KNOWLEDGE OF STUDENTS' INFECTION CONTROL WHEN PARTICIPATING IN COVID-19 TEST SAMPLING IN THE COMMUNITY

Huynh Thi My Quyen, Phan Minh Nhat, Vo Truc Phuong, Tran Dang Tieu Ny, Nguyen Anh Thi, Do Manh Tuong, Le Nguyen Minh Ngoc, Pham Hoang Khanh, Nguyen Hoang Tin[*]*

Can Tho University of Medicine and Pharmacy
[*]Corresponding author: nhtin@ctump.edu.vn

ABSTRACT

Background: Coronavirus Disease 2019 (COVID-19) pandemic got extremely complicated in 2021, appeared many new strains of viruses with high infectivity. So, knowledge and manipulation were important for protecting students against infection in COVID-19 sampling. Objectives: The study surveyed knowledge of students' infection control when participating in COVID-19 test sampling in the community. Materials and methods: A cross-sectional descriptive study was conducted on 195 volunteer students of Can Tho University of Medicine and Pharmacy (CTUMP). A series of 11 questions were also used to interview the participants. Results: The proportion of female volunteers who participated in the research was 52.8%, higher than male volunteers (47.2%). Students in the 45th cohort participated in research with the highest quantity (43.6%) and the lowest in the 42nd cohort (0.5%). The research had the largest number of general medical students participating (69.2%). The results showed that the knowledge of regular hand washing, removing gloves, removing N95 masks, and the time of disinfection spray with median points equal to the maximum point. The median overall knowledge score for the principle of removing Personal Protective Equipment (PPE) was 50%, compared to the maximum point of 100%. Only 24.6% of students got maximum scores in the knowledge of minimum safe distance, whereas 98.5% achieved maximum scores in the knowledge of COVID-19 sample collection skills. Conclusions: Students who took part in COVID-19 community sampling had a good understanding of most research topics. However, the principle of removing PPE was not well-understood.

Keywords: COVID-19, infection control, knowledge, SARS-CoV-2, CTUMP.

I. INTRODUCTION

At the end of 2019, for the first time in Wuhan City, China, several instances of viral pneumonia were recorded. The World Health Organization (WHO) has temporarily recognized SARS-CoV-2 as a result of the gene sequence (Severe Acute Respiratory Syndrome Coronavirus 2 of the Genus Betacoronavirus). The disease was caused by the SARS-CoV-2 virus called COVID-19 [8]. This pandemic has posed a threat to world health and increased mortality rates to 15%, causing a public health emergency in every country [1], [2]. Because of their specialized majors, medical students were a core group to help prevent epidemics; along with that, they faced COVID-19 exposure risk. According to reports from various nations, medical staff accounts for around 10% of overall COVID-19 cases [5]. To prevent and limit the consequences of infection, complying with recommended measures was essential and this was dominated by human illness knowledge [9]. Our study surveyed knowledge of students' infection control when participating in the collection of the COVID-19 samples for testing from the community.

II. MATERIALS AND METHODS

2.1. Materials

2.1.1. Study population

The study population was students of CTUMP who participated in volunteer test sampling in the community in Can Tho city.

2.1.2. Inclusion criteria

The sampling standard included: Students in the CTUMP sampling community group on the 4th wave of the COVID-19 pandemic in Vietnam.

Students participated in the COVID-19 test sampling campaign in Can Tho city.

Students were studying at CTUMP.

Students agreed to participate in the study.

2.1.3. Exclusion criteria

Students who graduated in 2021 returned first.

Students participated in the volunteer sampling community group but were not a student of CTUMP.

Students did not cooperate in the research process.

2.1.4. Time and place of the study

The study was conducted at CTUMP from December 2021 to February 2022.

2.2. Methods

2.2.1. Study design

The study was a cross-sectional descriptive study.

2.2.2. Sample size

The study utilized the sample size calculation formula:

$$n = Z^2_{1-\frac{\alpha}{2}} \frac{p \times (1-p)}{d^2} = 1,96^2 \frac{0,67 \times (1-067)}{0,07^2} = 174$$

With:

n: was the population size.

p: was based on our trial research of 21 students who took part in the community sampling at CTUMP. There were 14 students who demonstrated a good understanding (60/64 points) of infection control. We calculated p equal to 0.67.

d: was the margin of error that we chose at 0.07.

α: was the design significance level (we chose α at 0.05).

$Z_{1-\frac{\alpha}{2}}$: was a normally distributed value, calculated based on the level of statistical significance ($Z_{1-\frac{\alpha}{2}} \, at$ 1.96 with α at 0.05).

With this sample size, the number of students who needed to participate was 174.

In fact, there were 195 participants.

2.2.3. Sampling method

Subjects were invited to participate in the study by convenience sampling during the study period until the number of subjects was sufficient.

2.2.4. Study contents

Characteristics of materials included 3 variables: Gender, Major and Cohort. Gender includes 2 groups (male and female). Major included 8 groups (Medicine, Traditional Medicine, Odonto-Stomatology, Preventive Medicine, Public Health, Medical Technology, Nursing, Pharmacy). The cohort included 5 groups (42nd, 43rd, 44th, 45th, 46th).

The knowledge of students' infection control when participating in the collection of the COVID-19 samples for testing from the community included 3 parts.

The process before sampling the COVID-19 test included 6 steps of hand washing routine (1 point/step), 5 steps of manipulation of wearing disposable gloves (1 point/step), 9 steps of manipulation of putting on PPE (1 point/step), and 6 steps of manipulation of wearing N95 mask (1 point/step).

The process during sampling included 9 steps of COVID-19 test sampling (1 point/step) and minimum safe distance (2 points).

The process after sampling included 4 steps of manipulation of removing disposable gloves (1 point/step), 10 steps of manipulation of taking off PPE (1 point/step), 2 principles of removing PPE (1 point/step), 2 steps of taking off the N95 mask (1 point/step), and time of disinfectant spray in sampling process (detailed listing) (1 point).

2.2.5. Study materials

The researcher interviewed directly to study participants with a set of questions built based on Decision No. 4159/QD-BYT dated 28th August 2020 and Decision No. 5188/QD-BYT dated 14th December, 2020 [6], [7]; we were noted points based on their answers, with the point of each part was the total points of the steps in the process.

2.2.6. Statistical analysis

All of the data obtained from the research were processed with SPSS 20.0 software according to medical statistics method. The Kolmogorov-Smirnov test was employed to verify for a normal distribution. Quantitative variables without standard distribution were presented in the median, the maximum value (max), and the minimum value (min). The data on maximum value were presented as frequencies (f) and percentages (p, %).

2.2.7. Ethics approval

All research subjects were explained specifically about the research purpose and methods so that the students agreed to voluntarily participate and cooperate well in the research process. Students had the right to refuse to participate in the study or to terminate the study at any stage of the study. All information of study subjects was kept confidential and only used for research purposes. All information was provided to the individual student only and was accessible only to the researcher. The study has been approved by the Ethics Council in the Biomedical Research of CTUMP.

III. RESULTS

Table 1. Characteristics of a participants

Characteristics		f	p (%)	Major	f	p (%)
Gender	*Male*	92	47.2	*Medicine*	125	69.2
	Female	103	52.8	*Traditional Medicine*	31	10.8
Total		**195**	**100**			
Cohort	*42nd*	1	0.5	*Odonto-Stomatology*	3	1.5
	43rd	35	17.9	*Preventive Medicine*	13	6.7
	44th	38	19.5	*Public Health*	2	1.0
	45th	85	43.6	*Nursing*	3	1.5
	46th	36	18.5	*Medical Technology*	12	6.2
				Pharmacy	6	3.1
Total		**195**	**100**	**Total**	**195**	**100**

Of 195 participants, the proportion of female volunteers who participated in the research was 52.8%, higher than male volunteers (47.2%). Several in the 45th cohort participated in research with the highest quantity (43.6%) and students in the 42nd cohort was the lowest quantity (0.5%). The research had the largest number of general medical students participating (69.2%).

Table 2. The knowledge of students' infection control before the COVID-19 test sampling

Process	Points			Achieved maximum points		Median*100/ maximum points (%)
	Median	Min	Max	f	p (%)	
Hand washing routine	6	2	6	187	95.9	100
Wearing disposable gloves	4	0	5	85	43.6	80
Putting on PPE	8	5	9	77	39.5	88.9
Wearing N95 mask	5	1	6	78	40.0	83.3

According to Table 2, the median of hand washing was the highest point and equal to the maximum point (6/6), the median of gloves knowledge was the lowest (4/5).

Table 3. The knowledge of students' infection control during COVID-19 test sampling

Process	Points			Achieved maximum points		Median*100/ maximum points (%)
	Median	Min	Max	f	p (%)	
COVID-19 test sampling	7	1	9	48	24.6	77.8
Minimum safe distance	2	0	2	192	98.5	100

The proportion of participants gaining maximum scores at the minimum safe distance (98.5%) was higher than the COVID-19 test sampling (24.6%).

Table 4. The knowledge of student infection control after COVID-19 test sampling

Process	Points			Achieved maximum points		Median*100/ maximum points (%)
	Median	Min	Max	f	p (%)	
Removing disposable gloves	4	0	4	99	50.8	100
Taking off PPE	8	2	10	58	29.7	80
Principles of removing PPE	1	0	2	92	47.2	50
Taking off the N95 mask	2	0	2	105	53.8	100
Time of disinfectant spray in the sampling process	1	0	1	180	92.3	100

Removing disposable gloves, taking off the N95 mask, and time of disinfectant spray in the sampling process had the median equal to the maximum point. Principles of removing PPE had a low median, only 50% compared to the maximum point.

IV. DISCUSSION

In this study, male volunteers accounting for 47.2% (n=92) were lower than female volunteers accounting for 52.8% (n=103). Students in the 45th cohort participated in research with the highest quantity (43.6%) and 42nd cohort was the lowest quantity (0.5%). The research had the largest number of general medical students participating (69.2%). Because students of the 45th cohort and medical general were two groups of participants that our team was convenient to access.

The proportion of students who correctly answered the question on hand washing routine correctly was high, with a median of 6 points, and the number of students who correctly answered the question was 95.9%. A survey of 589 medical students in their fifth and sixth years at Ho Chi Minh City University of Medicine and Pharmacy (UMP) found that 544 students answered correctly, accounting for 92.4% of the total [3]. In addition, the University of Medicine and Pharmacy – Hanoi National University surveyed 653 students, with 647 of them answering correctly 99.08% of the questions [11]. It demonstrated that medical students understood the need for hand washing before obtaining samples and the importance of prevention and control SARS-CoV-2. Wearing disposable gloves had median reach 80% compared to the maximum level while only 43.6% of the student's answer is completely accurate. 39.5% of participants correctly answered the steps of putting on PPE, whereas compared to the UMP's 5th and 6th, 205/589 students answered correctly all majors accounting for 34.8% [3]. In our survey, 78 students (40%) answered correctly all of the procedures for using N95 masks, despite the fact that many students neglected to check the mask after wearing it. Whereas Wang et al. highlighted the function of the N95 mask in reducing the spread of COVID-19. They also noted that 10/213 health experts who did not wear a mask were infected with COVID-19, while no one was sick among the 278 persons who wore N95 masks [12]. In short, some limitations need to be paid attention to improvements, such as the knowledge of wearing an N95 mask and the steps of putting on PPE to protect everyone in the sampling process.

The results of a survey on infection prevention in sampling, with a 98.5% response to the question concerning the safety distance and a study of 434 nursing students at Hanoi Medical College had 54.2% (235/434 students) [10]. Similar to another study, which had 531 dentistry students from 32 Iranian universities, 43.1% of the questions were answered correctly [4]. Our study recognized that 77.8% of the students correctly answered the knowledge of the collection of COVID-19 test sampling results correctly. In another study, only 62.3% of 589 students in UMP's 5th and 6th general medical fields answered correctly [3]. As a result, medical students have a good comprehension of epidemic COVID-19 prevention, especially the risk of infection. It was comparable to the findings of research on 653 students studying at the University of Medicine and Pharmacy – Hanoi National University [11].

In Table 4 time of disinfectant spray 92.3% of the subjects achieved the maximum score. This data indicated that this knowledge was very important in the prevention of the COVID-19 epidemic. Also as emphasized very clearly in the article published by the Ministry of Health, Department of Preventive Medicine [6], only 58 students received the

maximum score on, 10 steps of manipulation of taking off PPE, although the median was 8 among 154/589 students in their 5th and 6th years of UMP [3]. It can be explained that this understanding is fairly fresh for students while engaging in anti-epidemic. The number of people is getting a low maximum score due to subjective elements in the processes of the content. The reason may be that the content is too long, and detailed, and every step when the researcher only needs one small detail that can lead to the remaining steps also affecting the score. In our study, taking off the N95 mask, the standard was 53.8%, and removing gloves with the median was up to 4 but the number of students achieved a maximum score of 99 students, accounting for 50.8%. Students were interested in removing gloves and taking off the N95 masks but our method of sampling was interviewing, so students presented. So students present their knowledge through words and confusion, other small details students easily ignore.

V. CONCLUSIONS

The majority of those who took part in the poll were students in the 45th cohort and the major was medicine. Regarding the knowledge of infection control, the principle of taking off PPE was only 50% compared to the maximum point. 77.8% of the students correctly answered the knowledge of collection COVID-19 test sampling correctly. The medians of the remaining contents ranged from 80% to 100% of the highest point.

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