




# Knowledge and Practice of COVID-19 Preventive Measures Among Indonesian College Students; A Survey After Two Years of Pandemic

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**Abstract.** This study aimed to discover knowledge and practices of COVID-19 preventive measures of college students after two years of the pandemic to prevent the spread of COVID-19. A cross-sectional study was conducted from March to June 2022. Fifteen questions of knowledge and 12 questions for practice were shared online with undergraduate students. There were five themes of preventive measures, including the general knowledge of COVID-19, keeping a safe distance, wearing a mask, hand hygiene, and respiratory ethics. The Chi-square test was operated to define the knowledge and practice relationship significance. In total, 285 students participated in this study. The average age was 22 years, the youngest student was 18 years old, and the oldest was 28 years old. Most students who participated in this study were females in Jawa Islands and from social science study fields. More than 90% of students correctly answered all the questions about the general knowledge of COVID-19. The most frequent correct answer was about the suggested occasion to do hand hygiene (99.3%). The poorest practice was avoiding hugging, kissing, and shaking hands when meeting with friends or relatives. Only 11 of 285 (3.9%) students had a poor practice of the COVID-19 preventive measures, while 96% had a good practice. Three of 190 (1.6%) students with high knowledge of COVID-19 preventive measures had poor practice, and 20% of students with low knowledge had poor practice (p-value 0.004). Knowledge of COVID-19 preventive measures significantly related to the practice.

**Keywords:** Knowledge · Behavior · Preventive Measure · COVID-19 · College Students · Indonesia

## 1 Introduction

Coronavirus Disease 2019 (COVID-19) has broadly impacted not only the health aspect but also other aspects such as the economy, education, security, and community welfare [1, 2]. Good strategies or actions are demanded to contain the spread of the virus to facilitate community return to normal activities to overcome the impact caused by the pandemic.

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It is recognized that COVID-19 is with us for the long term [3]. Preventive measures should become integral to daily activities, including keeping a safe distance, wearing a mask, washing hands, and practicing respiratory ethics when coughing or sneezing [4]. Implementing prevention measures will create a safe condition with minimal transmission potential that can support the movement of the economy and other activities, including university teaching and learning activities.

According to the knowledge, attitudes, and practices (KAP) theory, the control measures are influenced by people's knowledge, attitudes, and practices to prevent the transmission of COVID-19 [5]. Several factors, including the level of education, information, experience, and socio-cultural factors, can influence a person's knowledge. Furthermore, knowledge can influence behavior change. Behavior is the result of all kinds of experiences and interactions of a person with their environment, manifested in knowledge and practices [6].

As the largest community on campus, students are essential to participating in preventing COVID-19. Data on students' readiness to follow health protocols to prevent transmission of COVID-19 is still limited. This study aimed to discover the knowledge and practices of COVID-19 preventive measures of college students after two years of the pandemic and the relationship between knowledge and practice in efforts to prevent the spread of COVID-19.

## 2 Method

To achieve the study's aims, we conducted a cross-sectional study from March to June 2022. The study population was active students at the diploma and undergraduate level in Indonesia proved by their student number. The samples were conveniently recruited online using social media such as WhatsApp, Line, Telegram, Twitter, and Instagram.

We used questionnaires to obtain information about the knowledge and the behavior of COVID-19 preventive measures. Fifteen questions were shared to define the knowledge level, and 12 for practice. We classified the knowledge and behavior of COVID-19 preventive measures into five themes, including knowledge of COVID-19 in general, keeping a safe distance, wearing a mask, washing hands, and practicing respiratory ethics when coughing or sneezing. The questionnaires were tested for validity and reliability before spreading, and the instrument was proven valid and reliable.

The level of knowledge was defined based on the correct answers. We classified students into high knowledge if students could answer more than 75% of the question correctly, intermediate knowledge if it was 50% to 75%, and low knowledge if it was less than 50%. For each item of practice, there were three possible answers; always (score 2), sometimes (score 1), and never (score 0). We classified it into good practices if the students had a score of 14 or more and poor practices if the score was below 14.

Data were presented descriptively, and the chi-square test was operated to test the significance. The analysis was carried out using SPSS version 25 software.

### 3 Results

In total, 285 students participated in this study. The average age was 22 years, the youngest student was 18, and the oldest was 28. Most of the students who participated in this study were females, located in Jawa Islands, and from Social science study fields (Table 1).

More than 90% of students correctly answered all three questions about the knowledge of COVID-19 in general. The question that got the most frequent correct answer was about the occasions when it is suggested to do hand hygiene (99.3%). The question with the lowest correct answer was choosing the correct example of physical distancing practices (63.5%) (Table 2).

In general, most students (67.7%) had high knowledge about the COVID-19 preventive measure, 28.1% were in the intermediate, and 4.2% had low knowledge.

The most frequent COVID-19 preventive measure to be practiced was washing hands using currents water and soap whenever they looked dirty. The practice with the lowest proportion was the application of physical distancing by avoiding hugging, kissing, and shaking hands when meeting with friends or relatives (Table 3).

Only 11 of 285 (3.9%) students had a poor practice of the COVID-19 preventive measures, while 96% had a good practice. Three of 190 (1.6%) students with high knowledge of COVID-19 preventive measures had a poor practice of COVID-19 preventive measures, 8.1% of students who had intermediate knowledge had poor practice,

**Table 1.** Subjects Characteristic

|                    |                            | Mean (SD)  | Frequency | Percentage |
|--------------------|----------------------------|------------|-----------|------------|
| Age (year)         |                            | 21.4 (1.4) |           |            |
| Gender             | Male                       |            | 72        | 25.3       |
|                    | Female                     |            | 213       | 74.7       |
| Location (Islands) | Bali                       |            | 7         | 2.5        |
|                    | Jawa                       |            | 253       | 88.8       |
|                    | Kalimantan                 |            | 7         | 2.5        |
|                    | Maluku                     |            | 1         | 0.4        |
|                    | Nusa Tenggara              |            | 1         | 0.4        |
|                    | Papua                      |            | 1         | 0.4        |
|                    | Sulawesi                   |            | 6         | 2.1        |
|                    | Sumatera                   |            | 9         | 3.2        |
| Field of Study     | Social Science             |            | 125       | 43.9       |
|                    | Health Science             |            | 77        | 27         |
|                    | Physical Science and Match |            | 65        | 22.8       |
|                    | Education                  |            | 18        | 6.3        |

**Table 2.** The Number of Correct Answers for General Knowledge and COVID-19 Preventive Measures Knowledge

| No                           | Questions  | Number of the correct answer (%) |
|------------------------------|--|----------------------------------|
| <b>General knowledge</b>     |  |                                  |
|                              | What is the aim of COVID-19 preventive measure                             | 267 (96.0)                       |
|                              | What is COVID-19   | 252 (90.6)                       |
|                              | How the SARS-CoV-2 Virus is transmitted                                    | 260 (91.2)                       |
| <b>Hand hygiene</b>          |  |                                  |
|                              | When is the recommended time to wash the hands with water and soap         | 279 (97.9)                       |
|                              | On what occasion is hand hygiene suggested                                 | 283 (99.3)                       |
|                              | How to implement hand hygiene  | 234 (82.1)                       |
| <b>Respiratory etiquette</b> |  |                                  |
|                              | What to do if you cough or sneeze  | 246 (86.3)                       |
|                              | What is the purpose of implementing respiratory etiquette                  | 257 (90.2)                       |
|                              | What is the last step of respiratory etiquette                             | 185 (64.9)                       |
| <b>Wearing Mask</b>          |  |                                  |
|                              | What is the function of the Mask   | 236 (84.9)                       |
|                              | When is the compulsory time to wear a mask at home                         | 272 (95.4)                       |
|                              | In what area wearing a mask is not suggested                               | 255 (89.5)                       |
| <b>Physical Distancing</b>   |  |                                  |
|                              | How many meters is the safe distance to protect from COVID-19 transmission | 256 (89.8)                       |
|                              | Choose the correct examples of physical distancing practices               | 181 (63.5)                       |
|                              | Choose the practice that is not considered a physical distancing practice  | 223 (78.2)                       |

and 20% of students with low knowledge had poor practice (p-value 0.004). There was no significant difference in COVID-19 preventive measures practice regarding gender (Table 4).

**Table 3.** Compliance with COVID-19 Preventive Measures Practices

| No                           | Practices   | Number (%) |           |           |
|------------------------------|---|------------|-----------|-----------|
|                              |   | Yes        | Sometimes | No        |
| <b>General Practices</b>     |   |            |           |           |
|                              | I always consider taking COVID-19 preventive measures   | 250 (87.7) | 34 (11.9) | 1 (0.4)   |
| <b>Respiratory etiquette</b> |   |            |           |           |
|                              | I cover my nose or mouth with tissue or elbow whenever cough or sneeze                            | 246 (86.3) | 26 (9.1)  | 13 (4.6)  |
|                              | I do hand hygiene after coughing or sneezing  | 214 (75.1) | 59 (20.7) | 12 (4.2)  |
|                              | I always throw the used tissue into a closed/covered trash bin                                    | 255 (89.5) | 24 (8.4)  | 6 (2.1)   |
| <b>Hand hygiene</b>          |   |            |           |           |
|                              | Whenever my hands are dirty, I wash them with current water                                       | 270 (94.7) | 11 (3.9)  | 4 (1.4)   |
|                              | I always wash my hand with water and soap for at least 20 second                                  | 204 (71.6) | 63 (22.1) | 18 (6.3)  |
|                              | I always bring hand sanitizer wherever I go   | 192 (67.4) | 80 (28.1) | 13 (4.6)  |
| <b>Wearing Mask</b>          |   |            |           |           |
|                              | I always wear a mask properly covered nose and mouth  | 260 (91.2) | 23 (8.1)  | 2 (0.7)   |
|                              | I always wear a mask regardless of present or no warning  | 246 (86.3) | 29 (10.2) | 10 (3.5)  |
|                              | I only use a mask if there is an obligation to wear a mask before entering the place              | 201 (70.5) | 19 (6.7)  | 65 (22.8) |
| <b>Physical Distancing</b>   |   |            |           |           |
|                              | I always follow the rule of keeping physical distancing during a queue                            | 237 (83.2) | 44 (15.4) | 4 (1.4)   |
|                              | I choose to stay home if there is no urgent situation to leave the house                          | 211 (74.0) | 57 (20)   | 17 (6)    |
|                              | I avoid physical contacts like kissing, handshaking, or hugging when meeting friends or relatives | 185 (64.9) | 92 (32.3) | 8 (2.8)   |

**Table 4.** The Relationship between Knowledge, Gender, and Behavior

| Knowledge    | Practice |        | Total       | P value |
|--------------|----------|--------|-------------|---------|
|              | Good     | Poor   |             |         |
|              | Number   | Number | Number (%)  |         |
| Knowledge    |          |        |             |         |
| High         | 190      | 3      | 193 (67.7)  | 0.004   |
| Intermediate | 74       | 6      | 28.1 (28.1) |         |
| Low          | 10       | 2      | 12 (4.2)    |         |
| Gender       |          |        |             |         |
| Male         | 68       | 4      | 72 (25.3)   | 0.292   |
| Female       | 206      | 7      | 213 (74.7)  |         |

## 4 Discussion

The current study investigated Indonesian undergraduate students' knowledge and behavior toward COVID-19 preventive measures at the end period of the COVID-19 pandemic. This study found a high knowledge of COVID-19 and its preventive measures among the students, with the highest knowledge of hand hygiene. This finding was similar to a study investigating medical students' knowledge in Indonesia [7].

This high knowledge among undergraduate students could be explained by the timing of the study, which was more than two years after the pandemic. This study discovered the increased knowledge of students compared to the previous study. Studies among Indonesian undergraduate students conducted in 2020 indicated that most undergraduate students had an intermediate knowledge level of COVID-19, while this study illuminated that most graduate students had high knowledge levels [8, 9]. It exhibited that students have been learning well about COVID-19 and its preventive measures during the pandemic.

Generally, the study participants disclosed positive practices during COVID-19 preventive measures at the end period of the COVID-19 pandemic. The positive practice was significantly related to students' knowledge of preventive measures. Similar results were illuminated by other studies in Indonesia, the United States, and Saudi Arabia [6, 10–12]. On the contrary, a study from Egypt reported low adherence to COVID-19 preventive measures among students. The study indicated that 58% of students wearing a face mask, 41.3% avoid hugging or kissing others, and 20.7% keeping distance from others [13].

The current study was noticed to have several limitations. The self-reporting method may affect the study results because of personal bias, which could be stemmed from an inability to recall or a desire to exaggerate issues. Nevertheless, it is crucial to consider participants' responses regarding the preventive measure of COVID-19 as a starting point for further research.

## 5 Conclusion

This study investigated Indonesian undergraduate students' knowledge and behavior toward COVID-19 preventive measures at the end period of the COVID-19 pandemic and proved the significant relationship between knowledge and practice.

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**Authors Contribution.** AS, AAN, CEP, IA, and SJM conceptualized the study, prepared study protocols, collected data, conducted initial analysis, and wrote the first draft. AS conducted analysis, review and finalized final manuscript. All authors approved the submitted version.

**Conflicts of Interest.** The authors declare no conflict of interest.

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