Knowledge, Awareness, and Practices for Prevention of Vietnamese Students in the Passion of COVID-19: A Survey in the Health Industry, Nguyen Tat Thanh University, Ho Chi Minh City

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Abstract

The COVID-19 pandemic is the largest viral pandemic of the 21st century. We aimed to study COVID-19 knowledge, awareness, and practices (KAP) among medical and health sciences students in the Viet Nam, survey in the health industry, Nguyen Tat Thanh University, Ho Chi Minh city. It was conducted in English and comprised two parts: socio-demographic characteristics, and KAP towards COVID-19. A total of 1370 students responded to the survey. Out of which 74,8% of female students, 25,2% of male students. The knowledge of the students on COVID-19 was of high level; however, more than one-third of them feel unconcerned about how they feel about the disease. The majority of students believe and are willing to support and follow recommendations from competent authorities in Vietnam to prevent the entry of the coronavirus. Besides, more than two-thirds of students said that they completely know how to protect themselves from the coronavirus. Students of Vietnam's health sector had an acceptable level of knowledge, awareness, and good practices of preventive measures regarding the COVID-19 virus. There were no significant differences in most categories of students' gender-related knowledge, perceptions, and practices, or years of study.

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1 Introduction

Since late December 2019, numerous viral pneumonia cases of unknown causes have been consecutively reported in Wuhan city, China. Then the pathogen was soon isolated, analyzed, performed viral genome sequencing, and finally identified as a novel strain of coronavirus. Different from both MERS-CoV and SARS-CoV, this is identified as the seventh member of the coronaviruses family that infects humans (Zhu et al., 2020). Increasing evidence shows that COVID-19 is less lethal but more contagious than SARS-Cov and MERS-Cov (Wang et al., 2020; Paules et al., 2020; Chan et al., 2020). The outbreak soon spread to the whole country, reached beyond the border, and was declared as a Public Health Emergency of International Concern by World Health Organization in late January 2020.

Up to now, Vietnam has had a total of 4 outbreaks taking place on a national scale. Especially, the 4th epidemic, which has lasted from the beginning of May until now, has seriously affected social life. In particular, Ho Chi Minh City is considered the hardest hit. To curb the virus, Viet Nam quickly announced a high-level public health emergency response and adopted a series of special measures during the so-called "distancing" period, from implementing isolation society, popularizing public health education on a large scale, disinfection, strict door-to-door isolation, and face-to-face health checks, educational institutions and factories, offices are delayed, etc. The dramatic outbreak of the Delta virus in this fourth wave has impacted all stakeholders in education in an unprecedented way. Among them, university students represent a special group with greater autonomy and a pressing need for independent living, but lack of life experience. Therefore, their perception and behavior are probably more affected by this pandemic (Chaniago, 2021).

Health students are a critical piece for the system and are immersed in a range of key clinical activities within the health system. Their role has developed from merely observing, to being actively involved in patient care responsibilities. They belong to the novel generations of healthcare practitioners. Although they have little experience managing patients or using personal protective equipment properly, they have been allocated to several clinical wards to tackle the COVID-19 crisis (Tetro, 2020; Nishiura et al., 2020).

Currently, there is no treatment to prevent COVID-19, making the adoption of precautions the most important intervention available (Xu et al., 2020). Having a positive attitude towards these guidelines and adherence to these measures may be essential to avoid deaths and facilitate outbreak management. In our research, we aim to describe the knowledge, awareness, and practices of health students in Vietnam. We believe this information can better guide the design of medical education programs to approach acute health emergencies like COVID-19 (Li et al., 2020). Our research questions include:

1) What is the current knowledge, awareness, and practice of health students in Vietnam?
2) Impact of awareness of the COVID-19 epidemic on disease prevention practices of health students in Vietnam?

2 Materials and Methods

Survey development and measures

The data was collected using a 23-item online survey to health major students' knowledge, awareness, and practices (KAP) around COVID – 19. A novel survey instrument was developed for this study using items adapted from information about COVID-19, published by the WHO alongside items used in previous COVID-19 surveys (Khasawneh et al., 2020; Le et al., 2020). The questionnaire consisted of four sections: demographic characteristics, COVID-19 related knowledge, awareness, and practices (Lamme, 2003). The survey was developed and fielded in Viet Nam and later translated into English for reporting purposes. The survey was conducted using Google Forms, an online, cloud-based survey administration application. To minimize missing data, respondents were required to complete each item to proceed to the subsequent items. The full survey instrument is available in the additional file.

Demographic characteristics

We collected demographic information from respondents including; age, gender, the likelihood of chronic diseases, with whom you live, and the field of study where the student is trained (Table 1).

Table 1
Demographic characteristics

		Frequency (n)	Percent (%)
Gender	Male	345	25.2
	Female	1025	74.8
	Total	1370	100.0
Age	Under 18-year-olds	37	2.7
	From 18 to 24 years old	1319	96.3
	Over 24 years old	14	1.0
	Total	1370	100
Status life	With family	1231	89.9
	With friends	38	2.8
	With relatives	69	5.0
	Live alone	29	2.1
	Other	3	0.2
	Total	1370	100
Status have diseases chronic	Yes	52	3.8
	No	1318	96.2
	Total	1370	100

Domain: knowledge

The knowledge domain was composed of 8 questions. The questions evaluate students' knowledge about COVID-19 including its: virology, diagnosis, clinical management, prevention, and relevant infection control measures (Malterud, 2001). For questions in this domain, respondents were asked to answer "true", "false" or "not sure". Responses can be multiple choice or will be scored from 1 to 5 on a scale from "don't know" to "know very well". The obtained results show that the knowledge about COVID - 19 of health students is high (Lancet, 2020).

Domain: awareness

In the awareness domain, students were asked five questions about their opinions about their trustworthiness in information sources, the severity of the epidemic, and a measure of respondents' attitudes when they are faced with a new strain of the virus. All questions in the awareness domain have "yes" or "no" answer options, on a scale of 1 to 5, and can select more than one suitable opinion.

Domain: practices

Finally, the practice area consists of five questions. This domain reviews the use of prevention and self-protection guidelines; recommendations and measures to prevent epidemics of the government. All 5 questions rate the scale of answers from 1 to 5.

Data processing and analysis

Data were processed using SPSS 18.0 software. The level of students' knowledge on COVID-19 and the percentage of their knowledge, awareness, practice, and perception based on the selected questions were determined by frequency distribution (Myles et al., 2004). The normality of the data (number of corrected answers) was checked by the Kolmogorov-Smirnov test. This non-parametric test and histogram showed that our data were not normally distributed. We used Mann-Whitney and Kruskal-Wallis (non-parametric) tests to find the significance of the difference in the number of correct answers between two and more than two groups respectively. Statistical significance was accepted at $p < 0.05$.

The data results are tested Cronbach's Alpha coefficient > 0.6 and the total correlation coefficient of the observed variables at least 0.3; analysis of EFA and factor rotation matrix with KMO value > 0.5 and Sig test value, Bartlett's Test < 0.05; Eigenvalue > 1; extract factors with total variance extracted > 50%; calculate the correlation coefficient between the pairs of independent variables and the VIF index, perform regression equation estimation.

3 Results and Discussions

3.1 Demographical characteristics of subjects

Of 1370 from the health industry, Nguyen Tat Thanh University, 74.8% were female and 25.2% were male. Their age ranged from 17 to 24 years, of which 96.3% were between 18 and 24 years old during the past 4 months (89.9%). This shows that the knowledge, awareness, and prevention practices of COVID-19 among health major students will have an important influence on their family members (Soasiu, 2021). Another important feature is that the majority of health students do not suffer from chronic diseases (96.2%). As health students, they have access to medical knowledge and their sense of health care is very good (Gazmararian et al., 2003). That is also the reason for the high results in knowledge, awareness, and prevention skills of health students with COVID-19 (Table 1).

3.2 Knowledge of COVID-19

COVID-19 related knowledge was assessed by 5 items. Survey respondents were asked to rate their level of knowledge about the novel coronavirus. Survey respondents were asked to rate their understanding of the new coronavirus. Scores are calculated on a scale of 1 (very poor knowledge) to 5 (very good knowledge). There was no significant difference between sex and age (P>0.005). 66.1% (n = 905), rating their understanding of the coronavirus in general as good; and 14.0% (n = 192) rated their knowledge of the new coronavirus as very good (Centers for Disease Control and Prevention, 2020).

Knowledge of risk groups is generally high, with 83.7% (n = 1147) of respondents correctly identifying the elderly (65 years of age and older) as the group at risk, and roughly the same percentage of people respondents identified people with chronic diseases as a risk group. A smaller proportion of respondents, but still the majority (45.4%, n = 622) correctly answered that pregnant women are at risk, while only 37.8% (n = 519) of the respondents correctly answered that children under 6 years old are not an at-risk group.

Regarding knowledge of the symptoms of COVID-19, the vast majority of respondents correctly identified fever (98.8%, n=1354), shortness of breath (98.0%, n=1342), and cough (92.1%, n=1262) as symptoms. Fewer respondents, but the majority still correctly identified fatigue (93.7%, n = 1284), headache (80.7%, n = 1106), muscle or body aches (69.6%, n = 953), 70.3% (n = 963) of respondents knew that a runny or stuffy nose is a symptom directly related to COVID-19 infection, and only 56.0% (n = 767) said that diarrhea is a symptom of COVID-19 infection. These results are depicted in the chart below (Figure 1).
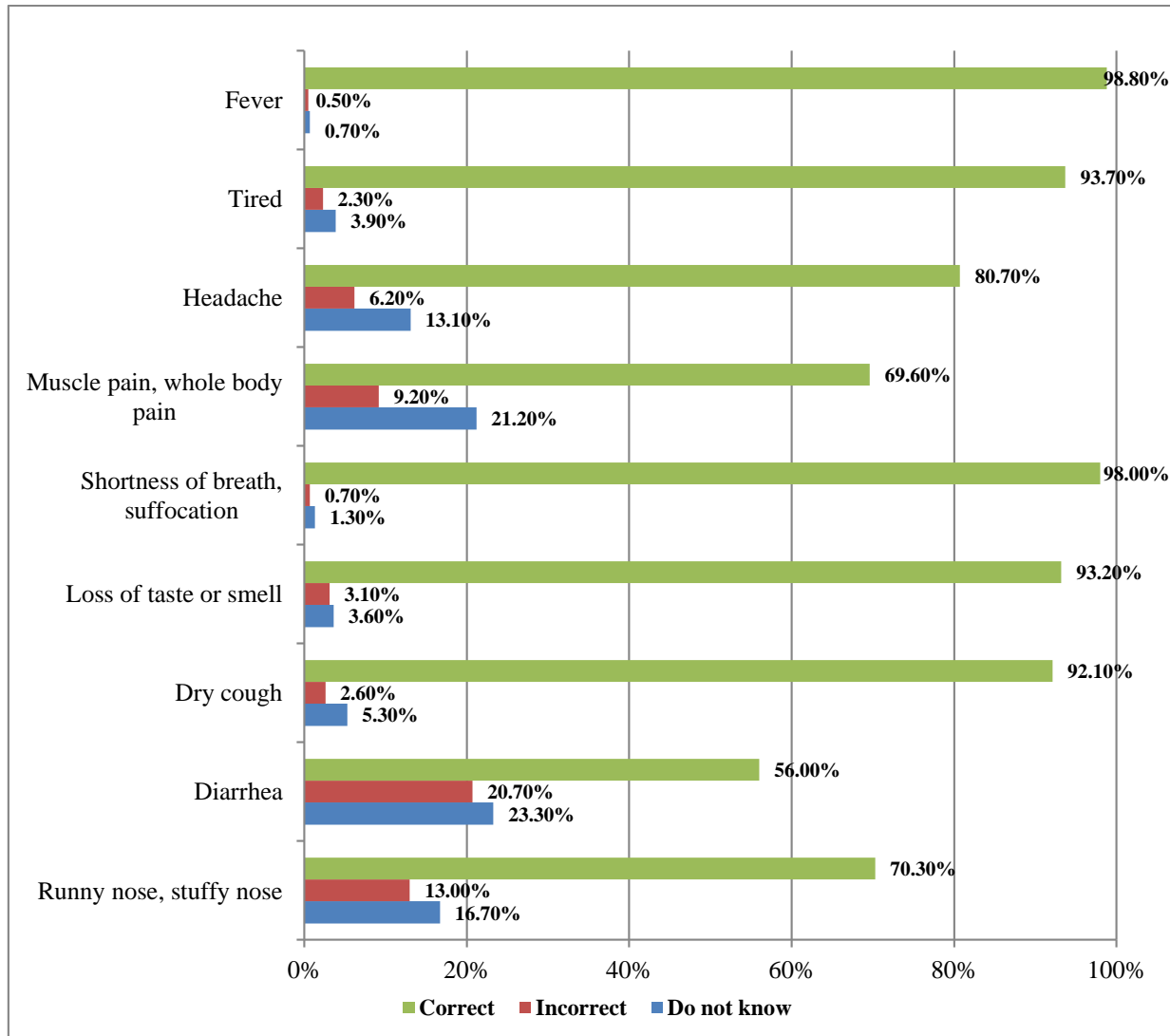
Figure 1. Percentage of survey respondents aware of symptoms of COVID-19

The final knowledge questions of the survey related to the transmission of COVID-19 and its treatment. 85.1% (n = 1166) know that COVID-19 is spread through droplets when coughing, sneezing, or having intimate contact. 98.6% (n = 1351) correctly reported an incubation period of up to 14 days and 40.2% (n = 551) knew that after a person has recovered from COVID-19 that person is not immune to the virus.

Respondents were then asked which method from the list of methods is effective in preventing COVID-19 infection. The vast majority of participants answered correctly regarding key practices that are effective in preventing infection, such as avoiding touching eyes, nose, and mouth with unwashed hands, using hand sanitizer to prevent infection, cleaning hands when soap and water are not available, staying home when you are sick, do not go abroad, cover coughs, avoid contact with infected people, avoid crowded places, isolate yourself and away from society (Grol & Grimshaw, 2003; Hölzel et al., 2011). Only 99.3% of respondents (n = 1361) said that wearing a mask is a preventative measure, and 58.4% (800) frankly answered that using antibiotics is a preventive measure against COVID-19 infection. 30.4% (n = 417) said prayer can be used to prevent infection, indicating a fairly high level of faith in the population, which may prove to be a protective factor related to healthy mental and emotional health and can be informative in choosing future awareness channels and sources. Table 2 presents the distribution of responses.

Table 2
How to effectively prevent the COVID-19 epidemic, students participating in the survey answered

Prevention	Answers	Frequency (rate)
Avoid touching your eyes, nose, and mouth with unwashed hands	Yes	1351(98.6%)
	No	7(0.5%)
	Don't know	12(0.9%)
Use hand sanitizer to clean hands when soap and water are not available	Yes	1328(96.9%)
	No	21(1.5%)
	Don't know	21(1.5)%
Stay home when you are sick or when you have a cold	Yes	1136(82.9%)
	No	146(10.7%)
	Don't know	88(6.4%)
Do not travel abroad	Yes	1254(91.5%)
	No	45(3.3%)
	Don't know	71(5.2%)
Use herbs and supplements	Yes	963(70.3%)
	No	140(10.2%)
	Don't know	267(19.5%)
Cover your mouth when coughing	Yes	1331(97.2%)
	No	10(0.7%)
	Don't know	29(2.1%)
Ensure a balanced diet	Yes	1284(93.7%)
	No	17(1.2%)
	Don't know	69(5.0%)
Avoid close contact with infected people	Yes	1356(99.0%)
	No	4(0.3%)
	Don't know	10(0.7%)
Vaccination	Yes	1357(99.1%)
	No	4(0.3%)
	Don't know	9(0.7%)
Exercise regularly	Yes	1347(98.3%)
	No	1(0.1%)
	Don't know	22(1.6%)
Wear the mask	Yes	1361(99.3%)
	No	1(0.1%)
	Don't know	8(0.6%)
Avoid large gatherings	Yes	1360(99.3%)
	No	1(0.1%)
	Don't know	9(0.7%)
Use of antibiotics	Yes	800(58.4%)
	No	205(15.0%)
	Don't know	365(26.6%)
Pray	Yes	417(30.4%)
	No	638(46.6%)
	Don't know	315(23.0%)
Self-isolation	Yes	1264(92.3%)
	No	47(3.4%)
	Don't know	59(4.3%)

Respondents asked what they felt they still needed regarding COVID-19-related information. As we can see from Table 3, most students need more knowledge about "scientific progress in developing new coronavirus treatments" and "scientific progress in developing vaccines against new coronavirus" (72.8%, n = 998 and 76.6%, n = 1049, respectively) and less knowledge was deemed necessary regarding "details of travel restrictions" (65.7%, n = 900).

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Table 3
Knowledge and information about COVID-19 that surveyors wish to have more

Information and knowledge want to know more	Result	
	Frequency	Rate
Symptoms of the new strain of coronavirus	1109	16.8%
Personal stories from others about how they coped	709	10.8%
Scientific progress in developing a vaccine against a new strain	1049	15.9%
Scientific progress in developing new strains of treatment	998	15.2%
How can I prevent the spread of disease?	855	13.0%
How can I care for someone in a risk group?	963	14.6%
Detailed information on travel restrictions, social distancing.	900	13.7%

3.3 Anwareness toward COVID-19

Participants were asked to rate their confidence in various sources of information related to COVID-19. Scores are measured on a scale of 1 (very little confidence) to 5 (very confident). The highest level of trust was recorded in the Ministry of Health and Hospitals, the lowest level of trust was found on social media. Mean scores differ between men and women ($P < 0.01$) for social television and daily or weekly newspapers with men having a higher mean confidence score than women, as shown in Figure 2.
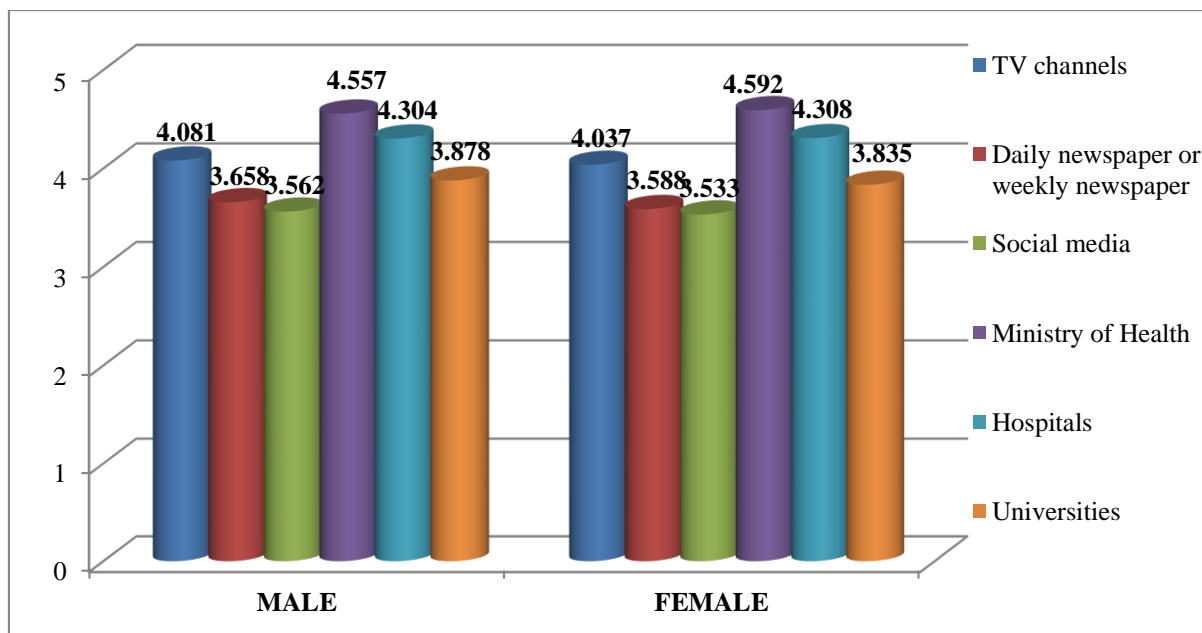

Figure 2. Average rating of students' trust in different sources of information related to the COVID-19 crisis by gender (scale from 1=very little to 5=very confident)

Respondents were then asked to rate their perception of the susceptibility and severity of COVID-19. Scores are measured on a scale of 1 (unlikely, not serious, or completely insensitive) to 5 (very likely, very serious, or very sensitive). Higher means were found for the perception of the severity of the virus is infected than for the perception of the probability of disease or susceptibility to infection. While no significant differences were found in terms of gender in terms of perception and severity if already infected with the new coronavirus. Figure 3 presents this data disaggregated by gender.
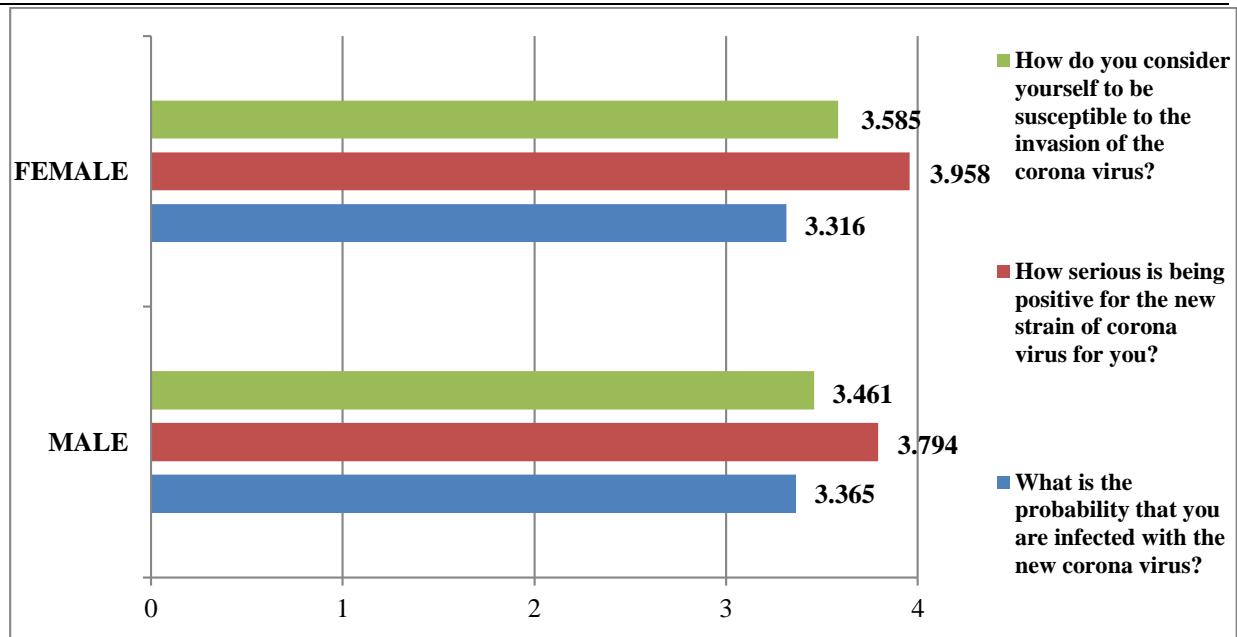
Figure 3. The average score on the perception of COVID-19 severity and susceptibility among students by gender
(on a scale from 1= very little to 5 = very confident)

Respondents were asked to report how much they agree with certain policies and/or practices that governments and citizens can implement in response to the COVID-19 pandemic. Scores are measured on a scale of 1 (strongly disagree) to 5 (strongly agree). Respondents were more likely to agree that "People coming from countries where there have been cases of coronavirus should be quarantined, whether they are sick or not." and "In at-risk areas, major events should be canceled by the organizers." Respondents are least likely to agree with the statement: "I think the measures currently being taken are exaggerated". In addition, a higher average score (more likely to agree) among female students related to the statement: "Only allowed to leave your home for professional, health or emergency reasons" and "Vietnamese people living abroad are not allowed to return to the country during the epidemic period" ($P < 0.01$). Table 4 presents this data.

Table 4
Average assessment score of students' awareness of current COVID-19 disease prevention policies in our country?
Scores are measured on a scale of 1 (strongly disagree) to 5 (strongly agree)

Identify	Average rating			
	Total	Male	Female	P-value
1. If there is a vaccine and I am eligible for the vaccine, I am ready to receive the vaccine.	4.567	4.568	4.567	0.979
2. People entering from epidemic-affected countries are required to quarantine whether they are infected or not.	4.654	4.632	4.661	0.494
3. The government should limit people's access to the Internet and social media to avoid misinformation about the epidemic.	3.325	3.429	3.290	0.095
4. School facilities and kindergartens need to be closed.	4.102	4.061	4.116	0.377
5. Factories and enterprises ensure the implementation of "3 on the spot".	4,318	4,322	4,316	0.919
6. Traditional markets and supermarkets should be closed.	3.355	3.467	3.317	0.046
7. The shipper team needs to be vaccinated.	4.598	4.530	4.620	0.052
8. Major events and festivals should be canceled.	4.335	4.281	4.353	0.229
9. I think the measures being taken are exaggerating the harm of the disease too much.	2.798	3.087	2.700	0.000

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10. Vietnamese living abroad are not allowed to return home during the epidemic period.	3.689	3.713	3.681	0.699
11. I think the current decisions are right.	4.123	4.122	4.124	0.971
12. I have a hard time getting through stressful periods of social distancing.	3.404	3.600	3.339	0.001
13. I easily get through stressful periods.	3.315	3.362	3.300	0.424
14. It is difficult for me to return to my previous work and study after the pandemic has passed.	3.222	3.449	3.145	0.000

Also regarding perception, respondents were asked how they feel about the coronavirus in some different respects. Respondents tend to feel more anxious and stressed when the new strain of coronavirus spreads rapidly. It causes fear and makes them feel powerless. The majority of respondents said that they feel stressed when the number of deaths from the COVID-19 epidemic increases. However, more than two-thirds of them also said that they can actively overcome the epidemic easily (male: 88.7%; female: 86.8%).

Concerning gender, significant differences were found in the extent to which the virus was found to cause fear (P < 0.05) and media advertising (P < 0.01), where women find the virus to cause more fear and men find the virus to be more advertised by the media. The results can be considered in Table 5.

Table 5
Students' opinions about coronavirus

Identify	Selection	Male		Female	
		Frequency	Rate (%)	Frequency	Rate (%)
1. The new strain of coronavirus (Delta) spreads faster than other viruses.	No	6	1.7	1	1.0
	Yes	339	98.3	1015	99.0
2. New strain of coronavirus (Delta) makes you feel scared.	No	57	16.5	87	8.5
	Yes	288	83.5	938	91.5
3. You see information about the epidemic being communicated in an unnecessary exaggeration	No	179	51.9	708	69.1
	Yes	166	48.1	317	30.9
4. The high number of people dying from the disease makes you feel stressed	No	77	22.3	114	11.1
	Yes	268	77.7	911	88.9
5. You can easily overcome the epidemic proactively	No	39	11.3	135	13.2
	Yes	306	88.7	890	86.8
6. You feel uninterested	No	256	74.2	864	84.3
	Yes	89	25.8	161	15.7

3.4 The Practice of Preventive Measures

Regarding prevention awareness and practices, Table 6 presents the results. Male students had higher average scores (better knowledge about how to protect themselves and perceived easier to avoid infection) than female students with a statistically significant difference.

Table 6
The average score of students' awareness and practice related to disease prevention by gender

Identify	Average rating			
	Total	Female	Male	P-value
1. Do you know how to protect yourself from coronavirus? Scores are measured on a scale of 1 (completely unknown) to 5 (very well known).	4.395	4.412	4.389	0.608
2. How difficult is it for you to avoid being infected with the coronavirus today? Scores are measured on a scale of 1 (Extremely difficult) to 5 (Extremely easy).	2.986	3.191	2.917	0.000
3. Are you willing to support and follow recommendations from competent authorities in Vietnam to prevent the entry of the coronavirus? Scores are measured on a scale of 1 (Strongly disagree) to 5 (strongly support).	4.612	4.580	4.622	0.361

When asked about the importance of the "5K Message" deployed by the Ministry of Health, most respondents said that this is an important solution in communicating COVID-19 prevention practices. The survey results also show that the evaluation level between men and women is similar, there is no significant difference. Table 7 depicts this result.

Table 7
Average rating of the importance of the 5K Message issued by the Ministry of Health to prevent coronavirus penetration of students by gender. Scores are measured on a scale of 1 (not important) to 5 (very important)

The "5K Message"	Average rating			
	Total	Female	Male	P-value
1. Gauze mask	4.690	4.664	4.699	0.0334
2. Disinfection	4.682	4.646	4.694	0.0337
3. Don't gather	4.655	4.594	4.675	0.0365
4. Health declaration	4.623	4.562	4.643	0.0375
5. Distance	4.664	4.629	4.676	0.0345

Finally, all respondents expressed their willingness to support and follow recommendations from competent authorities in Vietnam to prevent the entry of the coronavirus. The results also show that female students have a higher level of readiness than male students. However, this difference is not significant. Figure 4 depicts this result.
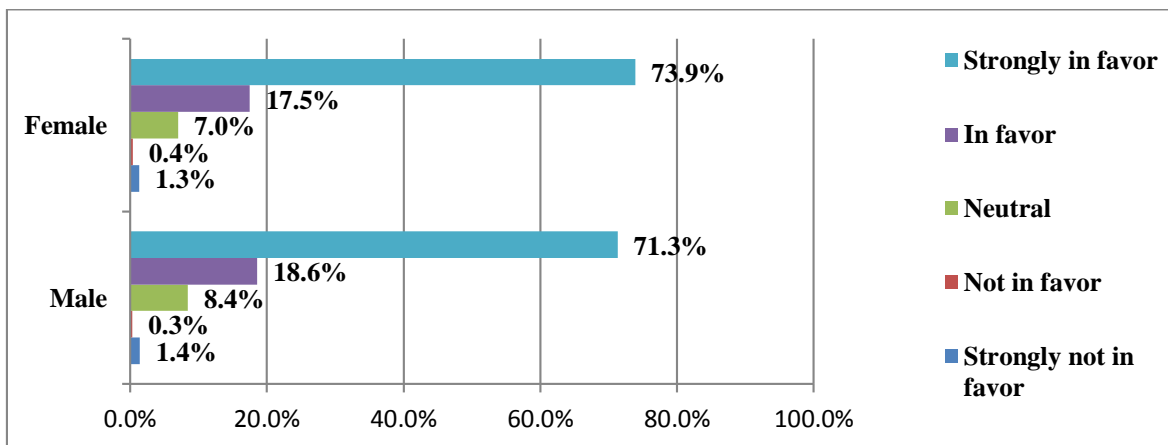

Figure 4. The average score of students' willingness to support and follow recommendations from competent authorities in Vietnam to prevent the entry of coronavirus of students. Scores are measured on a scale of 1 (not in favor) to 5 (strongly in favor)

3.5 Test the reliability of Cronbach's Alpha scale and evaluate the value of the scale

The reliability of the scale is tested through the Cronbach Alpha coefficient test. The research model of the topic includes 4 independent concepts and a first-order unidirectional dependent concept. Each concept has at least 3 observed variables. Cronbach's Alpha coefficient was performed separately for each concept. The scale only ensures reliability when Cronbach's Alpha coefficient is greater than 0.6 and the total correlation coefficient of the observed variables is at least 0.3. Table 9 below shows the results of Cronbach's Alpha coefficient analysis.

Table 9
Cronbach's Alpha coefficient analysis results

Observed variables	Correlate total variable	Coefficient Cronbach's Alpha if the variable type
Awareness of sources of information (RES), Cronbach's Alpha = 0.842		
RES_1: Channel of television	0.667	0.806
RES_2: Daily newspaper or weekly newspaper	0.636	0.813
RES_3: Social media	0.536	0.835
RES_4: Ministry of Health	0.644	0.816
RES_5: Hospital	0.647	0.811
RES_6: University	0.633	0.813
Awareness of the risks of the disease (RIS), Cronbach's Alpha = 0.791		
RIS_1: The possibility of infection with a new virus strain is very high	0.573	0.786
RIS_2: Infection with a new strain of Virus causes serious consequences	0.654	0.694
RIS_3: I find myself very susceptible to the coronavirus	0.678	0.670
Awareness of epidemic prevention measures (MEA), Cronbach's Alpha = 0.857		
MEA_1: If there is a vaccine and I am the subject of the vaccination, I am ready to receive the vaccine	0.659	0.831
MEA_2: People entering from countries with epidemics must be isolated	0.741	0.821
MEA_3: Factories and enterprises ensure the implementation of "3 on the spot"	0.663	0.830
MEA_4: The shipper team needs to be vaccinated	0.723	0.822
MEA_5: Stop organizing events and festivals	0.606	0.843
MEA_6: Closing schools and kindergartens	0.567	0.853
The opposite side of anti-epidemic measures (DRA), Cronbach's Alpha = 0.692		
DRA_1: Current anti-epidemic measures exaggerate the effects of the disease	0.493	0.621
DRA_2: It's hard to get through the stressful period of social distancing	0.528	0.578
DRA_3: It's not as easy to return to work and study as before the social isolation was over	0.505	0.601
Practice disease prevention (PRA), Cronbach's Alpha = 0.97		
PRA_1: Gauze mask	0.931	0.961
PRA_2: Disinfection	0.942	0.959
PRA_3: Don't gather	0.925	0.961
PRA_4: Health declaration	0.846	0.975
PRA_5: Keep distance	0.935	0.960

Table 9 shows that the coefficients of Cronbach's Alpha of the concepts are all 0.6 and the correlation coefficients of the total variables are all greater than 0.3. This result shows that the scale is reliable and no observed variables are excluded from the scale. Next, the topic analyzes exploratory factors to re-check the observed variables of the scale, to see if the observed variables converge on the measured factor or not.

3.6 Analysis of exploratory factors

Exploratory factor analysis was performed for the independent and dependent variables. Table 10 below presents a summary of the results of EFA analysis and factor rotation matrix.

Table 10
Summary of exploratory factor analysis results

Parameter	1st EFA	Last EFA
KMO value	0.878	0.843
Bartlett's test value	0.000	0.000
Eigenvalue	1.632	1.616
Total variance extracted	0.634	0.657
Minimum load factor	0.608	0.698
Number of extracted factors	4	4
Number of variables eliminated	3	0

The results in Table 10 show that the first EFA analysis with the KMO value = 0.878 (greater than 0.5) and the Sig test value. Bartlett's Test = 0.000 (less than 0.05), Eigenvalue = 1,632 (greater than 1), 4 factors have been extracted with a total variance of 63.4% (greater than 50%). The observed variables satisfy the convergence condition but do not satisfy the discriminant condition of the scale. There are 3 observed variables including RES4; RES5 and MEA6 had load factor difference < 2, so these observed variables were excluded and EFA analysis was performed again.

Also in Table 10, the final EFA analysis results show that KMO = 0.843 (greater than 0.5) and Sig test value. Bartlett's Test = 0.000 (less than 0.05), Eigenvalue = 1,616 (greater than 1) data has been extracted 4 factors with a total variance extracted 65.7% (greater than 50%) and no observed variables excluded due to meeting the conditions of convergence and discriminant value of the scale. Accordingly, factor 1 (RES) corresponds to the concept "*Awareness of sources of information*" including the variables RES1, RES2, RES3, and RES6. Factor 2 (RIS) corresponds to the concept of "*Awareness of epidemic risks*" including variables RIS1, RIS2, and RIS3; factor 3 (MEA) corresponds to the concept of "Awareness of epidemic prevention measures" including variables MEA1, MEA2, MEA3, MEA4 and MEA5; and finally, factor 4 (DRA) corresponds to the concept of "Awareness of the downside of anti-epidemic measures" including variables DRA1, DRA2, and DRA3.

Finally, the study performed an EFA analysis for the dependent factor corresponding to the concept of "*COVID-19 disease prevention practice*" represented by "*5K Message*". The results show that EFA analysis for dependent factors with KMO = 0.901 (greater than 0.5) and Sig test value. Bartlett's Test = 0.000 (less than 0.05), Eigenvalue = 4.485 (greater than 1), data extracted 1 factor with total variance extracted is 89.7% (greater than 50%). The results from the factor matrix show that there is one factor extracted with the smallest loading factor of 0.898 and no observed variables are excluded from the EFA analysis. Thus, the dependent factor (PRA) corresponding to the concept of "COVID-19 disease prevention practice" includes variables PRA1, PRA2, PRA3, PRA4, and PRA5. Next, the topic is to estimate the regression equation of the cognitive factors of the COVID-19 epidemic affecting the disease prevention practice of health students.

3.7 Regression analysis

Before performing regression equation estimation, the study calculates the correlation coefficient between the pairs of independent variables and the VIF index to test the model for violation of multicollinearity. The estimated results of the correlation coefficient and VIF index are shown in Table 11, the correlation matrix table is below.

Table 11
Correlation matrix

Research variable	PRA		RES		RIS		MEA		RES		VIF
PRA	1.000										----
RES	0.299	***	1.000								1.231
RIS	0.181	***	0.258	***	1.000						1.126
MEA	0.459	***	0.399	***	0.268	***	1.000				1.251
DRA	0.074	***	0.158	***	0.176	***	0.194	***	1.000		1.063

Phuong, N. T. T., Thuy, P. B. G., Phi, N. T. N., Nhan, P. N. T., & Son, N. H. (2022). Knowledge, awareness, and practices for prevention of Vietnamese students in the passion of COVID-19: A survey in the health industry, Nguyen Tat Thanh University, Ho Chi Minh City. International Research Journal of Management, IT and Social Sciences, 9(1), 26-42. https://doi.org/10.21744/irjmis.v9n1.1992

*** *level of significance* 1%*;* ** *level of significance* 5%*;* * *level of significance* 10%

The estimated results in Table 11 show that the correlation coefficient between the two independent variables RES and MEA has the highest value (r = 0.399) and the highest VIF index is 1.251 < 3. This result confirms that the regression model does not violate the assumption of multicollinearity PRA. Next, the regression results will be presented in Table 12 below.

Table 12
Regression results

Observed variables	PRA: Practice disease prevention				
	β		Std. Error	Beta	t. stat.
Constant	2.896	**	0.092	----	31.609
RES: Awareness of sources of information	0.087	***	0.017	0.133	5.057
RIS: Awareness of the risks of the disease	0.023	*	0.013	0.045	1.788
MEA: Awareness of epidemic prevention measures	0.313	***	0.021	0.400	15.033
DRA: Awareness of the downside of anti-epidemic measures	-0.015		0.012	-0.033	-1.343
Number of observations	1370				
R^2 adjusts	22.9%				

*** *level of significance* 1%*;* ** *level of significance* 5%*;* * *level of significance* 10%

Regression results in Table 12, regression coefficients of RES (0.087; $p < 0.01$), RIS (0.023; $p < 0.10$) and MEA (0.313; $p < 0.01$) all have positive signs and are significant. The statistic at 1% significance level (for RES and MEA) and 10% significance level (for RIS). This result shows that the factor *Awareness of information sources* (RES), Awareness of epidemic risks (RIS), and Awareness of anti-epidemic measures (MEA) have the same impact on Student's COVID-19 disease prevention practice (PRA). In particular, the awareness of anti-epidemic measures has the strongest impact on COVID-19 disease prevention practices. However, the regression coefficient of DRA (-0.015; $p > 0.10$) has a negative sign but is not statistically significant at a 10% significance level. This result shows that there is no relationship between the awareness of the negative side of anti-epidemic measures and the practice of COVID-19 disease prevention.

Discussion

COVID-19 caused a global pandemic that has affected entire populations, from all over the world. The spread of SARS-CoV-2 has upended medical education and its importance within health systems (World Health Organization, 2020). Health students can not only protect themselves, communicate to their familiar members, but also participate effectively in the volunteer health system in epidemic areas with knowledge, awareness, and understanding of preventive practice experience has been equipped (Gonzalo et al., 2017). According to information from the Central Committee of the Ho Chi Minh Communist Youth Union, after only a short time of launching, the Central Youth Union received an application to volunteer to participate in the prevention and control of COVID-19 in the southern region of Ho Chi Minh City. More than 10,000 volunteers across the country via the website: http://chongdich.doanthanhnien.vn. This is double the original estimate of 5,000 volunteers. Participants are teachers, young lecturers, students of universities and colleges, and students studying in the intermediate system of medicine, preventive medicine, traditional medicine, pharmacy, and pharmaceutical chemistry, nursing, midwifery, odontoid-maxillofacial, dentistry, medical laboratory technology, medical imaging techniques, rehabilitation engineering, public health, medical organization and management, medical management hospital management; pupils, students, teachers, young lecturers in 44 provinces and cities. Of the more than 10,000 registered volunteers, there are nearly 8,000 volunteers from the healthcare industry. More than 60% of volunteers have participated in volunteer activities of the Union, Association, and COVID-19 prevention and control activities of localities, units, and other provinces and cities.

Only in Ho Chi Minh City as of July 15, 2021, the Department of Health would like to welcome 24 delegations from the Departments of Health of the provinces, the Provincial General Hospital, the hospitals of the ministries and branches, and 11 colleges and universities with a total of 4,473 people including 535 doctors, 1,222 nurses, 53 technicians, 8 lecturers, and 2,655 students participated in support. In addition, the Department of Health also received 2,663 lecturers and students from universities across the country including Hai Duong University of Health Technology

(320 lecturers and students), University of Medicine and Pharmacy Thai Binh (350 students), University of Public Health (103 students), Hue University (95 students), Ho Chi Minh City University of Medicine and Pharmacy, Pham Ngoc Thach Medical University, Nguyen Tat Thanh University, Hong Bang International University, Faculty of Medicine, Vietnam National University Ho Chi Minh City, Vien Dong College, MilitarY Medical College 2 (Military Zone 7) volunteered to participate in tracing COVID-19 epidemic prevention and control.

At the program, the volunteers who are students of the health sector were instructed in knowledge and practical skills to prevent COVID-19, equipped with work protective gear; ensuring safety when performing tasks, manipulating epidemiological samples, guiding people to implement the "5K message" - Gauze mask (KHAU TRANG), disinfection (KHU KHUAN), Distance (KHOANG CACH), Don't gather (KHONG TU TAP), health declaration (KHAI BAO Y TE); supporting infected people's isolation areas, taking care of F0 and supporting vaccination for people, etc. This minimizes the overload of the local health system during the 4th outbreak with the fast-spreading and high-fatal Delta virus strain.

The research results show that the knowledge and prevention practices of health students are high. However, there are manY issues related to their awareness and perceptions. There were 77.7% male students and 86.8% female students feeling stressed when seeing the increase in the number of sick people praying from COVID-19. At the same time, 83.5% of male students and 91.5% of female students also felt fear when a new strain of Coronavirus (Delta strain) appeared and quickly spread the disease. A third of them think that there will have a hard time overcoming stressful social distancing periods and find it difficult to return to work and studY as before after the pandemic passes (Table 4). To the best of our knowledge, this is the first study in Vietnam to examine knowledge, attitudes, and practices regarding the diagnosis, treatment, prevention, prognosis, and education of COVID-19 among health students in a public university in Vietnam. A high level of knowledge is observed in our study is consistent with findings from a recent survey of health workers in other regions of the world (Bhagavathula et al., 2020).

Therefore, in addition to enhancing knowledge and practical skills for prevention, we need to pay special attention to cognitive and psychological support activities for health students in the context of the COVID-19 pandemic. There are still complicated developments in Vietnam and around the world, manY viral strains maY appear, resistance to vaccines or mandatory RA strengthening of local social distancing measures in epidemic areas, etc. More than anY force, students of the health sector need to be equipped with the knowledge, awareness, psYchologY, readiness attitude, and good preventive practice skills, because this is not just a medical force. It is also an important human resource to strengthen the health system in the context that the current COVID-19 epidemic can break out at anY time. We hope that this studY's results encourage the development of public health policies that improve the decision-making process against a disease without borders and promote and inform the creation of an evidence-based national training curriculum against COVID-19 (aimed at preparing and educating medical students). Moreover, we believe that having an adequate level of knowledge of COVID-19 will allow this type of program to be implemented efficiently, which will be of great benefit during this pandemic and for the future.

Limitations

Our study has a few limitations. The main limitation of this study is that it can only create an overview of what's happening to health students at a representative private university. The health sector of Nguyen Tat Thanh University includes Medicine, Preventive Medicine, Pharmacy, Nursing, LaboratorY TechnologY, Medical PhYsics, and Biomedical Engineering. This study has not yet delved into the comparative assessment of the knowledge, awareness, and prevention practices of each discipline in the health sector with each other. The short survey duration maY also contribute to the response rate not reaching 100%, however, it is necessary to assess knowledge gaps, awareness, and prevention practices during this period. The important first paragraph of the pandemic, to gauge how prepared health students are to deal with this public health emergency. Second, the non-random sampling of this study could be a source of self-selection bias. Although it is not possible to predict this bias's direction, we believe that it is reasonable to expect that knowledge could be overestimated if those with lower knowledge chose not to participate. Similarly, those who were more optimistic about the situation maY have been more inclined to participate, which could have underestimated negative attitudes and inadequate behavioral patterns. Third, since the survey was conducted using Google Forms, an online, cloud-based survey administration application, sampling bias maple occur. We trip manage it using health student-related groups. Future studies maY address this limitation bY selecting a random sample of students in each discipline, perhaps through the organization's e-mail. Social desirability bias is another potential limitation that could have affected attitudes and behavioral pattern responses due to the self-report nature of the survey. In other words, negative attitudes and inadequate behavioral patterns may be underestimated due to respondents having a desire to mark what they consider to be "socially acceptable" responses. However, the use of an anonymous online

survey should have mitigated the risk of this bias. Future studies could also avoid this bias by implementing direct observation of practice to get more accurate behavioral patterns estimates. Despite these limitations, we consider this study is a reliable estimator of knowledge, awareness, and practices of health students at a private university in Vietnam, can help inform their training needs, and can, in turn, be used to design a curriculum specific teaching about COVID-19 can act as an essential health care resource.

4   Conclusion

Like mantra middle-income countries, Viet Nam does not have operational readiness capacities or a definitive and actionable plan to combat a pandemic at the scale of COVID-19. The high level of knowledge of health students at universities is an essential resource that Vietnam will be exploited soon. Although the majority expressed confidence about government actions on the public health system, a large percentage of students in the health sector still feel worried about the risk of spreading and causing the death of COVID-19, so it is imperative to have access to protective equipment, to inject vaccines, to ensure their safety while theY volunteer to support the health system in places. Vietnam's higher education system must strengthen students' train while considering their personal development and awareness. Creating a national curriculum that considers public health guidelines for students' education will prepare them to efficiently contribute to population health maintenance when facing emergency health situations like COVID-19 while addressing the concerns that were raised in this study.

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