# Comparison of Covid-19 knowledge, attitudes, and preventive behavior between nursing students and other major students

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## ABSTRACT

**Introduction :** Coronavirus infection-19 is now emerging as a worldwide infection. Unlike before, covid-19 has a fast spread of infection, and the incidence rate is increasing at an uncontrollable rate as no proven treatment has been developed. In particular, according to statistics by age of confirmed patients in Korea, the age of people in their 20s has the highest incidence rate, which is believed to be due to their higher activity compared to other ages.

**Purpose :** university students should accurately recognize and implement infection control and prevention guidelines to maintain their health and prevent the spread of infection. In particular, nursing college students need to be careful not only because they are future medical personnel but also because they can be a source of infection for patients if they participate in clinical practice.

**Methodology :** In this study, we decided to compare the relationship between covid-19 knowledge, attitudes, and implementation of infection prevention activities, and identify and compare the differences between nursing and other major engineering students. Naver form questionnaires were distributed to 80 students attending a four-year university and a technical university in Daegu. The collected data were used for technical statistics, T-test and correlation analysis using the SPSS 18 program.

**Findings :** Significant relationships were drawn to Corona 19 related knowledge and attitudes, showing a positive attitude with higher knowledge levels, which also showed significant relationships in the implementation of infection prevention behaviors. Compared to other college students, nursing college students showed significantly higher levels of knowledge related to covid-19, and their attitude and implementation of infection prevention activities also showed higher scores on average, but did not show significant results.

**Originality :** Based on the results of the study, even nursing college students, including some other college students, could identify the level of knowledge, attitudes, and implementation of infection prevention activities related to covid-19, and can be used to develop effective education guidelines.

**Keywords**: Covid-19, Knowledge, Attitude, Preventive , Student

## INTRODUCTION

Coronavirus infection-19 (COVID-19, hereinafter Covid-19) is a novel infection first reported in Hubei Province, China in December 2019, with mild to severe respiratory infections such as fever, coughing, boredom, dyspnea and pneumonia. As of 00:00 on 28 June 2021, Korea recorded 155,572 confirmed cases of covid-19 progression and 2,015 confirmed deaths (Zhu,& Zhang, 2019)

Until now, it has been known as droplet, contact route, and is known to be caused by touching objects contaminated with the coronavirus and eyes, nose and mouth through droplets caused by coughing or sneezing. Therefore, the Ministry of Health and Welfare is actively recommending compliance with standard precaution, droplet precaution and contact-free (centers for Disease control and prevention, 2020).

Furthermore, non-drug mediation methods such as personal hygiene and distancing are known to be the most effective in maintaining daily life in novel infectious disease pandemic situations, where voluntary participation and receptive attitudes of members of society are important for such non-drug interventions to work successfully (Kwon & Lim, 2020). According to the age-specific trend of confirmed cases in Korea, 27.4% of college students had the highest incidence rate compared to the age group, which is about 5 times higher than 5.5% of elementary, middle and high school students (Lee, & Kim, 2019). Young age groups are asymptomatic or mild even if infected, and there is a significant risk of spreading infections in the region by actively engaging in social activities without medical care or examination (Jang & Sohn, 2020). Considering the characteristics of college

students in their 20s who are less afraid of new viruses or diseases than other age groups, it is important for college students to accurately recognize and implement infection control guidelines to maintain their health and block infection spread to other students (J & Wu, 2006).

In particular, students attending the College of Nursing should follow the preventive behavior guidelines exemplary as health care provider (Lee & Kim, 2021), and nursing students participating in clinical practice should be extra careful not to become a source of corona-19 infection (Kim, 2015).

In order to increase the performance rate of infection prevention rules that college students already know, education that can improve knowledge is important (Kim, & Song, 2018), and infection prevention education programs should be systematic and operated continuously rather than temporarily (Nour & Babilghith, 2015).

Prior studies of covid-19 were primarily medical studies investigating cases of infection, infection pathways, or risk of infection. (Hong, 2020; Kim & Seo, 2020). In China, where disease occurred, studies were conducted to determine the degree of knowledge, attitudes, and preventive behavior associated with covid-19 among ordinary people and medical workers (Kang, 2020; Zhong & Luo, 2020) and in Iranian and Indian medical students (Zhangz & Zhou, 2020; Taghrir & Borazjani, 2020). and in Chinese and Pakistani college students (Maheshwari, 2020).

In Korea, there is a prior study of attitudes and knowledge effects of covid-19 infection prevention behavior in general adults (Hong, 2020) but there is a lack of prior studies comparing covid-19 knowledge, attitudes and infection prevention implementation in health and medical students (Lee, & Kim, 2021).

Due to the nature of covid-19, the study results may vary from time to time, so at a time when covid-19 infection spread has led to phased social distancing, (Lee & Kim, 2021) a study is needed to separate healthcare disciplines into other majors.

Therefore, this study was conducted to identify the relevance between covid-19 knowledge, attitudes, and implementation of infection prevention activities, and to provide basic data on infection prevention control measures for college students with high risk of infection propagation.

## METHOD
### 1. Research Design

This study is a descriptive comparative study to identify the relationship between covid-19 knowledge, attitudes, and implementation of infection prevention activities and compare the knowledge, attitudes, and infection prevention activities of nursing and other engineering students.

### 2. Subject of study

The subjects of this study were nursing students attending universities and colleges located in Daegu City, and students majoring in other majors except nursing. The subjects were selected for those who could access Naver Form Link and 80 people who agreed to understand and participate in the purpose of this research.

### 3. Data collection

The data collection period was from June 23, 2021 to June 27, 2021, and the collection method was to distribute Naver form links through KakaoTalk chat rooms, university community and personal SNS to domestic college students. Subjects were allowed to move on to the next page when they answered all questions, and only those who voluntarily agreed to participate in the research after explaining the purpose of the research were allowed to participate in the survey. A total of 82 responses were recorded, of which 80 responses were used in the analysis, except for those who did not fill in the questions of demographic information, those who filled in the unknown information, and two incomplete responses to more than 1/2 surveys. The number of subjects studied was set at 0.05, effect size 0.15, and power 0.80, and 77 were calculated using G-Power.

### 4. Research Tools

#### 1) knowledge

To measure the degree of knowledge about covid-19, 16 questions developed by Yoon Sara (2020) were modified and supplemented by researchers based on the "Coronavirus Infection-19 Response Guidelines" KDCA, 2020).

The questions consisted of questions related to the symptoms of covid-19, propagation mechanisms, precautions, and coping mechanisms in the event of suspected symptoms.

All questions are composed of "yes" and "no" answers, and it is a two-way questionnaire that gives 1 point for the correct answer and 0 point for the wrong answer. The range of scores is from a minimum of 0 to a maximum of 16 points, and the higher the score, the greater the subject's knowledge of Covid-19.

In this work, the reliability of knowledge measurement tools was shown as Kuder-Richardson=.72.

#### 2) Attitude

In this study, the measurement tool of attitude was modified and supplemented by Kim (2017), and tools modified and supplemented by Choi Young-eun and Lee Eun-sook (2019) were used by researchers for this study.

Each item was measured on a Likert five-point scale, with two questions in the form of an infinitive sentence, No. 8 and No. 11 being reversed by charging each question from 1 to 5 'very not' to 5 'very yes'.

The range of scores ranges from 1 to 5, and the higher the score, the more positive the attitude toward covid-19.

The reliability of the tool Cronbach's α = .65 in

Park's study(2006).

Cronbach's α = .66 in a modified and complemented study by Kim (2017).

Cronbach's α = .83 in Choi Young-eun and Lee Eun-sook (2019)

Cronbach's α = .71 in this study.

### 3) Behavioral infection prevention activities

Questions to measure the level of implementation of infection prevention against covid-19 used promotional materials posted on the coronavirus infection-19 website, implementation measures for social distancing, and tools developed by two other people (2021).

The covid-19 infection prevention action implementation tool consisted of a total of 13 sub-regions: hand hygiene (4 questions), mask wearing (4 questions), physical contact (1 question), multi-use facilities (1 question), cough etiquette (1 question), ventilation (1 question), and visits to other areas (1 question).

Considering the five-point scale and frequency, the measurement is from at least 13 points to up to 65 points, with five points on the 12th to 14th, four points on 9th to 11th, three points on 6th to 8th, and two points on 3rd to 5th, and one point on 0-2nd.

In two other studies, Cronbach's alpha value was .79 for the implementation of infection prevention activities.

In this work, the value of Cronbach's alpha was shown to be .71.

### 5. Data analysis method

The collected data were analyzed using the SPSS 18 program. The general characteristics of the subjects under study, the knowledge, attitudes, and implementation of infection prevention behaviors used technical statistics to obtain frequency, percentage, mean, and standard deviation. The independent sample T-test was used to compare the knowledge, attitudes, and implementation of infection prevention activities of nursing college students and other college students. Correlation between knowledge of covid-19, attitudes, and implementation of infection prevention was calculated by Pearson's coronation coeficients.

### 6. Ethical consideration

This study was conducted to identify the connection between covid-19 knowledge and attitude, and the implementation of infection prevention activities, and to provide basic data on infection prevention control measures for college students with high risk of infection propagation. Before conducting the survey, the researcher explained the purpose, method, and process of the study, and accurately suggested that the collected data would be used only for research purposes and can be withdrawn at any time if desired. Only those who agreed to participate in the study were required to participate in the survey after elaborating on the period of use of the information obtained from the subjects and how it was collected, recorded, used, archived and discarded.

### RESULT AND DISCUSSION
### 1. General characteristics

Of the total 80 students, 42 (52.5 percent) were nursing college students and 38 (47.5 percent) were other major college students.

In terms of gender, 15 males (18.5%) and 65 females (80.2%). The age of the respondents was 54 (67.5%) between the ages of 20 and 22, with 9 first graders (11.3%), 27 second graders (33.8%), 38 third graders (47.5%), and 6 fourth graders (7.5%).

It was reported that 72 (90%) of electronic media such as SNS, TV, and Internet news were the highest, and that two other schools (2.5%) and six families (7.5%) obtained covid-19 related information.

Asked if anyone had received a covid-19 confirmation around them, 19 people answered yes (23.8%) and 61 people answered no (76.3%)(Table 1).

### 2. Comparison of knowledge, attitudes, and implementation of anti-impression behaviors of covid-19 according to general characteristics

Knowledge of covid-19 averaged 10.5 points for men, 11.9 points for women, with 12 points for age, and 12.3 points for first graders.

Comparing the average scores of nursing college students and other major students, 12.4 points for nursing college students and 10.8 points for other major college students, slightly higher for nursing students.The acquisition route for covid-19 was 11 points for school or home acquisition, and 11.7 points for respondents acquired through electronic media such as SNS, TV, and Internet news, slightly higher than those acquired at school or home.

Attitude and implementation of covid-19 was a little higher than that of men with 4.5 points for women's attitudes and 3 points for implementation.

In terms of age, 4.6 points for attitude and 3.1 points for implementation, 4.6 points for first graders, and 4.6 points for implementation, and the highest for third graders.

Nursing students scored 4.5 points in attitude and 3.1 points in performance, higher than other students. Respondents who acquired knowledge through school scored 4.9 points in attitude and 3.1 points in implementation, higher than those who acquired through other routes.(Table 1).

### 3. Correlation between knowledge and attitude and implementation of infection prevention activities related covid-19

A significant positive correlation between knowledge and attitudes about covid-19 ($p<.029$) appeared, so the higher the knowledge, the more positive the attitude, and the more positive the attitude, the more knowledgeable it can be confirmed.

Significant positive correlation between attitude to covid-19 and implementation of infection prevention actions ($p<.001$) has appeared, so the more positive the attitude, the more likely it is to conduct infection prevention.

However, there was no significant correlation between knowledge and implementation (p<.208)(Table 2).

## 4. Differences in knowledge, attitudes, and implementation of infection prevention activities on covid-19: Comparison of nursing and other major students

### 1) Knowledge of covid-19

As a result of measuring the knowledge level of covid-19 between nursing college students and other students, the health center should be contacted immediately if it has self-isolation, fever, or respiratory symptoms for 7 days if it is in contact with the confirmed person in question 11.

The wrong answer rate was the highest at 85% (65 people), and the answer rate for question 10's "Mask must be worn when visiting medical institutions or indoor multi-use facilities (Answer = Yes)" was the highest at 100% (80 people).

The average score for covid-19 according to the major is 12.42 (center value = 12) for nursing students and 10.89 (center value = 11) for other major students out of 16, indicating significant differences between groups (p<.001)(Table 3)(Table 4).

### 2) Attitudes to covid-19

The average covid-19 attitude score for each major was 4.56 points for nursing students (center value = 4.66) and 4.34 points for other major students (center value = 4.5), showing no significant difference between groups (p<).062)(Table 4).

### 3) Implementation of infection prevention measures against COVID-19

The average score of infection prevention behavior for covid-19 according to the major was 3.14 (center value = 3.34) for nursing college students and 2.81 (center value = 2.8) for other major college students out of 5, showing no significant difference between groups (p<).054)(Table 4).

| variable | Sortation | Total(%) | Knowledges (Average) | Attitudes (Average) | Compliance (Average) |
|---|---|---|---|---|---|
| Gender | Male | 15(18.5) | 15(10.5) | 15(4.1) | 15(2.7) |
| | Female | 65(80.2) | 65(11.9) | 65(4.5) | 65(3) |
| Age | 20~22 | 54(67.5) | 54(12) | 54(4.6) | 54(3.1) |
| | 23~25 | 12(15) | 12(11) | 12(4) | 12(2.4) |
| | 26~28 | 8(10) | 8(10.3) | 8(4.2) | 8(2.6) |
| | 29~ | 6(7.5) | 6(11.8) | 6(4,1) | 6(2.8) |
| Grade | 1 | 9(11.3) | 9(12.3) | 9(4.6) | 9(2.8) |
| | 2 | 27(33.8) | 27(11.6) | 27(4.4) | 27(2.9) |
| | 3 | 38(47.5) | 38(11.7) | 38(4.5) | 38(3) |
| | 4 | 6(7.5) | 6(10.8) | 6(4.1) | 6(2.8) |
| Major | Nursing | 42(52.5) | 42(12.4) | 42(4.5) | 42(3.1) |
| | Non-health science | 38(47.5) | 38(10.8) | 38(4.3) | 38(2.8) |
| Acquisition paths of COVID-19 information | school | 2(2.5) | 2(11) | 2(4.9) | 2(3.1) |
| | home | 6(7.5) | 6(11) | 6(4) | 6(2.7) |
| | Electronic media | 72(90) | 72(11.7) | 72(4.4) | 72(3) |
| Peripheral COVID-19 confirmed cases. | yes | 19(23.8) | 19(11) | 19(4.4) | 19(2.8) |
| | no | 61(76.3) | 61(11.9) | 61(4.4) | 61(3) |

**Table 1. General characteristics      (N=80)**

|  |  | Knowledges | Attitudes | Compliance |
|---|---|---|---|---|
| Knowledges | pearson r | 1 | .244 | .142 |
|  | p(both sides) |  | .029 | .208 |
|  | N | 80 | 80 | 80 |
| Attitudes | pearson r | .244 | 1 | .385 |
|  | p(both sides) | .029 |  | .000 |
|  | N | 80 | 80 | 80 |
| Compliance | pearson r | .142 | .385 | 1 |
|  | p(both sides) | .208 | .000 |  |
|  | N | 80 | 60 | 80 |

**Table 2. Correlation between knowledge and attitude and implementation of infection prevention activities related covid-19(N=80)**

| Variables | True | False |
|---|---|---|
| Fever (above 37.5 ℃), cough, difficulty breathing, muscle pain, and sore throat are characteristic symptoms during infection | 74 | 6 |
| Drops (saliva) generated when coughing or sneezing enter other people's mouths and become infected. | 70 | 10 |
| If you touch something contaminated with the COVID-19 with your hands and then touch your eyes, nose, or mouth, you can become infected. | 75 | 5 |
| Virus emissions are high at the time when symptoms appear, so they are easily spread in the early stages. | 60 | 20 |
| In the case of close contact within an enclosed space, the spread of infection increases. | 78 | 2 |
| To prevent COVID-19, you must wash your hands after going out. | 79 | 1 |
| Ventilate the room periodically to prevent COVID-19. | 70 | 10 |
| If you have a fever of 37.5 ℃ or higher or have respiratory symptoms, you should stay at home without going to school or going out | 70 | 10 |
| If the fever persists above 38.0 ℃ or the respiratory symptoms worsen, take a rest at home and observe the progress. | 27 | 53 |
| When visiting a medical institution or indoor multi-use facility, be sure to wear a mask | 80 | 0 |
| In case of contact with a confirmed patient, self-isolate for 7 days, and in case of fever or respiratory symptoms, contact the local public health center immediately. | 12 | 68 |
| The incubation period for COVID-19 is from 1 to 14 days | 73 | 7 |
| COVID-19 can be prevented with a cloth mask, not a mask for health use or for preventing droplets. | 52 | 28 |
| If a traveler has respiratory symptoms such as fever, sore throat, cough, etc. within 14 days after returning home, they should immediately seek medical attention at the nearest hospital | 15 | 65 |
| The mortality rate increases when the elderly, patients with impaired immune function, and patients with underlying diseases are infected. | 79 | 1 |

**Table 3.  Knowledge of covid-19                                        (N=80)**

| | variables | Mean±SD | Median | p |
|---|---|---|---|---|
| Knowledges | Nursing | 12.42 ±1.17 | 12 | |
| | Non-health science | | | p<.001 |
| | | 10.89 ±1.72 | 11 | |
| Attitudes | Nursing | 4.56 ±0.40 | 4.66 | |
| | Non-health science | | | p<.062 |
| | | 4.34 ±0.59 | 4.5 | |
| Compliance | Nursing | 3.14 ±0.82 | 3.34 | |
| | Non-health science | 2.81 ±0.67 | 2.8 | |
| | | | | p<.054 |

**Table 4. Differences knowledge, attitudes and com and implementation of infection prevention activities(N=80)**

This study is a descriptive correlation study to identify the correlation between knowledge, attitudes, and implementation of infection prevention activities and to see if there are significant differences between nursing and other students. The correlation of each variable resulted in a significant correlation between knowledge and attitude, attitude and implementation of infection prevention activities, but no significant results were obtained in knowledge and implementation of infection prevention activities.

In other words, higher knowledge levels related to covid-19 such as infection routes, symptoms, and government guidelines showed a positive attitude toward preventing infectious diseases, while higher positive attitudes toward covid-19 showed higher performance of infection prevention. This result was consistent with the prior study, which reported significant correlation between knowledge and attitudes,(Salman & Mustafa, 2020) and the higher the positive attitude toward covid-19, the higher the degree of implementation of infection prevention (Kim & Park, 2018; Saefi, & Fauzi, 2020).

According to a comparison of knowledge, attitudes, and implementation of infection prevention activities between nursing and other major students, the average score of Covid-19 knowledge was 12.4 points for nursing college students and 10.8 points for other major students. This is believed to be due to the fact that nursing college students have acquired knowledge related to infection through major and liberal arts courses.

However, in the current situation where new infectious diseases are prevalent around the world, it is necessary to quickly deliver up-to-date information to reduce the spread of covid-19, rather than making major differences.

When looking at question 11 of the knowledge tools that the subjects responded to, they had an 85% incorrect answer rate of "If you have contact with a confirmed person, you should contact the health center immediately if you have self-isolation, fever or respiratory symptoms for seven days." These researchers asked some incorrect respondents why they chose 'yes' to determine the cause of these incorrect rates.

As a result, the subjects were aware of calling the "Disease Management Agency 1339" to ask for help when symptoms appeared, but were not aware of how long self-isolation was carried out.

In addition to question 11, question 13 "Corona 19 can be prevented with cloth masks, not health masks or drool-proof masks." It also showed a high rate of incorrect answers.

Regarding this question, some incorrect respondents were also not properly aware of the difference between silk blocking masks and cloth masks when asked about the reason for choosing responses. In addition, some of the respondents said they saw on SNS that even cloth masks were equipped with a function to completely block the coronavirus, and that they had obtained incorrect information.

If such misinformation is recognized and informed

around, the incidence of infectious diseases will increase.

Therefore, college students who are likely to be exposed to wrong information due to their high SNS usage will need more special attention and management.

Attitude to Covid-19 was 4.5 points for nursing college students and 4.3 points for other major students, and 3.1 points and 2.8 points for nursing and other major students, respectively, were both high scores for nursing college students, but not significant differences.

There were no significant differences in attitude and implementation of infection prevention activities, which are believed to have affected the level of infection prevention and implementation of infection prevention due to high infection and lack of treatment.

Judging from the above results, implementation of infection prevention is important regardless of major, but especially health majors such as nursing college students will be involved in future medical and clinical practice, so we should pay more attention to compliance with infection prevention.

## CONCLUSION AND RECOMMENDATION

This study identifies the relationship between covid-19 related knowledge, attitudes, and implementation of infection prevention behaviors, and compares the levels of each variable to nursing and other college students.

As a result, college students showed a positive attitude as they had a higher knowledge level due to a significant relationship between the knowledge and attitudes associated with covid-19. This attitude also showed a significant relationship to the implementation of infection prevention activities, and attitudes, including awareness and awareness of infectious diseases, contributed to the practice of infection prevention activities. According to a comparison of the level of knowledge, attitudes, and implementation of infection prevention among nursing and other college students, nursing college students have significantly higher levels of knowledge related to covid-19 than other college students. Attitude and implementation of infection prevention activities also showed higher scores on average compared to other college students, but did not show significant results. However, this study has a very small number of samples, and it is difficult to generalize the results of the study in that the gender ratio between each group is not evenly distributed, and only for college students in one region. In addition, the selection of other college students is very wide, so it is necessary to set standards and classify them within the group.

The tools used to measure knowledge, attitudes, and implementation of infection prevention activities in this study are also unlikely to fully trust the results of the study, which identifies problems such as small number of questions and difficulty level of questions without discrimination. Therefore, a systematic verification process is needed to modify and supplement the tools used in this study. However, based on the results of the study, even nursing college students, including some other college students, can understand the level of knowledge, attitudes, and implementation of infection prevention activities related to covid-19. It is also meaningful in that it can be used to develop effective educational guidelines that can increase the practice rate of infection prevention for highly active college students.

In order to supplement the level of knowledge related to Covid-19 that showed significant results for each major, it is necessary to educate universities in the health and non-health sectors except nursing universities to be exposed to the latest information on infectious diseases outside their majors.

At the level of attitude and implementation of infection prevention activities that did not show significant differences between majors, it is necessary to educate college students on the risk of infectious diseases and the causes of preventive actions. With the recent development of the vaccine, the proportion of respondents said that the coronavirus 19 infectious disease would be less likely to spread was relatively high. This can be a cause for alarm. In addition, there is a high percentage of respondents saying that wearing personal protective equipment severely affects their work stress, indicating the risk of neglecting proper protective equipment.

Therefore, it is necessary to disclose accurate information about the current situation and to strengthen management for appropriate wearing of protective equipment. In addition, nursing college students preparing as future medical workers showed higher average scores than other college students at the knowledge level, but there was no difference in attitude and implementation. As a nursing college student preparing for future medical personnel, it seems necessary to have a higher level of practicality and active attitude toward infection prevention activities. If college students are supported to foster a positive attitude toward covid-19, I think the practice rate of infection prevention will increase, which will reduce the incidence of 20-29 among confirmed cases in Korea. Based on the research results, I would like to suggest the following: First, since the samples in this study are insufficient to generalize, it is necessary to study them with samples that complement the limitations of this study. Second, both nursing and other major engineering students acquired information using electronic media such as SNS, TV, and Internet news, so they should be actively utilized to promote and continuously provide the latest information and infection prevention education through electronic media. Third, there is a correlation between attitudes toward infectious diseases and the implementation of infection prevention acts, so

research on developing programs and measuring the effectiveness of attitudes is suggested.

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