




# Knowledge, attitude, perception, and factors associated with the risk perception of COVID-19 among nursing college students in Japanese universities: A cross-sectional study

Yuki Shimotake<sup>1</sup>  | Etongola Papy Steve Mbelambela<sup>1</sup>  |  
Sifa Marie Joelle Muchanga<sup>2,3</sup>  | Antonio F. Villanueva<sup>4</sup> |  
Marlinang Diarta Siburian<sup>2</sup> | Rie Shimomoto<sup>5</sup> | Kazuyo Ikeuchi<sup>6</sup> |  
Yoko Matsunaga<sup>7</sup> | Marina Minami<sup>1</sup> | Tatsuo Iiyama<sup>2</sup> | Narufumi Suganuma<sup>1</sup>

<sup>1</sup>Department of Environmental Medicine, Kochi Medical School, Kochi University, Kochi, Nangoku, Japan

<sup>2</sup>Department of International Trials, National Center for Global Health and Medicine, Tokyo, Japan

<sup>3</sup>Department of Obstetrics and Gynecology, Faculty of Medicine, University of Kinshasa, Kinshasa, Democratic Republic of the Congo

<sup>4</sup>Healthcare Unit, Economic Research Institute for ASEAN and East Asia, Jakarta, Indonesia

<sup>5</sup>Nursing Course Department, Kochi Medical School, Kochi University, Kochi, Nangoku, Japan

<sup>6</sup>Department of Nursing, Shikoku University, Department of Nursing School, Tokushima, Japan

<sup>7</sup>Department of Nursing Nihon Institute of Medical Science, Saitama, Japan

## Correspondence

Sifa Marie Joelle Muchanga, Department of International Trials, National Center for Global Health and Medicine, 1-21-1, Toyama, Shinjuku-ku, Tokyo 162-8655, Japan.  
Email: [Muchangasifa@gmail.com](mailto:Muchangasifa@gmail.com)

## Abstract

**Background and Aim:** The spread of coronavirus disease 2019 (COVID-19) in the world has brought different attitudes and perceptions among social strata. Nursing students being future first-line healthcare workers are more at risk of being infected and exposed to various stressors from shared information. The objectives of this study were to evaluate the knowledge, attitude, and perception of COVID-19 among nursing students and to estimate predictors of their risk perception.

**Methods:** We conducted an online survey among undergraduate nursing students at three selected Japanese Universities. Data on knowledge, attitude, and perception toward COVID-19 were collected using a structured questionnaire. We performed multiple logistic regression analyses to identify factors associated with the risk perception toward COVID-19 infection.

**Results:** Of the 414 nursing students who participated in the study, 368 (90.4%) reported that the media including radio, television, internet, and/or social media were the main source of knowledge. Fever (96.1%) and dry cough (89.6%) were reported as the main symptoms. Regarding the attitude toward the treatment and preventive measures, almost 92.8% of participants recommended the use of vaccines. Being female appeared to be three times associated with the fear of getting infected (adjusted odds ratio [aOR]:3.03; 95% confidence interval [CI]: 1.21–7.58). Students who took part in extracurricular activities reported that they feared being infected with COVID-19 (aOR:2.62; 95% CI:1.33–5.16). Other factors did not show an association.

**Conclusion:** Knowledge and attitude of nursing students toward COVID-19 were accurate for the majority of them, with the main source of information being the media. Practicing extracurricular activities and being female were associated with

the fear of the disease. Efficient and controlled communication is needed during widespread disease outbreaks.

#### KEYWORDS

COVID-19, epidemiology, infectious diseases, knowledge, nursing student, perception

## 1 | INTRODUCTION

Since its declaration as a global health emergency by the World Health Organization (WHO),<sup>1</sup> the coronavirus disease 2019 (COVID-19) pandemic continues to inflict far-reaching negative effects on all sectors worldwide. Even medical education has not been spared from the deep impact of the pandemic globally.<sup>2–4</sup> The symptoms of the disease range from mild, such as fever, cough, and shortness of breath, to severe, such as pneumonia, acute respiratory distress, and kidney failure, which can lead to death in critical cases.<sup>5</sup> Moreover, asymptomatic individuals may also be contagious because the virus has been detected in their respiratory secretions during the presymptomatic period.<sup>6</sup> Confirmation of infection requires nucleic acid testing of respiratory tract samples (e.g., nasopharyngeal swabs), but clinical diagnosis may be made based on symptoms, exposure, and chest imaging. COVID-19 has truly circled the globe, claiming more lives among the elderly, patients with comorbidities, and frontliners every day. This pandemic has affected healthcare services by triggering physical, psychological social, and economic status of healthcare professionals.<sup>7</sup> The WHO is continuing to publish new COVID-19 guidelines and protocols that include information on signs and symptoms and prevention of and protective measures against COVID-19, which have been adopted by the ministries of health of many countries.<sup>8,9</sup> While approvals of carefully selected diagnostic devices, medicines, and vaccines continue, compassionate approaches prevail and supportive care for patients is typically the standard protocol because to date no specific effective antiviral therapies have been identified.<sup>10</sup> Given that the COVID-19 pandemic is still ongoing and continues to bear upon our daily lives, especially those of health professional frontliners, this study aimed to evaluate the knowledge, perception, and attitude level and to estimate the predictors of perception toward COVID-19 among a group of future frontliners: undergraduate nursing students.

## 2 | METHODS

### 2.1 | Study design

An online survey was conducted from August 4 to September 6, 2020 among undergraduate students pursuing nursing degrees at selected Japanese Universities. The present survey was pilot-tested ( $n = 5$  students) to assess the feasibility of the study. Three Japanese Universities: Kochi University, Shikoku University, and Nihon Institute of Medical Science participated in this survey. The universities

were selected by convenience based on the investigator's university collaboration network.

### 2.2 | Sites

#### 2.2.1 | Kochi University

A public university established in 1949, Kochi University is one of Japan's prestigious national universities and is located in Kochi city, Kochi prefecture, on the southern Japanese island of Shikoku.

#### 2.2.2 | Shikoku University

A private university established in 1925, it is located in Tokushima city, Tokushima prefecture, also on Shikoku Island.

#### 2.2.3 | Nihon Institute of Medical Science

A private university established in 1918 as Josai Business School, Nihon Institute of Medical Science is located in Moroyama town, Saitama prefecture on the main island of Honshu. Saitama is considered as a part of greater metropolitan Tokyo.

### 2.3 | Sample size calculation

Sample size calculation was based on the hypothesis that the probability of having good knowledge, perception, and positive attitudes toward COVID-19 could be set at 50%, with a confidence interval (CI) of 95% and a precision of 5%. Using this, the calculated minimum sample size ( $N$ ) was 384.

### 2.4 | Inclusion criteria

Undergraduate nursing students aged 18 years or old enrolled in three Japanese universities for the academic year 2019–2020 were included in this study.

For the selected academic year, the number of enrolled nursing students was 280 for Kochi University, 403 for Shikoku University, and 357 for Nihon Institute of Medical Science. A total of 435 students participated in this survey, notably: 184 (65.7%) from Kochi

University, 230 (57.1%) from Shikoku University, and 21 (5.9%) from Nihon Institute of Medical Science. Given their small number, participants from the Nihon Institute of Medical Science were excluded from the main analysis. Thus, the final sample size became 414 (60.6%) participants. At the time of data collection, Japan was in lockdown; universities and institutions were closed. Since the students were not on the university campuses and mainly had online courses, we proceeded with the online survey.

## 2.5 | Study variables

Independent variables assessed were the following demographic characteristics: sex, age, academic year levels, parents' educational levels, and main sources of information on COVID-19. The dependent variables assessed were knowledge, attitude, and perception toward COVID-19.

## 2.6 | Questionnaire and data collection

After a detailed explanation of the study, a written informed consent was obtained from each participant. A structured questionnaire modified from the questionnaire developed by Olaimat et al.<sup>11</sup> was anonymously administered to all participants for the collection of sociodemographic data, knowledge, perception, and attitude toward COVID-19. The questionnaire was prepared based on the available information on the websites of the European and American Centers for Diseases controls (ECDC and CDC, respectively) and the WHO. It was reviewed by a panel of experts and revised based on their comments. Cronbach's  $\alpha$  was calculated, and it was within the acceptable level ( $>0.70$ ) with a value of 0.74.

The questionnaire contained four sections. The first section aimed to assess the sociodemographic attributes of the respondents on variables such as age, sex, school year, and the educational level of parents. The second section assessed the knowledge toward COVID-19. It consisted of questions on the source of infection and natural host (three items), mode of transmission (five items), symptoms (seven items), and methods of prevention, control, and treatment (three items) regarding COVID-19. Each correct response was weighted as 1 point, with 0 for incorrect responses. In the third section, we assessed the individual perception regarding infected persons, the seriousness of the disease, and whether the student worries about his or her life and declines to practice in hospitals that treat COVID-19 patients (five items). In the last section, we assessed the attitudes of respondents toward COVID-19. In this section (nine items), we explored outlooks on physical distancing rules, government response, international trade, treatment, preventive measures, and care for hospital inpatients.

## 2.7 | Statistical analysis

Continuous variables were summarized by the mean and standard deviation (mean; SD) and categorical variables were summarized

by proportion (%). Analysis of variance was performed to compare continuous variables and knowledge scores of more than two groups.  $\chi^2$  test was used to compare qualitative variables among different undergraduate year levels. Respondents' knowledge toward COVID-19 was arrived at by summing up the correct responses for a possible maximum score of 18. A correct answer to an item was assigned 1 point, while an incorrect answer was assigned 0. The score was used to compare different groups according to the studied characteristics.<sup>12-14</sup>

Multiple logistic regression analyses were performed to identify the factors associated with the risk perception toward COVID-19 infection after adjustment for the mother's education level, father's education level, knowledge, grade, and age. Results were presented as odds ratio (OR) with 95% CI.

Differences were considered statistically significant when the  $p$  values were less than 0.05. All analyses were performed using STATA Software version 13.0 for Windows (Stata Corp.).

## 2.8 | Ethical statement

This study was undertaken in accordance with international bioethical standards, in particular the Declaration of Helsinki. All participants provided their informed consent. The study protocol was approved by the Ethical Committee of Kochi University, Kochi Medical School. The study was conducted following the EQUATOR research reporting checklist and the STROBE checklist for cross-sectional research.

## 3 | RESULTS

Of 435 nursing undergraduate students who completed the survey, 414 were included in the analysis. Table 1 shows the general characteristics of the participants.

Their mean age was  $18.45 \pm 0.8$  years for Year 1 (or freshmen),  $19.44 \pm 0.7$  years for Year 2 (or sophomores),  $21.01 \pm 3.1$  years for Year 3 (or juniors), and  $21.72 \pm 1.1$  years for Year 4 students (or seniors). As compared with other students, sophomores were practicing more extracurricular activities ( $p < 0.003$ ).

Media including television, radio, internet, and/or social media were reported as the main sources of knowledge about COVID-19 by 92.0% of freshmen, 78.7% of sophomores, 95% of juniors, and 90.7% of seniors, and there was no significant difference between the groups of students.

Knowledge assessment regarding general information, mode of transmission, common symptoms, treatment, and preventive measures against COVID-19 are reported in Table 2.

Regarding general knowledge, 78.2% of freshmen, 75.4% of sophomores, 81.2% of juniors, and 80.2% of seniors reported that COVID-19 was first diagnosed in China. In addition, about 99% knew that it is a pandemic and 78.3% said that animals are the natural hosts of the virus.

**TABLE 1** General characteristics of the study population

General characteristics	Year 1 (n = 139)	Year 2 (n = 63)	Year 3 (n = 104)	Year 4 (n = 108)	Total (n = 414)
Gender					
Male	9 (6.5)	3 (4.8)	9 (8.7)	10 (9.3)	31 (7.5)
Female	130 (93.5)	60 (95.2)	95 (91.3)	98 (90.7)	383 (92.5)
Age, mean (SD) <sup>a</sup>	18.45 (0.8)	19.44 (0.7)	21.01 (3.1)	<b>21.72 (1.1)***</b>	20.09 (2.2)
Extracurricular activity practice, n (%)	45 (32.6)	<b>35 (55.6)**</b>	53 (52.0)	51 (47.2)	184 (44.8)
Father's education level, n (%)					
Junior high school	4 (3.6)	1 (2.3)		4 (4.3)	9 (2.7)
High school/vocational/other	65 (59.1)	26 (59.1)	53 (63.1)	53 (56.4)	197 (59.3)
College	41 (37.3)	17 (38.6)	31 (36.9)	37 (39.3)	126 (38.0)
Mother's education level, n (%)					
Junior high school	3 (2.7)	-	-	1 (1.1)	4 (1.2)
High school/vocational/other	62 (55.4)	37 (74.5)	59 (65.6)	69 (73.4)	225 (65.6)
College	47 (41.9)	12 (25.5)	31 (34.4)	24 (25.5)	114 (33.2)

Note:  $\chi^2$  test;  $p < 0.05$ .

Abbreviations: ANOVA, analysis of variance; SD, standard deviation.

<sup>a</sup>ANOVA.

\*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

When considering the transmission mode, 90.5% of participants reported that the infection can be transmitted by direct contact with infected persons without symptoms, 34.7% of participants reported that the transmission can be through handling domestic animals, and 73.8% reported it can be transmitted through contaminated fluids. About 88.3% reported that the infection can be transmitted through mosquito and arthropod bites.

When we compared the participants by the years of college, 88.8% of freshmen, 91.7% of sophomores, 93.1% of juniors, and 89.6% of seniors reported that the infection can be transmitted by direct contact with infected persons even asymptomatic. There was no difference in terms of knowledge and transmission mode.

Fever was the most commonly reported symptom by 96.1% of participants, followed by a dry cough by 89.6% of participants, while 10.4% reported other symptoms such as throat pain and muscle pain. Regarding the knowledge about symptoms, the intergroup differences showed that the majority of freshmen (78.4%) reported sputum to be a common symptom ( $p < 0.001$ ), while 77.9% of juniors reported vomiting ( $p < 0.05$ ).

For the treatment and preventive measures, 83.98% of freshmen were aware that there is no cure for COVID-19 versus 86.4% of sophomores, 74.7% of juniors, and 90.6% of seniors ( $p < 0.05$ ). Wearing masks as a preventive measure was reported by 99.3%, 96.8%, 92.2%, and 97.2% of freshmen, sophomores, juniors, and seniors, respectively ( $p < 0.05$ ). In addition, 79.2% recommended the 14 days of quarantine of infected subjects to prevent the spread of the disease.

As for perception, when considering all participants, 33.5% of participants were worried more about their life than treating

COVID-19 patients, and although 55.6% of them thought that COVID-19 is fatal for humans, 60.1% thought that the pandemic can be easily controlled. More than half of them, 58.5%, declined to practice in a COVID-19 treatment facility. When we compared participants by their school years, no difference was found between the groups with regard to perception.

Regarding the attitude toward the treatment and preventive measures, almost 92.8% of them recommended the use of vaccines to reduce the expansion of COVID-19 (data not shown).

Table 3 shows that the reasons for undergraduates to decline to practice in hospitals that treat COVID-19 patients have been due to perceived delay in the government's response as the reason for the spread of COVID-19 (67.0%;  $p < 0.01$ ), and also that COVID-19 appears as more severe than influenza (61.2%;  $p < 0.05$ ).

Predictors of fearful perception toward COVID-19 are shown in Table 4. Two new notable findings were revealed. Being female appeared to be three times associated with the fear of getting infected (OR: 3.03; 95% CI: 1.21–7.58). Participating in extracurricular activities appeared to be more than twice associated with the panic of being affected by COVID-19 (adjusted OR: 2.62; 95% CI: 1.33–5.16).

## 4 | DISCUSSION

This study aimed to evaluate the knowledge, attitude, and perception toward COVID-19 and to estimate the predictors of fearful perception toward COVID-19 among undergraduate nursing students from three Japanese universities. The number of cases in Japan

**TABLE 2** Knowledge and perception of nursing students on COVID-19 distributed by academic year

Factors	Freshmen (n = 139), n (%)	Sophomores (n = 63), n (%)	Juniors (n = 104), n (%)	Seniors (n = 108), n (%)	Total (n = 414), n (%)
<b>General knowledge</b>					
The first case of COVID-19 was initially diagnosed in China in 2019	104 (78.2)	43 (75.4)	82 (81.2)	85 (80.2)	314 (79.1)
COVID-19 is an infectious disease and a pandemic	136 (98.5)	58 (96.7)	101 (100.0)	107 (99.1)	402 (98.8)
Animals are the natural host of SARS-CoV2	102 (80.3)	48 (85.7)	72 (72.7)	81 (77.1)	303 (78.3)
<b>Transmission mode</b>					
COVID-19 is transmitted by handling domestic animals	50 (38.7)	18 (30.5)	30 (30.6)	38 (36.2)	136 (34.7)
COVID-19 is transmitted through the corpses of COVID-19 victims	109 (80.7)	48 (80.0)	76 (77.5)	88 (83.0)	321 (80.4)
COVID-19 is transmitted through mosquitoes or arthropods	113 (87.6)	51 (86.4)	89 (90.0)	94 (88.7)	347 (88.3)
COVID-19 may be transmitted by direct contact with infected persons without symptoms	119 (88.8)	55 (91.7)	94 (93.1)	95 (89.6)	363 (90.5)
COVID-19 is transmitted through droplets or by surfaces contaminated with the body fluids	98 (73.7)	50 (83.3)	73 (74.5)	72 (67.9)	293 (73.8)
<b>Most common symptoms of COVID-19</b>					
Dry cough	121 (87.1)	56 (88.9)	94 (90.4)	100 (92.6)	371 (89.6)
Sputum	<b>109 (78.4)***</b>	41 (65.1)	55 (52.9)	60 (55.6)	265 (64.0)
Fever	134 (96.4)	58 (92.1)	100 (96.2)	106 (98.2)	398 (96.1)
Vomiting	106 (76.3)	37 (58.7)	<b>81 (77.9)*</b>	80 (74.1)	304 (73.4)
Headache	56 (40.3)	19 (30.2)	42 (40.4)	46 (42.6)	163 (39.4)
Diarrhea	102 (73.4)	40 (63.5)	81 (77.9)	78 (72.2)	301 (72.7)
Others such as throat pain, muscle pain q15	16 (11.5)	6 (9.5)	10 (9.6)	11 (10.1)	43 (10.4)
<b>Treatment and preventive measures</b>					
There is no available cure for COVID-19	115 (83.9)	51 (86.4)	74 (74.7)	<b>96 (90.6)*</b>	336 (83.8)
Keep infected people in isolation for 14 days to protect others from COVID-19 infection	109 (81.3)	47 (78.3)	79 (79.8)	80 (76.2)	315 (79.2)
Wear a mask as a preventive measure	137 (99.3)	<b>61 (96.8)**</b>	94 (92.2)	105 (97.2)	397 (97.1)
<b>Main sources of knowledge, n (%)</b>					
Medical professional	1 (0.7)	2 (3.3)	1 (1.0)	5 (4.6)	9 (2.2)
Friend/family	8 (5.8)	3 (4.9)	3 (3.0)	3 (2.8)	17 (4.2)
Meeting/university	2 (1.5)	8 (13.1)	1 (1.0)	2 (1.9)	13 (3.2)
TV/radio/internet/social media	<b>126 (92.0)</b>	<b>48 (78.7)</b>	<b>96 (95.0)</b>	<b>98 (90.7)</b>	<b>368 (90.4)</b>
<b>Perception</b>					
I am afraid of being infected with COVID-19	119 (88.8)	54 (90.0)	91 (90.1)	98 (90.7)	362 (89.8)

(Continues)

TABLE 2 (Continued)

Factors	Freshmen (n = 139), n (%)	Sophomores (n = 63), n (%)	Juniors (n = 104), n (%)	Seniors (n = 108), n (%)	Total (n = 414), n (%)
I am worried more about my life than treating COVID-19 patients	39 (29.8)	20 (33.3)	34 (34.0)	40 (37.7)	133 (33.5)
I decline to practice in the hospital that treats COVID-19 patients	69 (51.9)	33 (54.6)	68 (67.3)	65 (60.7)	235 (58.5)
COVID-19 is fatal for humans	91 (70.5)	35 (58.3)	47 (46.5)	47 (44.3)	220 (55.6)
COVID-19 pandemic can be easily controlled	81 (62.8)	40 (66.7)	47 (47.5)	69 (65.1)	237 (60.1)

Note:  $\chi^2$  test.

Abbreviations: COVID-19, coronavirus disease 2019; SARS-CoV2, Severe acute respiratory syndrome coronavirus 2.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

TABLE 3 Risk perception toward COVID-19 among undergraduate nursing students

	I'm worried more about my life than treating patients	I am afraid of being infected with COVID-19	I decline to practice in the hospital that treats the COVID patients
The delay in the government's response is the reason for disease expansion, n (%)	78 (35.3)	202 (90.2)	150 (67.0)**
COVID-19 may be transmitted by direct contact with infected persons without symptoms	119 (33.5)	324 (90.0)	209 (58.4)
COVID-19 is an infectious disease affecting the entire world, n (%)	133 (34.0)	358 (89.9)	234 (59.1)
COVID-19 is less treatable than influenza, n (%)	48 (39.0)	114 (91.9)	68 (55.3)
COVID-19 is more severe than influenza, n (%)	94 (31.5)	276 (90.2)	186 (61.2)*

Note:  $\chi^2$  test.

Abbreviation: COVID-19, coronavirus disease 2019.

\* $p < 0.05$ ; \*\* $p < 0.001$ .

TABLE 4 Predictors of fearful perception toward (COVID-19)

Predictors	I am worried more about my life than treating patients, OR (95% CI)	I am afraid of being infected with SARS-CoV-2, OR (95% CI)	I decline to practice in the hospital that treats COVID-19 patients, OR (95% CI)
Gender (female vs. male)	0.51 (0.24;1.10)	<b>3.03 (1.21;7.58)*</b>	1.67 (0.73;3.53)
Age	1.03 (0.94;1.13)	1.05 (0.86;1.18)	1.02 (0.92;1.11)
Academic year (Years 2, 3, 4 vs. Year 1)	1.28 (0.82;2.02)	1.17 (0.60;2.30)	1.49 (0.98;2.27)
Mean knowledge score	1.05 (0.94;1.19)	1.05 (0.88;1.26)	<b>1.13 (1.01;1.27)*</b>
Main sources of COVID-19 information	0.88 (0.63;1.22)	0.89 (0.49;1.60)	1.09 (0.79;1.51)
The delay in the government's response is the reason for the expansion of disease (yes/no)	0.84 (0.55;1.29)	0.88 (0.46;1.69)	0.44 (0.29;0.66)***
Extracurricular activities (yes/no)	<b>0.57 (0.37;0.87)***</b>	2.62 (1.33;5.16)**	1.11 (0.74;1.65)

Abbreviations: OR, odds ratio; CI confidence interval; COVID-19, coronavirus disease 2019.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

and around the world continues to remain of concern to this day; thus, the need for more frontline caregivers lingers on. Numerous nurses are known among health professionals as compassionate, supportive, and caring persons. This study uncovered the minds of future nurses with regard to COVID-19.

In general, participants had good knowledge of the COVID-19 symptoms and preventive measures. Media like television/radio/internet/social media was reported as the main source of their COVID-19 knowledge. This study was conducted during the first lockdown in Japan, and even though some universities have been organizing online courses before the pandemic, the online courses were not popular and well structured. Young students staying at home had mainly their mobile phones and had continuous access to the information shared through internet.<sup>15</sup> Various information that was valid and fake was available through media. The good level of knowledge reported by participants highlighted the quality of disseminated information in Japanese media. Social media could act as a major conduit for sharing pandemic information and experiences in real time.<sup>16</sup> Similar results were also reported among university students surveyed in Jordan, the United Arab Emirates, and Saudi Arabia, with more than 70% of participants reporting media as the main source of information.<sup>5,8,17,18</sup> Much lower proportions have been reported in a Pakistani study, with 53.1% and 18% for social media and television as sources of knowledge, respectively.<sup>19</sup>

Regarding the mode of transmission of COVID-19, 73.8% of the respondents thought the virus is likely to be transmitted through inhalation of infected droplets and by contact with substances and/or materials contaminated with body fluids. This proportion is less but closer to the 91% and 92% reported in Jordanian and Saudi Arabian studies, respectively.<sup>17,18</sup> Direct transmission of the virus by asymptomatic subjects was also reported by the majority of participants (90.5%), which is in line with the WHO report that during an incubation period of 7–14 days, the person with COVID-19 acts as a reservoir and can transmit the virus.<sup>20</sup> Asymptomatic transmission during this period remains a concern for further investigation.

Fever and dry cough were considered as the most commonly reported symptoms of COVID-19. Similar results were reported in Palestinian, Ugandan, and Iranian studies.<sup>21,22</sup> Concerning the treatment and preventive measures, wearing masks and social isolation for 14 days for someone exposed to COVID-19 were sustained as preventive strategies by respondents. This is in agreement with reports from studies in China for wearing masks<sup>23</sup> and in Jordan and Saudi Arabia for social isolation.<sup>17,18</sup> However, in the Jordanian study, wearing a mask was not reported as an efficient preventive measure by a majority of participants.<sup>17</sup> The difference with the latter report could be attributed to the difference in the population studied and the questionnaires used. Also, wearing masks is in the behavior of the Japanese population for fear of being contaminated by certain viral diseases, in particular influenza.

Regarding the perception toward COVID-19 disease, 55.6% of participants professed that COVID-19 is fatal for humans and a majority (89.8%) of respondents reported to be afraid of being

infected. Even with that perception, 60.1% of respondents still thought that the COVID-19 pandemic could be easily controlled. Close results were reported in a Chinese study, in which 73.6% of the participants regarded COVID-19 as a very dangerous disease.<sup>23</sup> In addition, more than 95% of Chinese respondents believed that the epidemic would eventually be brought under control, yet more than half of the students were worried about being infected.<sup>24</sup>

Our results further revealed that the delayed response of the government alongside the severity of COVID-19 being greater than that of influenza were the most commonly mentioned reasons for declining to practice in hospitals that treat COVID-19 patients. Additionally, fear of being infected with COVID-19 was associated with extracurricular activities participation. This survey further revealed that being female was associated with fear of being infected by COVID-19 disease. It might be explained by the fact that the majority of respondents were female. In an Egyptian study, 83.1% of participants feared of becoming infected and the reasons advanced included the unavailability of a specific treatment or vaccine, associated fatalities, and the perceived unsatisfactory response of health authorities.<sup>25</sup>

#### 4.1 | Limitations

All participants were students from selected Universities; therefore, this sample is unlikely to be representative of the general student population. Further, there were not enough respondents per academic year level to analyze differences among year-level responses.

Data collection was self-reported and was dependent on the recall ability of participants; thus, the responses may be subject to recall bias. However, this could not alter the validity of the answer due to the fact that the pandemic is still ongoing and the knowledge has been updated gradually.

## 5 | CONCLUSION

The present study reported that the knowledge and attitude of nursing students toward COVID-19 were accurate for the majority of them, with the main source of information being the media. Practicing extracurricular activities and being female were associated with the fear of the disease. Efficient and controlled communication is needed during widespread disease outbreaks.

#### AUTHOR CONTRIBUTIONS

**Yuki Shimotake:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; writing – original draft; writing – review and editing. **Etongola Papy Steve Mbelambela:** Conceptualization; data curation; formal analysis; investigation; methodology; software; validation; writing – original draft; writing – review and editing. **Sifa Marie Joelle Muchanga:** Conceptualization; formal analysis; methodology; project

administration; software; supervision; validation; writing – original draft; writing – review and editing. **Antonio F. Villanueva**: Conceptualization; investigation; methodology; project administration; resources; validation; writing – original draft; writing – review and editing. **Marlinang Diarta Siburian**: Formal analysis; investigation; methodology; software; validation; visualization; writing – review and editing. **Rie Shimomoto**: Investigation; methodology; project administration; validation; writing – review and editing. **Kazuyo Ikeuchi**: Investigation; Methodology; Project administration; Resources; Validation; Writing – review and editing. **Yoko Matsunaga**: Investigation; methodology; project administration; resources; software; writing – review and editing. **Marina Minami**: Conceptualization; investigation; project administration; resources; software; writing – review and editing. **Tatsuo Iiyama**: Data curation; formal analysis; methodology; software; supervision; visualization; writing – review and editing. **Narufumi Suganuma**: Conceptualization; formal analysis; methodology; supervision; validation; writing – review and editing.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are not publicly available due to privacy and ethical restrictions.

## TRANSPARENCY STATEMENT

The lead author Muchanga Sifa Marie Joelle affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

## ORCID

Yuki Shimotake  <http://orcid.org/0000-0001-9537-2074>

Etongola Papy Steve Mbelambela  <http://orcid.org/0000-0002-5688-3119>

Sifa Marie Joelle Muchanga  <http://orcid.org/0000-0002-3646-7249>

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