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**Original article**

# Knowledge, attitude and practice towards Covid-19 pandemic of pharmacy students in University of Medicine and Pharmacy at Ho Chi Minh city, Vietnam

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**Abstract:** ***Introduction*:** The rapid increase of infected cases and fatalities during the COVID-19 pandemic has created a huge health crisis to the world and Vietnam in particular. Health professionals were put under massive pressure in preventing pandemic. This study was conducted to assess the knowledge, attitude and practice (KAP) during the COVID-19 disease through an online survey as well as related infection control practices among pharmacy students in the University of Medicine and Pharmacy at Ho Chi Minh City (UMP). ***Methods*:** The cross-sectional study was conducted based on the data obtained from an online questionnaire. Correlation analysis was performed using statistical tests and linear regression model for practice. The total study sample, chosen based on the inclusion and exclusion criteria was taken from pharmacy students in UMP during the study period. ***Results*:** A scale of KAP towards COVID-19 was developed with 43 questions and received 1,089 responses. We acknowledged that the awareness and practice of these students were at a good level (with a mean score of 8.37±0.77 and 8.46±1.33, respectively) and the attitude was optimistic with a mean score of 6.22±0.68. Related factors to practice included gender (p=0.005), year of study (p=0.013); to knowledge included the time spent in university (p=0.040); to attitude included social distancing (p=0.024). Multivariable regression analysis showed that practice is related with male gender (β=-0.254; p=0.001), the first 3 school years (β = 0.173; p=0.020), knowledge score (β =0.154; p=0.003). ***Conclusions*:** Based on a constructive scale, the study noted students' knowledge-attitude-practice towards COVID-19 at a good level. School year and knowledge scores positively affected practice scores, while male students had a negative effect.

**Keywords:** Pharmacy students; Knowledge-Attitude-Practice; KAP; COVID-19; Vietnam.

## 1. INTRODUCTION

The coronavirus disease was referred to as "2019 novel coronavirus", which was caused by a newly discovered transmissible virus, resulted in signs similar to the common cold, and later developed into severe acute respiratory syndrome [1]. It was first found in Wuhan, China, and spread worldwide with dramatic speed. By Sep 09th 2020, 27,764,017 infected cases were found in 215 countries and regions, causing over 902,356 fatalities all over the world [2]. World Health Organization (WHO) has officially announced COVID-19 outbreak "Public Health Emergency of International Concern" and has taken preventive measures against it [3, 4]. Vietnam also reported its first positive case on Jan 23, 2020, and up to 1,054 cases by Sep 09, 2020, with 35 deaths recorded [5, 6].

Due to its high infectivity and transmissibility, many studies have been conducted and showed that the coronavirus traveled from one to another through droplets of the infected individuals even when they seemed to be asymptomatic. It has

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been proved that the transmission could occur when one person touched the contaminated surface and rubbed their hands back to the face [7]. No specific treatment or vaccine has been validated at the time the study was conducted. With this fomite transmission, unprecedented actions have been adopted in every country as an attempt to contain this pandemic. For instance, Vietnam began its first extensive social distancing policy across the country within 15 days, on Apr 1, 2020 [8]. Schools and places for gathering such as bars, cinemas, coffee shops were shut down and citizens were obliged to wear face coverings when going out [9]. These preventive measures turned out to be effective as the community infectivity started to lessen [10].

A study by Zhong BL and partners cited that the more Chinese people are up to date with the current situation, the less likely they are to have negative attitudes and avoid potentially dangerous practices [11]. Learning the amount of knowledge people absorbed and their habit modification in the past few months helps to assess the awareness and compliance towards these preventative actions. Studies on knowledge, attitude, and practice (KAP) have been carried out between groups of participants, and students are one among these. In this study, we evaluate the KAP of pharmacy students of UMP, Vietnam regarding the COVID-19.

## 2. MATERIALS AND METHOD

### 2.1. Study design

A cross-sectional study was fielded from February to July 2020 with the participation of pharmacy students at UMP, Vietnam. At the time of study, the total quantity of students in the faculty was 2,007, covering from freshmen to seniors. Due to the aggravation of the pandemic, schools were forced to shut down and E-courses were encouraged for theoretical classes [12]. For practical sessions and exams, they were asked to follow the safety protocol of the Health Ministry, such as keeping a safe distance from each other and washing hands with alcohol-based sanitizer [13]. Therefore, a Google form survey was developed and posted publicly by the Ho Chi Minh Communist Youth Union of Pharmacy Faculty, an organization which represents the interests of pharmacy students. Through this organization, the online survey was delivered directly to pharmacy students.

***Sample size***

During the study period from February 2020 to July 2020, the sample size was taken entirely from the population of pharmacy students. All eligible participants satisfying all inclusion and not meeting exclusion criteria, were accounted for the study. Therefore, the population of this study only represented pharmacy students attending at UMP.

***Inclusion criteria***

- Pharmacy students attending to UMP in 2020
- Able to access the online survey
- Consent to take part in research

***Exclusion criteria***

- Students answering more than once
- Violate the reverse question.

### 2.2. Questionnaire

The questionnaire was constructed based on a systematic review of KAP towards COVID-19 on Pubmed, Cochrane Library and google scholar. A small group interview with 15 students (3 students of each class) was held to adjust words and structures of questions and statements. The questionnaire was validated based on official documents from the online portals of WHO and Vietnam Health Ministry. A pre-test was conducted on study sample of 100 students with 20 students each class to adjust the questionnaire.

The questionnaire included 2 parts (socio-demographic data and KAP part) and one reverse question in the KAP part to figure out unqualified answers. A reverse question has the contrarian content to one statement about prevention knowledge, and answers which had the same responses to both were eliminated from the study.

The survey provided the information of the study to all participants before taking the questionnaire and allowed them to join voluntarily by signing a consent form online.

Socio-demographic data investigated population characteristics such as sex, age, year of study, place of residence, co-habitant, infection status, quarantine status, source of information and update frequency. Demographic information of participants was anonymously collected by asking for initials and email addresses were obtained to remove duplicate answers.

The attitude domain (7 questions) focused on risk perception, such as the probability of getting transmitted and recovering, and whether the preventive measures enforced by the local authority kept them safe from the virus. On the Likert scale of 5, these participants were asked to rank from 1 (totally disagree) to 5 (totally agree) based on their perspective. The practice domain (13 questions) was to analyze the practice of students during the quarantine and their adaption to this global crisis. For each response, two points were added for the "more frequent" option, one point for "as usual" and zero for "less frequent".

KAP scores were calculated by the following equation:

$$\text{KAP score} = \frac{\text{Total score of each domain}}{\text{Maximum score}} \times 10$$

Based on the classification of Bloom B.S., the knowledge and practice of every participant were rated from good (8 – 10 points); average (6 – 8 points) to bad (less than 6 points). The attitude of each respondent was rated from positive (6 – 10 points) to negative (less than 6 points) [14]. Since all the questions were made compulsory, response rate was considered to be 100%.

### 2.3. Statistical analysis

Data retrieved from the questionnaire were analyzed using IBM SPSS Statistics 26.0 and Microsoft Excel 2010 with a confidence level of 95%. The level of students' KAP was determined by simple frequency (n) and percentage (%). Statistical hypothesis tests were used to assess the correlation of different elements affecting the KAP result based on the normality of KAP score. In particular, a T-test or Mann-Whitney was used to discover the relevance between KAP and factors including sex, place of living, quarantine status, while the ANOVA test or Kruskal-Wallis was used to evaluate the

connection between KAP and year of study, infection status. The relation between age and KAP was established using Pearson or Spearman. P-value of 0.05 or less was considered statistically significant, meaning "relevant".

## 3. RESULTS

### 3.1. Demographic characteristics

The survey received 1,213 responses and crossed out 124 unqualified answers based on the inclusion/exclusion criteria and reverse question. With 1,089 qualified responses, a demographic characteristic analysis was performed and demonstrated in Table 1.

According to Table 1, the participants aging between 19 and 26 (21.06 ± 1.65) were mostly female students (67.2%), twice as much as their male counterparts. Based on the year of study, the sophomores took up the majority with 23.9%. More than 90% of them were in Ho Chi Minh City at the time of the survey and most of them were staying with their friends. 91.7% of students had never had any contact with F1, F2, or F3 and more than 80% of enrolled individuals had never been in quarantine before. Most participants kept up with the information about COVID-19 from internet (93.6%), social network (89.3%) and SMS from Ministry of Health (77.2%) with 59.4% participants updating once or more times per day.

**Table 1.** Demographic characteristics (n = 1,089)

| **Variable** | | **Frequency (%)** | **Variable** | | **Frequency (%)** |
|---|---|---|---|---|---|
| Gender | Male | 357 (32.8) | Place of residence | HCMC | 1,041 (95.6) |
| | Female | 732 (67.2) | | Others | 48 (4.4) |
| Year of study | First year | 260 (23.9) | Update on the information | Never | 3 (0.3) |
| | Second year | 251 (23.0) | | Hardly ever (1-2 times/ week) | 68 (6.2) |
| | Third year | 187 (17.2) | | Sometimes (3-4 times/week) | 370 (34.0) |
| | Fourth year | 223 (20.5) | | Often (once a day) | 458 (42.1) |
| | Fifth year | 168 (15.4) | | Very often (more than once/day) | 190 (17.4) |
| Co-habitant | Parents | 178 (16.3) | Source of information | Internet | 1,019 (93.6) |
| | Relatives | 323 (29.7) | | Social network | 972 (89.3) |
| | Friends | 480 (44.1) | | Message from MOH | 841 (77.2) |
| | None | 108 (9.9) | | Family/Friends | 705 (64.7) |
| Infection status | F1 | 2 (0.2) | | Television | 634 (58.2) |
| | F2 | 12 (1.1) | | Poster/Banners | 255 (23.4) |
| | F3 | 76 (7.0) | | Medical staffs | 162 (14.9) |
| | Never | 999 (91.7) | | Propaganda vehicle | 152 (14.0) |
| Quarantine status | At medical center | 0 (0.0) | | Newspaper | 95 (8.7) |
| | At home | 171 (15.7) | | Radio | 71 (6.5) |
| | At quarantine area | 8 (0.7) | | Others | 5 (0.5) |
| | Community quarantine | 60 (5.5) | **Variable** | **Mean (SD)** | **Min – Max** |
| | Never | 877 (80.5) | Age | 21.06 (1.65) | 19 - 26 |

*F1 - those who have close contact with the infected; F2 - those who have close contact with F1; F3 - those who have close contact with F2; SD - Standard deviation; MOH – Ministry of Health; HCMC – Hochiminh city*

### 3.2. Knowledge domain

Table 2 described the outcome of the knowledge investigation of the study participants. Regarding each subtopic from the set of knowledge questions, almost every student had accurate replies about general knowledge (definition and initial source). More than 90% of students had an appropriate insight into the specific signs and incubation period. Virus transmission, treatment, and quarantine also received a large proportion of correct responses. However, the agreement on the use of flu vaccine against coronavirus varied, with 23.7% stating unsure and 14.5% having the wrong answer. The same happened to question about the necessity of N95 for people interacting with F0 (70.3% agreed; 19.4% disagreed and 10.3% uncertain).

Across the entire study sample, the median COVID-19 knowledge was scored 8.37 out of 10 points (IQR: 8 - 9). The majority participants (87.88%) attained a high score ($\geqslant$8) with maximum score of 10 and no respondent scored less than 6 points.

### 3.3. Attitude domain

Seven questions were given out and results were recorded in Table 3. As noted, more than 60% of students believed they would be more likely to catch the virus if no containing actions were applied. The percentage of students who thought their family could get germ-transmitted was nearly equal to those who did not. A three-fourths of the participants were supposed to develop to a more complicated state and only a quarter believed they could not recover. More than 70% of students believed in protective measures applied and the vast majority of them was confident that Vietnam could put this pandemic under control.

### 3.4. Practice domain

Some adjustments in students' practice were demonstrated in Table 4. A large portion of these participants (80% approximately) were also reported to be more compliant with the compulsory guidance proclaimed by the Ministry of Health of Vietnam. These guidelines consisted of statements from P1 to P8. Some actions were also taken but with a smaller proportion of only 50 to 65% of the population, since these measures were not made obligatory by the authority, including: (1) avoid recirculating spaces, (2) rinse with salt water or mouthwash, (3) good nutrition, (4) healthy lifestyle, (5) do exercise.

**Table 2.** Knowledge about COVID-19

| No. | Question | Count (%) | | |
|---|---|---|---|---|
| | | Yes | No | Not sure |
| **General knowledge** | | | | |
| K1 | COVID-19 is an acute respiratory disease caused by a new strain of coronavirus* | 1,077 (98.9) | 10 (0.9) | 2 (0.2) |
| K2 | It was first discovered in Wuhan, China* | 1,074 (98.6) | 2 (0.2) | 13 (1.2) |
| **Symptoms** | | | | |
| K3 | The common symptoms are fever, fatigue, dry cough, sore muscle* | 1,001 (91.9) | 83 (7.6) | 5 (0.5) |
| K4 | It takes about 14 days of incubation before exposure* | 1,058 (97.2) | 26 (2.4) | 5 (0.5) |
| **Transmission** | | | | |
| K5 | The virus transmit through 3 main modes: droplets, aerosol particles, contaminated surfaces* | 1,046 (96.1) | 33 (3.0) | 10 (0.9) |
| K6 | Asymptomatic patients cannot transmit the germs | 157 (14.4) | 913 (83.8) | 19 (1.7) |
| **Treatment** | | | | |
| K7 | No vaccine for coronavirus yet (May, 2020)* | 949 (87.1) | 105 (9.6) | 35 (3.2) |
| K8 | Early treatment can help patients recover from the disease* | 949 (87.1) | 59 (5.4) | 81 (7.4) |
| K9 | Not every patient get worse physically when infected* | 1,032 (94.8) | 26 (2.4) | 31 (2.8) |
| K10 | Elderly, people with chronic diseases and obesity have greater risk of illness complications* | 1,028 (94.4) | 25 (2.3) | 36 (3.3) |
| **Prevention** | | | | |
| K11 | Flu vaccines prevent risk for infection | 158 (14.5) | 673 (61.8) | 258 (23.7) |
| K12 | N95 respirators should only be used for those who have direct contact with the patients* | 766 (70.3) | 211 (19.4) | 112 (10.3) |
| K13 | Surgical masks can help to contain the virus tramsmission through droplets* | 1,010 (92.7) | 53 (4.9) | 26 (2.4) |
| K14 | Wearing masks inside out is the better way for prevention | 32 (2.9) | 991 (91.0) | 66 (6.1) |
| K15 | Alcohol concentration in the hand sanitizer must be 60% or above* | 840 (77.1) | 144 (13.2) | 105 (9.6) |
| K16 | Children and young people have no neccessity in taking these precautions | 1 (0.1) | 1,076 (98.8) | 12 (1.1) |
| K17 | People should stay in air-recirculated spaces to avoid catiching coronavirus* | 8 (0.7) | 1,057 (97.1) | 24 (2.2) |
| K18 | Every person should avoid crowded places, such as train stations and public transportation* | 1,056 (97.0) | 32 (2.9) | 1 (0.1) |
| **Quarantine** | | | | |
| K19 | Isolation and treatment for the positive individuals is an effective way to block the outbreak* | 1,079 (99.1) | 6 (0.6) | 4 (0.4) |
| K20 | Those who have direct contact with the patients (F1) need to be quarantined immediately* | 1,068 (98.1) | 13 (1.2) | 8 (0.7) |
| K21 | 14-day quarantine is compulsory for F1* | 1,061 (97.4) | 16 (1.5) | 12 (1.1) |

**correct statement*

**Table 3.** Attitude on COVID-19

| No. | Question | Scale (%) | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| A1 | Chances of you being infected | 2,75 | 7,53 | 25,35 | 30,67 | 33,7 |
| A2 | Chances of your family members being infected | 1,01 | 10,56 | 42,05 | 28,47 | 17,91 |
| A3 | Your illness severity in case of being infected | 0,55 | 1,84 | 21,03 | 39,67 | 36,91 |
| A4 | Your recovery possibility in case of being infected | 0,55 | 1,84 | 20,94 | 39,76 | 36,91 |
| A5 | All the safety measures are applicable to stop the widespread | 0,55 | 2,84 | 25,71 | 50,2 | 21 |
| A6 | COVID-19 will be under control in no time | 0,28 | 1,56 | 15,24 | 38,2 | 44,72 |
| A7 | Vietnam can take over this pandemic | 0,18 | 0,55 | 9 | 25,81 | 64,46 |

**Table 4.** Practice towards COVID-19

| No. | Question | Frequency (%) | | |
|---|---|---|---|---|
| | | Less frequent | As usual | More frequent |
| P1 | Increase air ventilation and stay hygiene | 1,6 | 12,4 | 86 |
| P2 | Only go out when neccessary | 0,3 | 12,5 | 87,2 |
| P3 | Stop touching your hands to the face | 0,5 | 18,2 | 81,3 |
| P4 | Wash your hands with soap and water in 20 seconds or use an alcoholic sanitizer | 0,4 | 4,7 | 94,9 |
| P5 | Wear mask when going to hospitals or public places | 0,4 | 5,8 | 93,8 |
| P6 | Cover your mouth and nose when sneezing or coughing with tissue or handkerchief | 0,1 | 13,5 | 86,4 |
| P7 | Keep a safe distance of at least 1 meter in pubic | 0,5 | 12,5 | 87 |
| P8 | Contact the nearest healthcare centre when alike symptoms appear | 0 | 14,7 | 85,3 |
| P9 | Healthy lifestyle. Get enough sleep | 2,4 | 45,9 | 51,7 |
| P10 | Do exercises | 1,3 | 33,2 | 65,5 |
| P11 | Good nutrition | 1,8 | 29,4 | 68,8 |
| P12 | Rinse with saltwater or mouthwash | 0,5 | 31,4 | 68,1 |
| P13 | Avoid staying in recirculating spaces too often | 7,3 | 37,1 | 55,6 |

### 3.5. Related factors

This study discovered a correlation between knowledge – practice (r=0.042, p=0.019) and knowledge – attitude (r=0.067, p=0.005) (Figure 1). It has been found that related factors to practice were gender (U= 117,161.0, p=0.05) and year of study ($\chi 2 = 12.6$, p=0.013), while social distancing had a close relation with attitude (U = 255,77.5, p=0.024). A linear regression analysis was generated between the elements involved (Table 5). By that, practice score went down by 0.254 points when a male student (p=0.001); increased 0.173 points if they were freshmen, sophomores, or juniors (p=0.020); increased 0.154 points when knowledge score added 1 (p = 0.003).

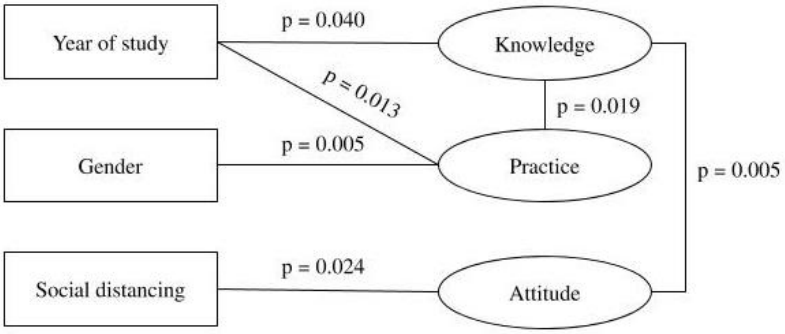


**Figure 1.** KAP correlation

**Table 5.** Factors related to practice score

| Factor | Unstandardized coefficient | | Standardized coefficient | | p-value |
|---|---|---|---|---|---|
| | β | SE | βk | | |
| Constant | 7.310 | 0.442 | | 175.291 | 0.000 |
| Male | -0.273 | 0.085 | -0.097 | -3.214 | 0.001 |
| Knowledge | 0.135 | 0.052 | 0.078 | 2.605 | 0.009 |
| 1st, 2nd, 3rd year | 0.172 | 0.083 | 0.062 | 2.072 | 0.039 |

## 4. DISCUSSION

Coronavirus has become an alarming crisis in every country in the world. The number of positive cases has reached 27,764,017 with a death toll of 902,356 people by Sep 09, 2020 [2]. There are some studies on the perception of the public, especially students towards COVID-19 in other countries. Despite a moderate level of knowledge about the pandemic, majority of Indian responders felt panic, distress and need mental healthcare [15]. A study on public Italian perception reported high uncertainty, fear, and sadness perceived by the respondents [16]. However, there are no studies on the risk perceptions of Vietnamese during the

pandemic. In this study, we aimed to assess the KAP of pharmacy students, who would be future healthcare specialists, towards the COVID-19 pandemic.Understanding their knowledge about COVID-19, which partly reflect the public awareness, will provide a general view to contribute the future local policy for the required educational interventions.

In the present study, we discovered that the internet, social media, and SMS from the Ministry of Health were three main sources accessed by the participating students. Similarly, a finding in Egypt indicated that pharmacy students often kept up the situation through social media and television [17]. This could be explained since the network is reachable almost everywhere these days. Taking the advantage of technological advances, many webzines have created an exclusive category only to deliver news about COVID-19. WHO and the Health Ministry of Vietnam have also utilized their websites to constantly promote health, guidance, and recommendations, especially in this emerging scenario [18].

Based on the outcome of the knowledge domain, the undergraduate individuals were indicated to have adequate fundamental information regarding this global eruption. The majority of participants have correct answers towards the transmission route of the virus. This result was comparable with the findings of Iman and colleagues in Jordan which showed that more than 87% of pharmacists were aware of this aspect [19]. A study in China on college students reported only 25% of responders having correct answers for transmission questions [20]. However, there was still some confusing information misled by untrustful resources. For instance, the use of the flu vaccine in the prevention of COVID-19 remains a controversy among scientists since no evidence was given to prove that the flu vaccine had the ability to block the invasion of this novel virus, along with its capability in relieving signs and symptoms [21]. The high ratio of students who possessed basic notions about different aspects of coronavirus was expected due to the excessive news reports about COVID-19 all over the media sources.

From the attitude domain, the undergraduates were shown to have good expectations towards the situation. Even so, a large proportion of participants were concerned about the high contagion probability of themselves and their families. These results matched with one carried out by Erick T. Baloran et al. in the Philippines [22]. Moreover, Lincango-Naranjo Eddy et al. witnessed a large proportion of students (98.1%) were afraid that they might become the carrier to their family in a study in Ecuador [23].

According to the findings of this study, there was a significant difference between males and females in students' behaviors, with higher preventive measure adherence among females. This was similar to the other two previous studies of Md Abdul Wadood and colleagues, Yaling Peng, and colleagues [24, 25]. This could indicate that females were more aware of the importance of COVID-19 preventive behaviors compared with males. Besides, a significant difference was also reported between different year of study, which was in contrast to the results of Yaling Peng and colleagues in China [24]. According to the regression analysis, two elements having upward effects on practice were knowledge and year of study (from the first year to the third year), whilst gender, especially male students, had a negative correlation to this domain. Consequently, attention should be paid to male students and seniors in order to ensure their compliance with current safety protocols. The output also highlighted the role of the communication industry in executing the general guidance as well as providing additional training to enhance modification in students' practice.

Our study has some limitations to be put into discussion. First, the research was aimed at exploring the knowledge and lifestyle of the undergraduate pharmacy students in UMP, which did not represent neither the population of students from all over the country nor healthcare professionals. Furthermore, the cross-sectional study design was incapable of noticing the shift in participants' perceptions and behavioral patterns during the pandemic. Finally, the impact of propaganda campaigns on the community was not fully assessed. As the result, we recommend a research with more extended population, monitoring the adjustments made and the influence of these campaigns on the public perspective.

## Conclusion

In conclusion, pharmacy students were generally knowledgeable, possessed the optimistic attitude, and proactive approach towards the COVID-19 pandemic. However, gender and school-year should be taken into account for future educational programs as an attempt to increase awareness and improve practices regarding this pandemic. Periodic interventions and training are recommended to keep students up-to-date with the current situation and better awareness.

## ETHICS STATEMENT

This study received approval to perform by Pharmacy Faculty – University of medicine and pharmacy at Ho Chi Minh city. The confidentiality and anonymity of the participants were guaranteed.

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## CONFLICT OF INTEREST

The authors reported no conflicts of interest.

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