation coefficient.

(5) The factors affecting the face mask use preventive behaviors were analyzed by using the Multiple Linear Regression.

RESULTS

1. General characteristics

The general characteristics are shown in Table 1. The mean of age was 21.71, and the percentage of women was higher(73.8%). Regarding the grade from freshmen to senior, the sophomore was the most. The most responses were obtained from 'Living with family members (70.4%)' for type of cohabitant, '1-2 times(74.8%)' for the number of cold symptoms for last one year. 'Not checked regularly(82%)' for the regular lung exam, and 'Yes(84%)' for the experience of receiving education on COVID-19 [Table 1].

[Table 1] General characteristics

N=206

Characteristics		n(%) / Mean±SD
Age		21.71±5.78
Gender	Male	54(26.2)
	Female	152(73.8)
Grade	Freshman	77(37.4)
	Sophomore	57(27.7)
	Junior	51(24.8)
	Senior	21(40.1)
Type of cohabitant	Living alone	43(20.9)
	Living with a friend	11(5.3)
	Living with family members	145(70.4)
	Others	7(3.4)
Cold symptoms (last 1year) (coughing, fever, sore throat)	≤2times	154(74.8)
	≤4times	34(16.5)
	≥5times	18(8.7)
Regular Lung exam (Chest X-ray)	Not checked regularly	169(82.0)
	Check regularly	37(18.0)
Received education on COVID-19	Yes	173(84.0)
	No	33(16.0)

2. Level of Knowledge related to COVID-19

In the results of analyzing the knowledge related to COVID-19, The mean correct answer rate was 90.4% [Table 2]. Among the whole items, the item No. 11, 'The 1st case of COVID-19 was diagnosed in China.' showed the highest correct answer rate(98.1%), which was followed by the item 'COVID-19 is a respiratory tract infections caused by new coronavirus'(97.1%). And the item No. 14, 'The treatment for COVID-19 is antiviral drugs' showed the lowest correct answer rate(59.7%).

[Table 2] Level of Knowledge related to COVID-19

N=206

	Question	Correct answer rate (%)
1	COVID-19 is a respiratory tract infections caused by new coronavirus.	97.1
2	The 1st case of COVID-19 was diagnosed in China.	98.1
3	The COVID-19 appears to have been transmitted to humans by snakes or bats.	89.3
4	Symptoms of COVID-19 include fever, cough, discomfort in breathing, and problem of gastrointestinal tract.	94.7
5	The incubation period of COVID-19 is up to 2 weeks. And the average is 5 days.	87.9
6	COVID-19 can be diagnosed by PCR test. Specimens are taken from the nasopharynx and oropharynx.	90.8
7	COVID-19 can be spread through droplets from coughing.	98.5
8	COVID-19 is transmitted through close contact with an confirmed case.	94.2
9	COVID-19 can be prevented through good hygiene behavior (including hand washing).	90.3
10	A mask with a level of KF-94 or higher is useful for blocking droplets	93.2
11	Avoiding close contact, washing your hands well and wearing a mask can help prevent COVID-19.	94.7
12	Only pregnant women, the elderly and people with underlying medical conditions should wear masks.	80.6
13	People who are at high risk of spreading the disease and who have frequent contact with others should wear a mask at all times.	91.3
14	The treatment for COVID-19 is antiviral drugs.	59.7
15	If you have been in close contact with someone infected with COVID-19 and have symptoms (within 14 days), you should contact your health center.	96.6

3. Korea Face Mask Use Scale Preventive Behaviors, Anxiety, Risk Perception of COVID-19

The mean total score of face mask use preventive behaviors was 18.47±6.36 points; the mean total score of risk perception of COVID-19 was 4.72±1.37 points; and the mean total score of anxiety was 1.48±3.01 points [Table 3].

[Table 3] Face Mask Use Scale Preventive Behaviors, Risk Perception and Anxiety of COVID-19

N=206

Variables	No	Items	Range	Sum Range	M±SD	Sum M±SD
K-FMUS	1	I wear a mask outside to protect myself from a cold (influenza).	0-4	0-24	3.28±1.12	18.42±6.36
	2	I wear a mask at the hospital to protect myself from colds (influenza).	0-4		3.32±1.11	
	3	I wear a mask at home when I have symptoms similar to a cold (influenza).	0-4		3.31±1.07	
	4	I wear a mask even outside when I have cold (influenza)-like symptoms.	0-4		3.37±0.99	
	5	I wear a mask in the hospital when I have cold (influenza)-like symptoms.	0-4		2.52±1.48	
	6	I wear a mask at home when my family has a cold (influenza).	0-4		2.63±1.45	
Risk Perception	1	I am more likely to be infected with COVID-19 than others.	1-4	2-8	2.07±0.71	4.72±1.37
	2	I am afraid that I will be infected with COVID-19.	1-4		2.65±0.96	
Anxiety	1	I felt dizzy or fainted when I heard news related to COVID-19.	0-3	0-15	0.37±0.71	1.48±3.01
	2	I couldn't sleep with thoughts related to the COVID-19.	0-3		0.29±0.63	
	3	My body freezes when I hear or think about the COVID-19.	0-3		0.27±0.65	
	4	I lose my appetite when I hear or think about the COVID-19.	0-3		0.30±0.66	
	5	I have gastrointestinal problems when I hear or think about the coronavirus.	0-3		0.26±0.65	

4. Face Mask Use Scale Preventive Behaviors, Risk Perception according to General characteristics

The face mask use preventive behaviors, risk perception of COVID-19, and anxiety according to the general characteristics are as follows[Table 4]. According to grade(F=4.630, *p*=.004), there were differences in face mask use preventive behaviors like the seniors showed the higher degree of face mask use preventive behaviors than sophomores. The risk perception of COVID-19 showed differences according to gender(t=-2.331, *p*=.021) and experience of receiving education on COVID-19(t=-2.639, *p*=.009), and the women and people who received education showed the higher degree of risk perception of COVID-19 than men and people without education respectively. There were no differences in anxiety.

[Table 4] Face Mask Use Scale Preventive Behaviors, Risk Perception according to General characteristics

N=206

Characteristics	Categories	K-FMUS		Risk Perception		Anxiety	
		M±SD	t or F (*p*)	M±SD	t or F (*p*)	M±SD	t or F (*p*)
Gender	Male	18.70±6.10	0.377 (.706)	4.35±1.69	-2.331 (.021)	1.37±2.97	-0.313 (.755)
	Female	18.32±6.47		4.85±1.22		1.51±3.02	
Grade	Freshman	18.48±6.10	4.630 (.004)	4.71±1.42	1.084 (.357)	1.05±2.07	2.360 (.291)
	Sophomore	16.90±6.21		4.92±1.19		1.80±3.48	
	Junior	18.98±7.51		4.74±1.35		1.43±3.73	
	Senior	20.95±3.26		4.14±1.65		2.28±2.45	
Type of cohabitant	Living alone	18.69±6.43	1.788 (.151)	4.71±1.38	0.685 (.562)	1.75±3.29	1.818 0.145)
	Living with a friend	17.88±7.03		4.55±1.39		0.53±1.65	
	Living with family members	19.80±2.39		5.00±1.41		1.50±2.41	
	Others	13.75±3.10		5.25±1.16		2.53±0.18	
Cold symptoms (last 1year) (coughing, fever, sore throat)	≤2times	18.69±6.43	0.643 (.527)	4.71±1.38	0.958 (.385)	1.74±3.29	2.486 (.086)
	≤4times	17.88±7.03		4.55±1.39		0.52±1.65	
	≥5times	17.11±4.07		5.11±1.47		1.05±1.86	
Lung exam (Chest X-ray)	Not checked regularly	18.54±6.11	-0.587 (.558)	4.66±1.29	1.218 (.225)	1.29±2.57	1.894 (.060)
	Check regularly	17.86±18.54		4.97±1.70		2.32±4.45	
Received education on COVID-19	Yes	18.55±6.11	3.110 (.002)	4.83±1.37	-2.639 (.009)	1.54±3.19	-0.684 (.494)
	No	16.72±7.61		4.15±1.27		1.15±1.69	

5. Correlations among Face Mask Use Scale Preventive Behaviors, Risk Perception according to General characteristics

The correlations of face mask use preventive behaviors, anxiety, and risk perception of COVID-19 are as follows[Table 5]. The anxiety showed a significant correlation with the face mask use preventive behaviors of research subjects(r=.0.153, *p*=.028). There was also a significant correlation between anxiety and risk perception of COVID-19(r=.0.291, *p*<.001).

[Table 5] Correlations among Face Mask Use Scale Preventive Behaviors, Risk Perception according to General characteristics

N=206

	K-FMUS r(*P*)	Risk Perception r(*P*)	Anxiety r(*P*)
K-FMUS	1		
Risk Perception	-0.083(.234)	1	
Anxiety	-0.153(.028)	0.291(<.001)	1

6. Factors Influencing Face Mask Use Scale Preventive Behaviors

To verify the factors affecting the face mask use of subjects, this study performed the multiple regression analysis by setting the grade and experience of receiving education on COVID-19 that showed statistically-significant relations with the face mask use as independent variables through the dummy variable processing, and also putting the anxiety that showed a significant correlation with the face mask use as an independent variable. In the results of testing the basic assumption for the regression analysis following the criteria, the tolerance limit was .15~.99, which was higher than 0.1. The variance inflation factor was 1.008~1.033, which was lower than 2. Thus, there were no problems of multicollinearity between independent variables. To test the independence between error terms, the Durbin-Watson test value was drawn, and the results of the analysis was shown as 1.955 close to 2, so there was no autocorrelation. The assumption of linearity and normality for the regression analysis was met. In the results of the multiple regression analysis, the regression model was significant (F=7.187, p<.001), and the adjusted determination coefficient(Adj. R squared) showing the explanatory power of the model was .108. In the results of this study, when the anxiety was higher(B=0.28), and when they had experience of receiving education on COVID-19(B=0.16), the face mask use was highly shown. The total explanatory power of those variables was about 11%(adjusted R squared =.108) [Table 6].

[Table 6] Factors Influencing Face Mask Use Scale Preventive Behaviors

Variables	B	SE	β	t	p	VIF
(Constant)						
Anxiety	0.131	0.031	0.287	4.282	.000	1.033
Received education on COVID-19	0.621	0.248	0.166	2.503	.013	1.032
R squared=12.5%, Adjusted R squared =10.8%, F=7.187 p<.001 Durbin-Watson=1.955						

DISCUSSION

The purpose of this study is to understand the degree of COVID-19 knowledge and face mask use preventive behaviors of Korean university students, and also to examine the factors affecting the face mask use preventive behaviors. In the results of this study, the factors affecting the face mask use preventive behaviors were anxiety and experience of receiving education on COVID-19. In the results of a preceding research, the factors affecting the face mask use preventive behaviors were depression, anxiety, and educational background[18]. In this preceding research, the anxiety was also shown just like this study.

In this study, there were many cases of living with parents in living type. Considering the high transmission rate of COVID-19 between family members, it would be essential to wear a mask with family members at home. The guidelines by the Korea Centers for Disease Control & Prevention recommend to avoid contacts with cohabitants and to make sure to wear a mask during the period of self-quarantine[19]. According to a preceding research, the face mask use between family members could prevent the spread of COVID-19[25].

The most research subjects experienced 1-2 times of cold symptoms for last one year, and the subjects who did not get regular lung exam were more than the subjects who got it regularly. In the results of analyzing the national health-related behaviors by the National Health Insurance Service, the increased subjects who practiced the prevention of epidemics in daily life like frequently wearing a face mask and washing hands because of the COVID-19 pandemic, were led to the decreased patients who used medical institutions for respiratory diseases such as cold, influenza, and pneumonia[26]. However, this study did not question about the actual exposure to the COVID-19. Thus, considering the subjects exposed to the COVID-19, the interpretation of this part could be changed. The further researches would need to verify the experience of getting exposed to the COVID-19.

Most of the research subjects did not get the regular lung exam. Actually, before the COVID-19 pandemic, they probably did not even pay attention to their lungs at ordinary times. In the national health screening program conducted by the National Health Insurance Service of Korea, every man & woman in their 20 or up are mandatorily required to get the health screening, and this screening includes the lung exam (Chest X-ray) [27]. However, the students who had no subjective symptoms probably did not get the screening as they did not feel the necessity. It would be necessary to inform the importance of screening, and to guide them to get the lung exam regularly in the future.

There were more students who received education on COVID-19. As this study was conducted over one year after the first outbreak of COVID-19, many students were exposed to the relevant education. In the results of this study, the students who received education on COVID-19 showed the high degree of face mask use preventive behaviors and also high level of risk perception of COVID-19.

Also, regarding the degree of COVID-19 knowledge in this study, the correct answer rate of university students was 90.4%, and the correct answer rate of 'The first case of COVID-19 was diagnosed in Wuhan, China.' was the highest (98.1%), which was followed by the correct answer rate of 'COVID-19 is a respiratory infection caused by a new species of coronavirus family.'(97.1%). And the item No. 14, 'The disease can be treated by usual antiviral drugs.' showed the lowest correct answer rate (59.7%). In the results of analyzing the knowledge related to COVID-19 by the preceding research using the same tool, the mean correct answer rate of total items was 90.0% [20]. The subjects of this study showed the high degree of knowledge almost equal to preservice medical personnel. With the increased attention to the COVID-19, the level of knowledge was probably raised by education through various media, and education/public service advertisement provided by the state or local governments. Also, according to a preceding research, among the whole items, the item No. 11, 'The COVID-19 can be prevented through no close contacts such as handshakes and kissing, not attending meetings, and frequent hand disinfection' showed the highest correct answer rate(98.6%) while the item No. 14, 'The COVID-19 can be treated by usual antiviral drugs' showed the lowest correct answer rate(50.0%)%[20]. This showed the similar result to the results of this study. In the education related to the COVID-19 for ordinary people, it would be necessary to include the part of treatment.

In this study, the mean total score of risk perception of COVID-19 was 4.72±1.37 while the mean total score of risk perception of COVID-19 was 5.51±1.26 in a preceding research. The subjects of this study showed a bit lower score, which could be interpreted into many different ways. The nursing students who were the research subjects of the preceding research probably had the high degree of risk perception of COVID-19 because they had to frequently contact with others like clinical practice, and they were highly anxious about the spread of the COVID-19. However, the ordinary university students did not have to contact with

many people because of non-face-to-face class, which was probably led to the low degree of risk perception of COVID-19. Also, the degree of anxiety in research subjects was not that high. After going through the COVID-19 pandemic for a year, the vaccination, settled prevention of epidemics in daily life, and decreased confirmed cases probably lowered their anxiety compared to the moment when the COVID-19 was initially broken out.

The anxiety showed correlations with the face mask use preventive behaviors and risk perception of COVID-19. This result was similar to the results of preceding researches[20] [18].

Just as mentioned in the beginning of conclusions, however, the factors actually affecting the face mask use preventive behaviors were anxiety and experience of receiving education on COVID-19. In a preceding research, the anxiety influenced the face mask use preventive behaviors. According to another preceding research, in case of experiencing more COVID-19 knowledge and having the high degree of risk perception of COVID-19, the COVID-19 preventive behaviors were performed well[9]. Even though the COVID-19 preventive behaviors include the face mask use, the tool is not same as this study, so the judgment could be a bit limited. But as a result, it was a similar variable, and showed the results partially according with [28].

Conclusion

Putting together the results of this study, on the basis of 2022, it has been two years since the initial outbreak of COVID-19, and most of Korean university students seem to be adapting themselves to this situation. The state is actively explaining how to prevent the COVID-19 through various public service advertisements and education while the subjects are overcoming it through active prevention of epidemics in daily life. However, they were still passive about the preventive screening of respiratory diseases, and also lacking in COVID-19 knowledge such as treatment. In the future, the state or school health officials would need to provide more education of management & treatment of respiratory diseases including the COVID-19 to university students.

Also, in order to raise the risk perception of COVID-19, it would be required to continuously educate the necessity of wearing a face mask for respiratory health and reducing the risk of reinfection even after the anxiety of COVID-19 disappears. In the future, it would be also significant to develop an education program related to this.

This study used the online convenience sampling method for a few universities, so it is difficult to generalize the results of this study to the whole university students of Korea. And with the COVID-19 pandemic, various factors were working as the factors affecting the preventive behaviors, and this study could not include all the items regarded as the factors affecting them, so the explanatory power could be insufficient.

The limitation of this study is the explanatory power is not high. Although the explanatory power of this study is not high, this study is significant because there was no previous study that looked at the face mask use preventive behaviors, knowledge, risk perception, and anxiety of Covid-19. In addition, since Korea made it compulsory to wear a mask from the early days of COVID-19, the degree to which students wear a mask is high. In the case of other countries, the situation may be very different from that of Korea. Therefore, it is considered that a follow-up study on this is necessary.

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