ORIGINAL RESEARCH

Knowledge, Attitude, and Practices of University Students Towards Covid-19 Prevention

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Abstract

Background: COVID-19 has affected the educational system, particularly students of higher educational institutions. Accurate knowledge about the disease, its transmission, and preventive measures are critical for containing an outbreak. University students, the next generation of professionals, may play an imperative role in propagating key health information to society.

Objectives: The study aims to assess the level of knowledge, the attitude of concern, and prevention practices among university students towards COVID-19 prevention.

Methods: This descriptive study was conducted at a private higher educational institution in Central Luzon, Holy Angel University. 357 university students were recruited as study participants from the university's different departments using the purposive sampling method, and data were collected using an online self-administered questionnaire.

Results: Among the 357 university students who completed the questionnaires, most were females (58.5%). The results show a good level of attitude of concern and good knowledge of clinical manifestations of COVID-19. The students' most frequently stated source of transmission is exposure to coughing and sneezing via droplets. Additionally, wearing face masks was the most reported method of protection against the infection.

Conclusion: The study revealed that university students have adequate knowledge, practices, and attitude of concern towards COVID-19. To bridge the gap between current and required knowledge, it is essential to establish further professional educational campaigns to increase university students' awareness of the pandemic.

Keywords: *coronavirus 2, COVID-19, pandemic, severe acute respiratory syndrome, students, universities*

Introduction

Viral diseases continue to rise and pose a significant public health concern, and several viruses have triggered past global epidemics, such as Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS) (de Wit et al., 2016). Most recently, an emerging respiratory disease caused by the highly contagious novel coronavirus (SARS-CoV 2) was first detected in December 2019 in Wuhan, China (Zhonghua et al., 2020; Zhu et al., 2020; Zhong et al., 2020). COVID-19 has rapidly spread within the other cities in China and eventually worldwide (Wang et al., 2020); thus, the World Health Organization declared the disease a global pandemic. This new virus has spread rapidly worldwide, affecting 215 countries. As of December 6, 2020, over 66 million cases, and 1,534,344 deaths have been reported globally (Worldometer, 2020).

In the Philippines, the Department of Health's first case was on the 30th of January 2020, a 38-year-old-female Chinese national, and the first local transmission was confirmed on March 7, 2020 (Ramzy & May, 2020). The government has adopted several measures to monitor and control the rapid spread of the country's ongoing COVID-19 outbreak. Currently, there is no available anti-viral treatment for COVID-19. Prevention is the primary method to avoid acquiring the disease (Dhama et al., 2020). Thus, the CDC (2020a) summarized the recommended everyday preventive actions to help prevent the spread of respiratory viruses, which includes the following: (1) Use of face masks; (2) Covering coughs and sneezes using tissue then safely disposed (or, use of flexed elbow); (3) Proper handwashing for at least 20 seconds; (4) Physical distancing from infected people; (5) Refrain from touching the face, especially the mouth and nose, with unwashed hands; and (6) Frequently touched objects and surfaces should be cleaned and regularly disinfected.

COVID-19, as a fast-changing and emerging global health challenge, has impacted all industries since its outbreak in December 2019 (Kassema, 2020; McKibbin & Fernando, 2020). Several studies have been conducted to determine the virological characteristics and clinical effects of COVID-19 (Huang et al., 2020). However, limited studies focused on assessing the knowledge, perceived severity, and controllability of the pandemic. Knowledge and behavioral assessment of such outbreaks are important, particularly because of the massive number of misconceptions and false information circulating on social media about disease transmission and acquisition methods (Mohamad et al., 2020; Geldsetzer, 2020). The management of this pandemic primarily depends on the adherence to the recommended measures taken. For any health preventive measures to be beneficial, a thorough approach must ensure proper education. Good knowledge of coronavirus infection is associated with positive attitudes and effective practices; therefore, concise knowledge of a disease affects individuals' preventive practices and attitudes (Kok et al., 2008). Thus, a Knowledge, Attitude, and Practice study are essential for understanding the level of awareness

towards COVID-19 as it provides baseline information to determine the type of intervention that may be required to change misconceptions about the virus (Zhong et al., 2020). In an unprecedented way, COVID-19 has affected all stakeholders in education, especially university students who represent a special group of people characterized by more autonomy and a pressing need to live independently but with limited experiences. University students are in the physical and mental development stage of significant changes. It is also the time in which their perspective on life and the world gradually takes shape. Their understanding of society and self-knowledge is not adequately developed at this point, and they are inexperienced at adjusting to society's pressure (Zhao et al., 2020). Therefore, their perceptions and behaviors would inevitably be influenced in the face of a major crisis such as a pandemic. This study was first conducted locally and targeted students, the next generation of professionals and agents of change within their families and communities to ensure readiness and social adaptation in the event of a pandemic (Mohr, K. & Mohr, E., 2017). Such a crisis offers students the opportunity to learn, nurture compassion, and build resilience while building a safer and more caring community. This study aims to assess the knowledge, the attitude of concern, and prevention practices of university students towards COVID-19. This investigation's results are expected to assist in better planning for awareness campaigns among higher educational institutions and directing the various health authorities to modulate their policies accordingly to prevent the spread of the virus, leading to rapid control containment of the ongoing pandemic.

Methodology

Research Design

The study utilized a cross-sectional descriptive research design to assess coronavirus infection-related knowledge, attitude, and practices among university students.

Sample and Setting

Purposive sampling was the technique utilized in the selection process of the participants. Participants of this study were college-level students from Holy Angel University as it is the largest private educational institution with the largest student population in Central Luzon. The open-access web-based epidemiologic statistics package (OpenEpi.com, version 3.01) yielded a total of three hundred fifty-seven (357) university students after factoring in the estimated population size of five thousand (5,000), hypothesizing a 50% chance of the outcome variables being noted at 95% confidence interval (Dean et al., 2013).

Study participants were full-time university students, 18 years of age or older at the time of the survey, both male and female students who participated voluntarily.

Research Instrument

A self-administered questionnaire adapted from Al-Hazmi et al. (2016) was utilized for the study. It assessed university students' knowledge regarding the clinical manifestation and mode of transmission, the attitude of concern, and preventive practices towards COVID-19. The questionnaire was designed by a focus group comprised of an epidemiologist, infectious disease experts, and family physicians. The questionnaire's reliability in its English translated form was measured by calculating the internal consistency for each of the subscales and the total scale. Cronbach's coefficient alpha of the total scale is >0.8, which is generally regarded as satisfactory (Al-Hazmi et al., 2016). Permission from the author via email was requested for the utilization of the tool.

The study questionnaire featured multiple-choice questions, and it is divided into 4 parts. The first part comprises the participant's attitude of concern towards the disease, risk perception regarding the virus. To measure the attitude among the participants, they were asked a question whether they perceive the coronavirus infection (COVID-19) as "Very dangerous," "Moderately dangerous," or "Not dangerous." The second and third parts have identified the participants' knowledge about the disease's signs and symptoms and its mode of transmission, respectively. To measure knowledge about the viral infection, 10 items were included. These items include knowledge regarding the clinical manifestations and transmission routes. The last part determined the practices towards protection against coronavirus transmission. To measure practices, participants were asked whether they use face masks; do handwashing; use tissues during coughing and sneezing; avoid close contact with infected individuals, and avoid touching their nose, mouth, and eyes to reduce the risk of infection.

Data Collection Procedure

Several strategies were utilized to reach as many participants as possible. This includes social networks such as reaching out to university student council officers and social media posts thru various media channels to share the survey questionnaire. A study's protocol was attached to the survey tool containing a letter of invitation and electronic informed consent. The data was collected via an online survey questionnaire using "Google Forms." The google form link was posted and sent to participants using electronic means of communication (thru email and other web-based platforms). Questionnaire responses were downloaded from Google Forms and exported to Microsoft Excel for coding and further analysis. The data is to be stored for two years from the date of termination of involvement or at such time. The participant submits electronic cancellation of his consent as per the Data Privacy Act of 2012.

Data Analysis

Using descriptive statistics functions in Microsoft Excel, the data were tabulated and analyzed. The statistical data were analyzed in the form of mean and standard deviation for the

participants' age and expressed as frequency and percentages for the participants' socio-demographics, coronavirus infection-related knowledge, attitude, and practices for descriptive purposes.

Ethical Approval

The study was ethically approved and reviewed by the Institutional Review Board (IRB) committee of Holy Angel University with the protocol number: 2020-031-CMSARTE-KPACOVID19. The participation of university students was completely consensual, anonymous, and voluntary. Each questionnaire was accompanied by a cover letter explaining the study's purpose, informing the participants that their participation was optional, and they are entitled to withdraw from the study at any stage. A consent form was also attached to the study's protocol to complete the survey forms and how the participants' identification and responses will be kept confidential. No identifying information was required for demographic profiling and analysis of participants.

Result

Table 1. Demographic profiles of university students

Demographic Variables	f	%
Age		
18-20	274	76.8
21-23	63	17.6
24-26	14	3.9
27-29	1	0.3
30-32	3	0.8
33-35	2	0.6
Gender		
Male	148	41.5
Female	209	58.5
Department		
School of Business and Accountancy	79	22.1
School of Engineering and Architecture	59	16.5
School of Arts and Sciences	28	7.8
School of Education	31	8.7
School of Hospitality and Tourism Management	25	7.0
School of Nursing and Allied Medical Sciences	73	20.5
School of Computing	31	8.7
College of Criminal Justice Education and Forensics	31	8.7

Demographic Variables	f	%
Year Level		
First-year	48	13.4
Second-year	206	57.7
Third-year	91	25.5
Fourth-year	10	2.8
Fifth-year	2	0.6

Note: **n** = 357 **f** = frequency **%** = percentage

Demographic characteristics

This study involved 357 university students recruited from the different departments of Holy Angel University. As for the age distribution, their mean age is 20.23 (SD:2.19) and ranges from 18 to 35 years old. Among them, more than half of the participants (58.5%) were females. As for the department, 22.1% were from the School of Business and Accountancy, 20.5% were from the School of Nursing and Allied Medical Sciences, 16.5% were from the School of Engineering and Architecture, and 40.6% were from other departments of the university. The majority of the students belong to the 2nd year (57.5%) level in the university.

Table 2. The attitude of concern of University students towards coronavirus infection

Attitude Variables	Males	Females	Total f (%)
Very dangerous	70	127	197 (55.2)
Moderately dangerous	68	79	147 (41.2)
Not dangerous	10	3	13 (3.6)
TOTAL	148	209	357 (100)

Note: **n** = 357 **f** = frequency **%** = percentage

Attitude of concern

Regarding students' attitude of concern of university students towards coronavirus infection. Based on the data, an attitude of concern about the viral infection can be observed (55.2%), whereas only a few reported having no concern (3.6%). More females than males regard coronavirus as very dangerous among genders.

Table 3. Knowledge about the clinical presentation of coronavirus infection

Knowledge (signs and symptoms) Variables	*Yes*		*Total*	*No*		*Total*
	Males (36.97%)	Females (54.45%)	f (%) (91.42%)	Males (4.49%)	Females (4.09%)	f (%) (8.58%)
Fever	145	206	351 (98.3)	3	3	6 (1.7)
Cough	145	206	351 (98.3)	3	3	6 (1.7)

Knowledge (signs and symptoms) Variables	*Yes*		*Total*	*No*		*Total*
	Males (36.97%)	Females (54.45%)	f (%) (91.42%)	Males (4.49%)	Females (4.09%)	f (%) (8.58%)
Shortness of Breath	144	208	352 (98.6)	4	1	5 (1.4)
Nasal and Throat Congestion	139	202	341 (95.5)	9	7	16 (4.5)
Diarrhea	87	150	237 (66.4)	61	59	120 (33.6)

Note: **n** = 357 **f** = frequency **%** = percentage

Table 4. Knowledge about the mode of transmission of coronavirus infection

Knowledge (mode of transmission) Variables	I agree		I don't agree		I don't know		Total
	f	%	f	%	f	%	f (%)
Coughing and sneezing	357	100	0	0	0	0	357 (100)
Handshaking	344	96.4	8	2.2	5	1.4	357 (100)
Touching of surfaces such as doorknobs and tables	346	96.9	6	1.7	5	1.4	357 (100)
Exposure to crowded places	355	99.4	2	0.6	0	0	357 (100)
Animals to humans	167	46.8	121	33.9	69	19.3	357 (100)

Note: **n** = 357 **f** = frequency **%** = percentage

Knowledge of clinical presentation and mode of transmission

Among the university students in the different departments, there is an overall agreement regarding the responses. The majority of the students have a good knowledge regarding the signs and symptoms and have reported shortness of breath (98.6%), fever (98.3%), and cough (98.3%) as common factors in the clinical presentation of the viral infection. However, it also showed that several university students recognized that diarrhea (33.6%) is not a clinical manifestation of coronavirus. Moreover, female university students illustrated a slightly better understanding (54.45%) of coronavirus infection's clinical presentation compared with male university students.

Among the ways the virus can be transmitted, all university students agree that the most common transmission source is exposure to coughing and sneezing via droplets. The majority (99.4%) also agree that exposure to crowded places can increase infection risk. A proportion of students who think that handshaking (96.4%) is slightly lower than those who think that touching surfaces may increase infection spread. Furthermore, less than half of the participants (46.8%) knew that coronavirus infection could be transmitted through animals to humans and associated with infection risk.

Table 5. Practices to prevent coronavirus infection

Practices Variables	I agree		I disagree		I don't know		Total
	f	%	f	%	f	%	f (%)
Using face mask	357	100	0	0	0	0	357 (100)

Practices Variables	I agree		I disagree		I don't know		Total
	f	%	f	%	f	%	f (%)
Handwashing	327	91.6	4	1.1	26	7.3	357 (100)
Using tissues during coughing and sneezing	327	91.6	11	3.1	19	5.3	357 (100)
Avoiding close contact (1 meter or 3 feet) with an infected person	349	97.8	7	1.9	1	0.3	357 (100)
Avoid touching of nose, mouth, and eyes	319	89.3	11	3.1	27	7.6	357 (100)

Note: **n** = 357 **f** = frequency **%** = percentage

Prevention Practices

The results show that 100% of university students have reported that the most frequently used practices of protection against virus transmission are face masks and avoiding close contact with infected persons (97.8%). Besides, handwashing and the use of tissues during coughing and sneezing have often been reported by students as preventive measures. Among the following protection practices, university students' least suggested method is avoiding the touch of nose, mouth, and eyes towards infection prevention.

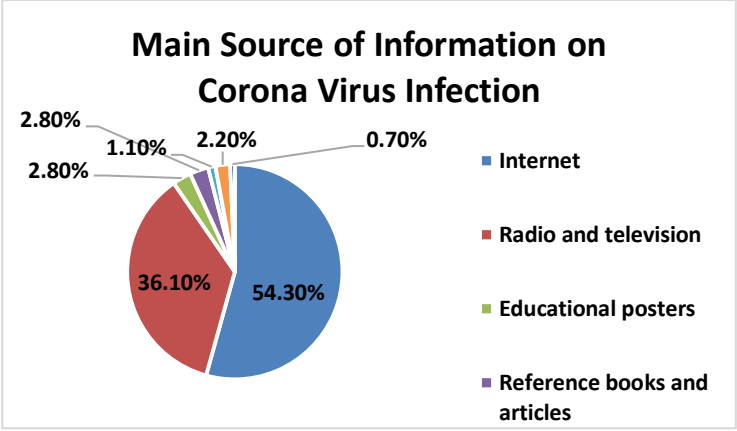

Figure 1. Source of information about coronavirus infection among university students *(n = 357).*

The main source of information

The analysis shows that 54.3% of university students use the internet as their main source of information regarding coronavirus infection. About 36.1% collected information from radio and television. Among sources of information, newspapers, and magazines, 1.1% appear to be a less favored option for gathering knowledge towards the viral infection.

Discussion

The study shows that majority of the students were adequately attentive to the essential details of the viral infection. University students from Holy Angel University have good knowledge about the clinical manifestations (91.42%) and mode of transmission of COVID-19. For many decades, several generations of students have advanced from higher education institutions. Generation Z's new generation comprises individuals born between 1995–2009 (Strauss & Howe, 2020; McCrindle & Wolfinger, 2011) are the dominant generation of students currently entering the university (Mohr, K. & Mohr, E., 2017). Gen Z has unique characteristics and expectations, and like the millennials, they were raised with technology. However, technology is part of their everyday lives (Schwieger & Ladwig, 2018). Thus, the reasonably high level of knowledge amongst university students was likely due to their exposure to social media (54.3%) as their main source of information regarding COVID-19. They were aware that the most common symptoms of COVID-19 are fever, fatigue, and dry cough, with patients experiencing difficulty breathing and other symptoms including headache, sore throat, and diarrhea (Chen et al., 2020; Wang et al., 2020). The most frequently reported source by university students is coughing and sneezing via droplet for what concerns transmission mode. This finding comes from a study on survey data among Indonesian undergraduate students wherein most of the students were knowledgeable about COVID-19, and their overall attitude was favorable (Saefi et al., 2020). Similarly, a Nigerian study reported that 88% of university students had correct knowledge about symptoms, spread factors, self-isolation, and medical cures of COVID-19 (Rakhmanov & Dane, 2020).

The most frequently reported source of information regarding COVID-19 is the internet (54.3%) and the media (36.1%). Gen Z often referred to as true digital natives: from their earliest youth, have been exposed to the internet, social networks, and the mobile system is characterized as 'information curators' who use social media to perceive the world (Seemiller & Megan, 2016). In this study, the findings among university students regarding knowledge on COVID-19 reflect a good relationship between their understanding and the information available in the media about COVID-19. For example, most students recognized that fever, cough, and shortness of breath are the common clinical manifestation of COVID-19. However, most of the students identified animal to human transmission as associated with a higher risk of infection. It is comparable with the Department of Health (2020) report that animals are probably the source of COVID-19 and may have originated from animals before it has infected humans.

However, a handful of students seems to disagree and is unclear if it is related to increased infection risk. This is unsurprising given that no official statement confirms animals as a source for the virus. This finding is consistent with the fact that the exact source of the COVID-19 is uncertain, it has been primarily hypothesized to have come from an animal but according to CDC (2020b), there is no evidence that these animals can transmit the disease and spread COVID-19 to humans. Therefore, more studies are needed to understand whether and how COVID-19 could affect different

animals.

The study also resulted in an overall good practice of preventive measures among university students toward the disease. Most university students follow practices of COVID-19 towards prevention, such as the use of facemask, hand washing, and avoiding close contact with infected individuals. These measures are well known for the prevention of many infectious diseases, particularly respiratory transmitted viral infections. However, all the participants support the attitude of wearing a mask and its practice as a preventive measure against the infection. This contradicts the advice shared by the WHO (2020) that there is insufficient evidence for or against the use of face masks in healthy individuals in the wider community, and it should be combined with other key measures to prevent infection, such as hand washing, proper cough etiquette, and social distancing. The behavior and practice of wearing face masks may reflect the vast amount of information circulated and regarded by the community, which needs further awareness campaigns to minimize the panic among the wider community.

Since the outbreak of COVID-19, there have been worldwide enacted school closures that range from one month to the rest of the academic year, and approximately billions of learners (1.716 billion) have been affected. It has created a negative effect on the educational institution's stakeholders and an impact on socio-economic consequences (UNESCO, 2020; Lindzon, 2020). The fight against the coronavirus continues worldwide. Thus, university students' knowledge, practices, and attitude regarding viral infections are critical information in response to its outbreak (Ajilore et al., 2017; Tachfouti et al., 2012). In 2010, a study examined the level of understanding of domestic and international university students towards seasonal and pandemic influenza wherein it stated that it is necessary to emphasize that pandemic influenza could pose a real threat, students should be informed about disease transmission and risk of infection to determine as to which strategies are to be effective and strictly comply to the preventive health measures (Seale et al., 2012). During the H1N1 influenza pandemic in 2009, it recorded over 95,500 cases at 170 American college institutions. Researchers have found out that college students showed a lack of knowledge regarding the disease, thus ignoring the H1N1 vaccine and flu-prevention behaviors (Koskan et al., 2012). Insufficient knowledge of the disease's characteristics facilitates preventable transmission of disease, inaction with health behavior, and fear from the disease (Kok et al., 2008).

As the educational system enter this unfamiliar crisis management phase, the government must make good efforts to provide the community with sufficient knowledge regarding COVID-19, especially on specific control measures such as wearing face masks integrated with other viral infection-prevention initiatives. The government's role in disseminating valuable information about the current pandemic can have a significant impact on the wider community, particularly among schools and universities (Hornik, 2002; Wakefield et al., 2010; Majumder et al., 2015).

Nurses play a critical role in providing health education and counseling, as the main objective of health programs focuses on prevention and early intervention in the face of a major health

crisis. During this pandemic, nurses are the primary educators, resources for information, and the front-liners towards providing care during periods of crisis (Buchan et al., 2019; Cohen et al., 2012). As front-line healthcare professionals, nurses are key stakeholders in developing and implementing policies regarding care standards during the pandemic. They are well-positioned to lead the health system by partnering with physicians, health organizations, and the government to provide comprehensive educational campaigns for families and students to bridge the gap between the current and required knowledge.

Limitations

In interpreting the results of this study, limitations of the study were also considered. A limitation of this study is the instrument utilized for the collection of data. The instrument was adopted from a survey that had been validated and used previously in Saudi Arabia (Al-Hazmi et al., 2016). A limited number of questions measured the level of knowledge, attitude, and practice. Thus, to identify KAP's actual extent, additional assessments will be necessary, using all aspects of KAP towards COVID-19.

Another limitation of this study is the probability of socially acceptable responses provided by participants. Since this study used self-reported data, participants may have responded positively to knowledge, practices, and attitude questions based on what they consider to be expected (Mortel & Thea, 2008).

Conclusion

This study is the first to attempt to assess the perceptions of university students about coronavirus infection locally. In conclusion, the present study has demonstrated good knowledge and practices towards COVID-19 and presented the level of risk perception among 357 university students at Holy Angel University. The findings show a good level of perception about the risk of the disease. An attitude of concern about COVID-19 is shown by factors such as reporting fever, cough, and shortness of breath as clinical signs and symptoms manifest from the virus. The indication of fever, cough, and shortness of breath as a clinical presentation could be related to the students' orientation towards the most common clinical manifestation of COVID-19. Most university students sought their knowledge from social media settings and traditional media. This perception could be an important finding on the students' awareness regarding the severity of the disease.

Awareness of the disease is regarded as the first step in any health education program carried out. Knowing the causes and sources of a disease's transmission increase the likelihood that individuals may become more aware of the spread of communicable diseases and the preventive measures to slow its transmission. The study suggests establishing professional health education

campaigns to enhance further awareness of university students, which would positively influence their perception towards coronavirus infection, and to inform students about measures such as avoidance in touching nose, mouth, and eyes can prevent the spread of infection and proper cough etiquette by using tissues. Higher education institutions may develop a policy or project implementation for such an outbreak to be prepared for the current crisis, COVID-19, and the infectious diseases that might emerge in the future. Moreover, among other health care professionals, nurses should be more involved in the process of education about infectious diseases.

Finally, as this study was first conducted locally and with only university students as participants in this survey, there is a need to conduct correlational studies involving teaching and non-teaching personnel in the state and universities of the state and country occurrence of the pandemic.

Conflict of Interest

The author has no conflict of interest to disclose.

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