



Knowledge, Attitudes, and Practices of the Vietnamese as Key Factors in Controlling COVID-19

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Abstract

This study aimed to describe knowledge, attitudes, and practices (KAP) in controlling COVID-19 and some related factors among the Vietnamese population in 2020. A cross-sectional study was conducted involving 1999 participants aged 18–59 years old, through an online questionnaire. The results showed that 92.2% of the participants had a high knowledge level regarding COVID-19 prevention measures, 68.6% had a positive attitude toward COVID-19 prevention measures, and 75.8% practiced all six measures for preventing the spread of the virus. Age, sex, marital status, knowledge, and fear were significantly associated with the practices aimed at COVID-19 prevention. Married people and participants with high levels of knowledge were more likely to practice all preventive measures. In contrast, young people, men, and those who fear COVID-19 were less likely to practice all preventative measures. Good KAP among Vietnamese people could be an important factor in helping authorities gain initial success in containing the coronavirus and COVID-19. In addition to continuously raising and maintaining the community's awareness, attitude, and practices in disease prevention, the introduction and strict implementation of sanctions and regulations were also important in ensuring good practices were implemented and sustained over time. Groups with lower KAP levels should be provided with more information and support to promote appropriate disease prevention practices.

Keywords Knowledge · Attitudes · Practices · COVID-19 · Vietnam

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Introduction

COVID-19, caused by a novel coronavirus, was first reported in Wuhan, China, on December 31, 2019. The coronavirus has seen been spreading quickly worldwide. The World Health Organization (WHO) declared the COVID-19 a global pandemic on March 1, 2020 [1]. Vietnam shares a 1449.566 km border with China [2], and they hold a strong tourism and trade relationship. In 2019, the Chinese were the highest number of international tourist arrivals in Vietnam, with 5.81 million visitors [3], and in January, 2020, 644,700 Chinese tourists visited Vietnam [4]. According to the Ministry of Labor, War Invalids, and Social Affairs, more than 560,000 Vietnamese workers were working in 36 countries and territories where COVID-19 cases have been reported, and approximately 90,000 foreign workers have been working in Vietnam, including 29,035 Chinese workers [5]. Hundreds of thousands of unlicensed workers frequently travel between Vietnam and China [6]. A significant movement of people between the two countries has increased the risk of COVID-19 transmission from China to

Vietnam. Vietnam authorities were among the first countries to record the first case of COVID-19, in a person who had travelled from Wuhan, China on January 23, 2020.

By July 22, 2020, Vietnam was one of the successful countries to have dealt with the COVID-19 pandemic. More than 6 months after Vietnam's first case (January 23), the total number of Vietnamese infected with coronavirus by July 22, 2020, was 401 cases, with 365 people making a full recovery, and with no deaths reported [7]. By July 22, 2020, the COVID-19 pandemic in Vietnam can be described in three pandemic phases [8]. The first phase was from the first identified case to February 25, 2020, with all 16 cases were tracked back to Wuhan transmission and recovered. The second phase was from March 6 to March 19, 2020, with 69 cases reported and traced to transmission outside of China. The third phase was from March 20, 2020, with some clusters in areas of high population density [8]. These untraceable sources created potential risks for community spread of the disease, and thus the Vietnamese authorities ordered a nationwide social-distancing policy from April 1 to April 30, 2020.

The number of cases reported in Vietnam has remained quite low compared with other Asian countries. Timely and appropriate responses helped Vietnamese authorities to control the COVID-19 pandemic in the first six-month period. COVID-19 KAP may follow KAP theories [9]. Lessons learned from the SARS outbreak in 2003 suggest that knowledge and attitudes regarding infectious diseases are associated with the level of panic emotion among the population, which can further complicate attempts to prevent the spread of the disease [10]. To date, there are no vaccines or medicines for COVID-19; therefore, disease prevention and control depend on adherence to all preventive measures recommended by the Vietnam Ministry of Health (MOH) and the WHO. Given the severe health dangers of COVID-19 and unprecedented economic damage due to necessary social distancing measures, it is crucial to understand the KAP among Vietnamese people. This study aimed to describe KAP regarding COVID-19 prevention and some related factors among Vietnamese in April 2020. The results provide evidence-based information for developing programs to continuously improve KAP on COVID-19 prevention in Vietnam to face the new wave of the pandemic that began July 24, 2020, and may serve as an example for other countries of similar settings in studying and designing intervention programs to combat the pandemic.

Methods

Study Design

The study was cross-sectional in design.

Study Participants

Participants aged 18 years or more living in Vietnam at that time were invited to answer an online survey questionnaire. In this paper, we analyzed data for participants aged 18–59 years. Participants aged 60 years and older were analyzed in another separate paper that explored information on the elderly. Participants were required to have an internet connection, to voluntarily participate in an online questionnaire, and to be able to read, understand, and answer the provided questions.

Sample Size and Sampling

The study sample was calculated using the one-proportion sample size formula with an absolute precision $d=0.05$, design effect $DE=2$, and p was the proportion of people with appropriate KAP on COVID-19 prevention. No previous study had been implemented to assess KAP of people on COVID-19 prevention, so $p=0.5$ was chosen to have the largest sample size needed. The calculated sample size was 768 people. Participants were selected using non-probability, self-nominated sampling.

Data Collection

A community-based national sampling survey was not appropriate during the pandemic; therefore, an online survey was conducted from April 2 to 9, 2020. With approximately 65 million social media users in Vietnam at January, 2020, among a population of 97 million people [11], the study was expected to collect data with a variety of demographic characteristics. A questionnaire was posted on the research team's network, reaching all students of the Hanoi University of Public Health, and then was sent to other people in their networks to invite them to participate in the study. On the top of the questionnaire was provided a brief introduction to the background, objectives, procedures, voluntary nature of participation, declaration of anonymity and confidentiality, and a guide for filling in the questionnaire, as well as the link of the online questionnaire. The questionnaire included three main groups of KAP questions regarding COVID-19 prevention, which were based on guidelines of Vietnam MOH, and took approximately seven minutes to complete. The questionnaire was completed by 2600 people, of which 2001 people were aged 18–59 years. Two records had no data on gender and were excluded, leaving answers from 1999 respondents for analyses.

Data Analysis and Statistical Method

Both descriptive and inferential statistics were performed and all independent variables were described under main outcomes by calculating frequencies and percentages.

Frequencies of correct answers on KAP were described. A comparison of KAP according to demographic characteristics was performed (z-test, Chi-square test as appropriate). Binary logistic regression analyses were used to identify factors associated with practices.

Measurements

Knowledge

Eleven questions were used to assess the knowledge of COVID-19 prevention and the questions were scored according to the number of correct options. The questions asked about the key symptoms and uncommon symptoms of COVID-19, the three key transmission routes, high-risk groups, the possibility of transmission of asymptomatic COVID-19 cases, the unavailability of specific drugs, and the appropriate preventive measures. Each correct option was scored one point and the total maximum knowledge score from 11 questions was 23. Participants with higher scores had higher levels of knowledge. According to Bloom's classification of knowledge, people having $\geq 80\%$ of the total score (≥ 18.4 scores) have a high level of knowledge, and those with lower scores than this cut-off point have a low level of knowledge.

Attitudes

Eight questions were used to assess the attitudes of participants on COVID-19 prevention, such as their beliefs on the vulnerable groups, the level of severity of the disease, people who were at higher risks of infection, their fear of the pandemic and the levels of confidence on the capacity of the Vietnamese Government and the community to control the pandemic. The answers to each question had two directions: negative (0 point) and positive (1 point). The total maximum attitude score from eight questions was eight points. Participants with the higher scores had more positive attitudes about the COVID-19 control. Those with attitude scores from 80% of the total attitude score and above (≥ 6.4) had positive attitudes.

Practices

There were six measures of COVID-19 prevention, which were used in the logistic model (did all six measures [1] and did not [0]). Binary logistic regression analyses were used to identify factors associated with practices (enter method). Unstandardized regression coefficients (β) and odds ratios (ORs) and their 95% CIs were used to quantify the associations between variables and practices. Data analyses were conducted with SPSS version 24. The statistical significance level was set at $p < 0.05$ (two-sided).

Results

Demographic Characteristics of the Studied Respondents

The general demographic characteristics of the studied sample are shown in Table 1. Among 1999 respondents, 30.3% were aged 18–29 years, 39.7% were aged 30–39 years, and the remaining 30% were aged 40–59 years. The proportion of female respondents was 78.3% and 77.7% were married. Most participants (94.8%) were Kinh ethnic and about two-thirds (68.7%) had undergraduate or post-graduate education levels. Most respondents were living in urban areas (80.8%) and were office workers (62.7%). Other occupations such as intellectual jobs, freelancers, students, and workers accounted for 10.9%, 6.9%, 6.5%, and 4.4%, respectively.

The three most common sources of information on COVID-19 prevention and control were television (97.2%), the internet (97%), and newspapers (84.1%). Other less common sources of information included radio, friends, colleagues, relatives, health staff, and officials. Eighty-one percent of respondents said that the amount of COVID-19 information provided was sufficient, and 15.4% thought that it was too much (Table 1).

Knowledge, Attitudes, and Practices in Controlling COVID-19

Knowledge

The knowledge of the respondents on COVID-19 prevention is presented in Table 2. The results showed that the mean knowledge score of 1999 participants was 20.86 (SD 1.85) out of the total maximum score of 23. Significant differences were shown in mean knowledge scores between groups of ethnicity, education, and occupation. Groups of married people, higher education, office workers, and intellectuals had better knowledge of COVID-19 prevention ($p < 0.01$) than comparison groups. A high knowledge level was held by 92.2% of participants, with the knowledge score $\geq 80\%$ of the total maximum score of 23 (Table 2).

Attitudes

A positive attitude toward COVID-19 prevention was held by 68.6% of the participants, with an average score ≥ 6.4 out of 8.0. The average attitude score of 1999 participants was 6.88 (out of a maximum of 8.0). There were

Table 1 Demographic characteristics of the studied respondents (n = 1999)

Variables	Frequencies	Percentages
Age		
18 to 29	606	30.3
30 to 39	794	39.7
40 to 59	599	30.0
Sex		
Male	433	21.7
Female	1566	78.3
Marital status		
Married	1554	77.7
Unmarried/other	445	22.3
Ethnic		
Kinh	1895	94.8
Other	104	5.2
Education		
Under/graduate	1373	68.7
Other	626	31.3
Living location		
Urban	1616	80.8
Rural	383	19.2
Occupation		
Officials	1253	62.7
Freelance	137	6.9
Worker	88	4.4
Intellectual	218	10.9
Students	130	6.5
Other	173	8.7
Sources of information on COVID-19		
TV	1944	97.2
Radio	1514	75.7
Newspapers	1682	84.1
Internet	1939	97.0
Relative	1430	71.5
Friend, colleague	1541	77.1
Health staffs	1557	77.9
Officials	1509	75.5
Think that the information on COVID-19 is sufficient		
Too little	72	3.6
Sufficient	1620	81
Too much	307	15.4

significant differences in mean attitude scores between groups of age, sex, ethnicity, and occupation ($p < 0.05$). Groups of young people (18–29 and 30–39 years), females, Kinh people, and officials/intellecuals had more positive attitudes toward COVID-19 prevention than other groups ($p < 0.05$, Table 3).

Table 2 Knowledge score in controlling COVID-19 by demographic variables (n = 1999)

Variables	Mean score	SD	P
Age			
18 to 29	20.75	1.79	0.174
30 to 39	20.89	1.77	
40 to 59	20.94	2.02	
Sex			0.443
Male	20.80	1.80	
Female	20.88	1.87	
Marital status			< 0.01
Married	20.92	1.80	
Unmarried/other	20.66	2.02	
Ethnic			< 0.001
Kinh	20.90	1.77	
Other	20.14	2.87	
Education			< 0.001
Undergraduate or graduate	21.00	1.61	
Other	20.56	2.28	
Occupation			< 0.001
Official, intellectual	20.96	1.68	
Other	20.56	2.31	
Living location			0.231
Urban	20.89	1.84	
Rural	20.76	1.90	
Average knowledge score	20.86	1.85	
% with high knowledge level	1843 people	92.2%	

Practices

Most of the respondents (75.8%) practiced all six key measures in preventing COVID-19. The most common practice was washing hands frequently (98.5%), followed by wearing a face mask frequently (95.8%), covering mouth and nose when coughing or sneezing (93.1%), avoiding crowded places (92.7%), keeping a two-meter distance from another person (90.3%), and avoid touching face (eyes, nose, and mouth 90.1%, Table 4). Barriers to practicing measures were experienced by 58.8% of the respondents. Common barriers were difficulty in changing daily habits (55.1%), inconvenience (19.4%), lack of personal protective equipment (20.4%), and feeling uncomfortable (4.0%). It was remarkable that 8.3% of this group thought that it was not necessary to implement recommended measures.

Factors Influencing Practices in Preventing COVID-19

Factors associated with practicing all six measures for COVID-19 prevention were explored and the dependent variable was the level of practice (two values: 1-did all six

Table 3 Score of attitudes toward COVID-19 prevention by demographic variables (n = 1999)

Variables	Mean score	SD	P
Age			
18 to 29	6.96	1.03	<0.001
30 to 39	6.93	1.05	
40 to 59	6.74	1.10	
Sex			
Male	6.74	1.06	<0.01
Female	6.92	1.06	
Marital status			
Married	6.90	1.05	0.167
Unmarried/other	6.82	1.11	
Ethnic			
Kinh	6.90	1.04	<0.01
Other	6.61	1.38	
Education			
Undergraduate or graduate	6.91	1.03	0.143
Other	6.83	1.13	
Occupation			
Official, intellectual	6.91	1.01	<0.05
Other	6.80	1.20	
Living location			
Urban	6.88	1.06	0.981
Rural	6.89	1.08	
Average attitude score	6.88	1.06	
Positive attitude	1372 people	68.6%	

Table 4 Practices of participants to prevent COVID-19 and barriers of practices (n = 1999)

Practices to prevent COVID-19	Frequency	(%)
Avoiding crowded places	1854	92.7
Wearing a face mask often	1915	95.8
Keeping hands clean	1969	98.5
Covering coughs and sneezes	1861	93.1
Keeping 2 m distance with another person	1806	90.3
Avoid touching face (eyes, nose, mouth)	1802	90.1
Practicing all six preventive measures	1515	75.8
Barriers		
Had barriers in practicing preventive measures	1175	58.8
Types of barrier		
Difficult to change a daily habit	648	55.1
Inconvenience to practice preventive measures	228	19.4
Lack of personal protective equipment	240	20.4
Feel uncomfortable	47	4.0
Unnecessary	98	8.3
Others	36	3.1

measures, and 2-did less than six measures). The model was fit to use and the predicted percent of the model was 75.6%. Results showed that age, sex, marital status, knowledge, and fear were significantly associated with practicing measures of COVID-19 prevention. Married people and people who had a high level of knowledge were more likely to practice all measures of prevention, while young people, males, and people who were afraid of COVID-19 were less likely to take all preventive measures (Table 5).

Discussion

By July 22, 2020, COVID-19 was a global pandemic of more than 15 million cases that have been reported and more than 600,000 deaths. Vietnam had 401 cases, 365 people made a full recovery, and there were no deaths reported [12]. It is crucial to promote the community's awareness about the pandemic and apply appropriate prevention behaviors. This was a population-based online survey (1999 respondents) to assess responses of the Vietnamese community to the COVID-19 pandemic. To the best of authors' knowledge, this was the first study in Vietnam and among very few studies in the world assessing the community's KAP in COVID-19 prevention. In the context of the pandemic continuing to progress globally, and Vietnam is currently facing a new wave of the pandemic, this community's KAP assessment was crucial. It provided scientific evidence to promote prevention and control of the pandemic.

The study showed that the proportion of female respondents was much higher than men (78.3% vs 21.7%), which was similar to a study by Huong et al. [13] (females accounted for 75.7%) [13]. A high level of knowledge was held by 92.2% of respondents, and 80.8% of respondents

Table 5 Factors associated with practice level to prevent COVID-19 (n = 1999)

Variables	B	S.E	Sig	Exp(B)
Age (18–29; 30–39; 40–59)	– .375	.080	.000	.687
Sex (male; female)	– .273	.132	.039	.761
Marital status (married; unmarried)	.537	.140	.000	1.711
Ethnic (Kinh; other)	.232	.230	.312	1.262
Education (under/graduate; other)	– .178	.124	.151	.837
Occupation (officials/intellectual; other)	– .003	.017	.874	.997
Living place (urban; rural)	– .083	.139	.550	.920
Level of knowledge (high; low)	.584	.186	.002	1.793
Perception of the susceptibility of COVID-19 (yes; no)	.419	.270	.121	1.520
Fear (yes; no)	– .463	.182	.011	.630
Barriers of practice (yes; no)	– .209	.112	.063	.811
Constant	– .847	.650	.193	.429

knew all nine measures of COVID-19 prevention. These results were quite similar to the recent study by Zhong et al. [14] with 90% of Chinese residents knowledgeable about COVID-19. In comparison to previous studies related to the community's KAP during an outbreak in Vietnam [15, 16], the KAP in the COVID-19 outbreak was far better. The high rate of knowledgeable participants may correlate with the overwhelming news in social media and on television, as well as daily warning messages sent from the government and the MOH to everyone's mobiles. The Government, universities, and technology companies have cooperated to create reliable platforms, friendly mobile applications to daily update COVID-19 disease information, as well as to track COVID-19 quarantine cases. Besides, the previous experiences in controlling other virus outbreaks, such as influenza A (H1N1) and SARS, may help the communities to have a better understanding of the COVID-19.

Regarding attitude toward the pandemic, 68.6% of respondents held a positive attitude, and the mean score was 6.88 (out of 8). In which, 99.2% of the respondents believed in the government's COVID-19 control measures, and 98.8% were confident that the government could control the COVID-19 pandemic. Also, young people, women, Kinh ethnic group, and officials/intellectual workers were more likely to have a more optimistic attitude toward COVID-19 prevention and control. The optimistic attitude of the community may have resulted from regular information about the disease being updated on various mass media channels. Besides, it may be because the community witnessed the government's unprecedented strong preventive measures since the first positive cases were discovered on January 23, 2020. Also, people saw the fact that the current number of COVID-19 cases in Vietnam was much lower than in many countries across the world, which could increase the community's confidence to overcome the epidemic.

In terms of practices, 75.8% of the respondents implemented all six preventive measures. However, 58.8% of participants reported some barriers for taking appropriate practices such as difficulty to change the routine, lack of protective equipment, and feeling uncomfortable. In fact, during the first phase of the pandemic, Vietnam experienced a face mask shortage due to the large number of masks being exported to China. However, the crisis was soon tackled by efforts to increase mask production and other medical equipment. Moreover, the findings showed that a remaining 8.4% of people thought these preventive measures were not important. This may affect the implementation and maintenance of good practices. They may take preventive measures to avoid penalties rather than doing these voluntarily.

The findings of KAP in this study were quite similar to those reported in a recent study by Zhong et al. [14] with 90% of Chinese residents knowledgeable about COVID-19, 97.1% had an optimistic attitude on Chinese government's

capacity to control the pandemic, and 98.0% had worn masks when going out. In comparison to previous studies related to the community's KAP during an outbreak in Vietnam [15, 16], the KAP in the COVID-19 outbreak was far better. This was probably due to the seriousness of the COVID-19 pandemic worldwide, which may be causing people more concerned. Also, the strict measures of the government in controlling the pandemic have changed the lives of people and forced people to understand the disease as well as applied compulsory preventive measures.

Interestingly, the percentage of optimistic attitude (68.6%) was lower than the percentage of good practice (75.8%). This did not follow the behavioral change model, which explained that good knowledge would contribute to a positive attitude, which in turn increases the appropriate practice [17]. The high rate of the community's good practices in COVID-19 prevention could partly be due to strict prevention measures implemented by the Vietnamese Government, which were underpinned through laws, sanctions, and regulations. For example, Document No. 925 / STP-PBGDPL of Hanoi Department of Justice issued that people who did not wear face masks in public places were subject to a maximum fine of VND 300,000 (equivalent to 1–3 days' governmental salary), or those who gathered in crowded places without keeping social distancing were subject to a maximum fine of VND 10 million/person (equivalent to 1–3 months' salary). It means that even though people did not have a positive attitude on COVID-19 prevention, they may still have appropriate practices due to the fear of violating the regulations. The results of this study suggest that in addition to raising the community's awareness to encourage people to have a positive attitude and proper practices, the introduction of sanctions and regulations is also very important to ensure good practices are implemented and sustained over time. Also, the logistic regression model indicated that young people, males, and people who were afraid of COVID-19 were less likely to do all preventive measures. These findings helped to identify target groups that needed to be provided with more knowledge about disease prevention to have better practices.

Limitations

Although certain interesting results were found by this study, several limitations should be acknowledged. The first methodological limitation was the use of an online survey. Selection bias could be a problem because the respondents were more likely to be concerned about the disease, and who easily accessed the internet. As a result, the findings may be overestimated. However, the survey was conducted during the pandemic with limited time for data collection, and thus, an online survey seemed to be the most appropriate method. The authors have tried to expand the network of participants, as much as possible, through the network of students and

their relatives, who came from many regions throughout Vietnam with diverse demographic characteristics. Besides, the findings of the research may not be generalizable to other countries because the impact of the COVID-19 pandemic is very different in scales, and countries vary in socioeconomic characteristics, the policy, health system, and communication campaigns. However, the study could be a good reference for countries, which share similar conditions.

Conclusions

The knowledge and practices of Vietnamese people in preventing COVID-19 were quite good, while only about two-thirds of the participants had a positive attitude toward prevention. Good knowledge and practices among Vietnamese people may be an important factor that helped the country in controlling COVID-19 with initial success. In addition to continuously raising and maintaining the community's awareness, attitude, and practices in COVID-19 prevention, the introduction and strict implementation of sanctions and regulations are also very important to ensure good practices are implemented and sustained over time. Young people, males, and people who were afraid of COVID-19 were less likely to practice all preventive measures, and thus need to be provided with more information and support to promote appropriate disease prevention practices.

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Compliance with Ethical Standards

Conflict of interest The authors declare that there is no conflict of interest.

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