

Post-COVID-19 condition: an online survey by questionnaire on 250 participants recovered from COVID-19 in Central Vietnam

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Abstract

Two years since the COVID-19 pandemic onset, the evidence base about post-COVID-19 conditions, also known as long COVID, is emerging. Studies showed that approximately 20%-70% patients may be suffered from the long COVID. **Objectives:** To preliminary assess the prevalence of post-COVID-19 condition and several related factors in COVID-19 patients in Thua Thien Hue province and Central Vietnam. **Methods:** A descriptive cross-sectional study was performed on people who have recovered from COVID-19 (confirmed by rapid antigen testing or PCR for SARS-CoV-2 result negative) for at least 2 weeks up to the time of the online survey using a questionnaire through the website: <https://docs.google.com/forms/d/14ZvBAhhZjfW-gi3pIJ7j4f1OBSw2fQeym8M-XaXUtp8/edit>. **Results:** 53 patients (21.2%) had persistent symptoms after at least 2 weeks of recovery. Of which, full-body weakness accounted for the highest rate (94.3%), followed by losing appetite or poor eating (90.6%). 86.3% of patients have a persistent cough, insomnia, and difficulty sleeping. Patients with headaches and dyspnea accounted for 69.5% and 56.8%, respectively, while other symptoms accounted for a lower rate. There was a statistically significant relationship between the time of infection, duration of disease, treatment place, use of sauna with herbal medicine, adherence to the *5K message from Vietnam's Ministry of Health, saltwater mouthwash daily, and the prevalence of the post-COVID-19 condition ($p < 0.05$). The use of antipyretic drugs, antibiotics, antiviral drugs, vitamins, and supplements was not related to the post-COVID-19 condition in our survey group ($p > 0.05$). **Conclusion:** The post-COVID-19 condition is likely to become an important public health issue in the future, which may affect physical and mental health, and makes significant economic consequences for individuals, families, and society. A long-term survey is needed to accurately evaluate of the impact of post-COVID condition on patients.

Keywords: post-COVID-19 condition, long COVID, online survey, Thua Thien Hue, Central Vietnam.

1. INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a highly contagious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Since the COVID-19 pandemic onset, it has posed enormous challenges to the healthcare systems worldwide. Over 470 million cases of COVID-19 and 6 million deaths were reported up to April 1st, 2022. However, there is still a large proportion of infected cases underreported. After more than two years of fighting against the pandemic, the number of COVID-19 cases is still increasing. Fortunately, the number of symptomatic cases and severe cases only account for a small percentage, resulting in a significant reduction in deaths. The majority

of COVID-19 patients return to normal health after about two weeks of infection. Nevertheless, accumulating evidence highlighted that a yet uncertain proportion of people have experienced a variety of mid-and long-term effects after recovering from their initial illness. These mid-and long-term effects are collectively known as the post-COVID-19 condition, or the long COVID. Multiple studies from different regions worldwide have shown that post-COVID-19 condition extends beyond the cardio-respiratory system to affect most other bodily systems both anatomically and physiologically, including gastrointestinal, neurological, psychiatric, and dermatological

systems [1]. Many individuals experienced a variety of persistent symptoms after COVID-19, with dyspnea, persistent cough, myalgia, fatigue, hair loss, heart palpitations, headache, and anxiety or depression among the most common sequelae. Besides, there are cases of digestive disorders such as loss of appetite, diarrhea, smell and taste disorders, etc [2].

The World Health Organization (WHO) has published the first official definition of the post-COVID-19 condition. Accordingly, the post-COVID-19 condition is defined as the illness that occurs in people who have a history of SARS-CoV-2 infection, usually within three months from the onset of COVID-19, with symptoms and effects that last for at least two months and cannot be explained by an alternative diagnosis. Recent studies showed that approximately 20%-76% of patients could experience persistent symptoms after recovering from COVID-19. Some groups of patients can have a higher risk of developing the long COVID, including patients with underlying conditions (e.g. hypertension, coronary artery disease, diabetes, metabolic disorders, etc); patients that are over 60 years old (who are at risk for co-morbidities that have not yet started, but may promote the conditions after COVID-19); patients hospitalized with severe symptoms after the infection (respiratory failure, high fever, etc); pediatric patients who are under 11 years old, etc. In addition, several factors such as work, income, drugs use, and isolation treatment ... can also be the risks of increasing the frequency of post-COVID-19 symptoms [3,4].

There are hundreds of patients visiting the hospitals for the post-COVID-19 check-up daily, according to data collected in Hanoi and Ho Chi Minh City, Vietnam. Most of the patients are over 60 years old. Besides, there are still young adults who suffer from respiratory failure after COVID-19, and some need to be hospitalized for treatment. Up to date, there has not been a study on the post-COVID-19 condition in the Central provinces of Vietnam. This study is an online survey using a set of questionnaires on several issues regarding COVID-19 and post COVID-19 condition to provide a preliminary assessment of their effects and related factors in Central Vietnam.

(*) 5K messages from Vietnam's Ministry of Health: *Facemask, Disinfection, Distance, No gathering, Health declaration* [16].

2. MATERIALS AND METHODS

2.1. Research subjects

As this survey aimed to investigate the prevalence of post-COVID syndrome, participants who have had COVID-19 at least a month prior were included in the survey. These participants have recovered from COVID-19 (confirmed by rapid antigen testing or PCR to identify SARS-CoV-2 result negative) for at least 2 weeks up to the time of the online survey.

2.2. Research design

This is a descriptive cross-sectional study by questionnaire. The sample size was calculated by the formula:

$$n = Z_{(1-\alpha/2)}^2 \times \frac{p \times q}{d^2} = 224,5 \approx 225 \text{ samples.}$$

In which: n is the sample size, $\alpha = 5\%$, then $Z_{(1-\alpha/2)}^2 = (1,96)^2$, p is the expected the prevalence of the post-COVID-19 condition, metrically around 30% [2], d is the estimated error, choose $d = 0.06$. The sample size is calculated as 225. There were 250 individuals participated in this survey.

2.3. Survey content

Data is collected from individuals through the link below:

<https://docs.google.com/forms/d/14ZvBAhhZjfw-gi3plI7j4f1OBSw2fQeym8M-XaXUtp8/edit> which created new.

The information included in the questionnaire were age, gender, occupation, residence, characteristics of acute COVID-19 (fever, cough, dyspnea, other symptoms), history of hospitalization (duration, severity, length of hospital stay, need for mechanical ventilation), duration since symptoms onset, and presence of persistent symptoms by systems: general symptoms (fever, fatigue or full-body weakness, exhaustion), respiratory symptoms (dyspnea, cough), neuropsychiatric symptoms (headache, insomnia, trouble sleeping), digestive symptoms (loss of appetite, poor eating). The data collected from the questionnaire will be automatically entered into the author's computer by email: tdbinh.dhyd@gmail.com

2.4. Statistical processing

Incomplete and inconsistent data were excluded from the analysis. The data was cleaned and transferred to the statistical package for Social science (SPSS) version 21.0 for analysis. Descriptive statistics are presented as percentages. The χ^2 test was used to determine the association of categorical variables. A p-value < 0.05 was considered to be statistically significant.

3. RESULTS

Table 1. Demographical characteristics of participants (n=250)

Demographical characteristics		n	%
Age	<18	2	0.8
	18-60	228	91.2
	>60	20	8.0
Gender	Male	120	48.0
	Female	130	52.0
Occupation	Student	86	34.4
	Employee	75	30.0
	Medical worker	61	24.4
	Retirement, other	25	10.0
	Farmer	3	1.2
Residence	Urban	202	80.8
	Rural	48	19.2

Most of the patients were from 18 to 60 years old (91.2%). Patients who were over 60 years old account for 8.0%, and people under 18 years old were very few with 2 persons, accounting for 0.8%. The number of men and women in the study was equivalent. There is an insignificant difference in the occupational distribution of subjects between students, public employees, and health workers. The group of retirees, other occupations, and farmers account for very a low percentage. Most of the participants live in urban areas, only a few people live in rural areas (19.2%). The participants were asked to answer the questions online through computers, which makes it difficult for the elderly, rural people, and children. This is a limitation of the study.

Table 2. Acute COVID-19 characteristics

Acute COVID-19 characteristics		n (250)	%
Time of infection	In 2021	76	30.4
	In 2022	174	69.6
Duration since symptoms onset	Less than 1 week	159	63.6
	Less than 2 weeks	81	32.4
	More than 2 weeks	10	4.0
Treatment place	At home	164	65.6
	At isolation area	76	30.4
	At medical facilities	10	4.0
Fever >38°C	Yes	106	42.4
	No	144	57.6
Cough	Yes	153	61.2
	No	97	38.8
Dyspnea	Yes	68	27.2
	No	182	72.8
Other symptoms	Yes	119	47.6
	No	131	52.4
Hospitalization	Yes	31	12.4
	No	219	87.6
Outpatient visit	Yes	33	13.2
	No	217	86.8

Since our survey was conducted in mid-March 2022, the patients in the study got the disease mainly in the early 2022 (69.6%). The number of patients who had a disease duration of less than 1 week accounted for 63.6%, while the number of cases prolonged over 2 weeks only accounted for 4.0%. The majority of patients (65.6%) were self-monitored and cared for at home. 30.4% were in isolation management and only 4.0% had to admit to medical facilities. Among the main symptoms of COVID-19, cough accounts for 61.2%, while fever, dyspnea, and other symptoms are less than 50%. There were 12.4% of patients needed to hospitalize for monitoring and 13.2% for outpatient care.

Table 3. Measures of care and treatment for COVID-19

Measures of care and treatment for COVID-19		n (250)	%
Mechanical ventilation	Yes	6	2.4
	No	244	97.6
Antipyretic drugs	Yes	48	19.2
	No	202	80.8
Antibiotics	Yes	62	24.8
	No	188	75.2
Supplements and vitamins	Yes	38	15.2
	No	212	84.8
Other drugs (anticoagulant, anti-inflammatory)	Yes	48	19.2
	No	202	80.8
Herbal sauna	Yes	2	0.8
	No	248	99.2
5K message	Yes	190	76.0
	No	60	24.0
Saltwater mouthwash	Yes	240	96.0
	No	10	4.0

There were 6 participants (2.4%) who were treated with mechanical ventilation. About 20% of participants used antipyretic drugs, antibiotics, antiviral drugs, vitamins, and supplements. Very few patients used anti-inflammatory and anticoagulant drugs (0.8%). There were 76.0% of patients who used the traditional method of sauna with herbal. Most of the patients adhered to the 5K message of Vietnam's Ministry of Health, as well as to saltwater mouthwash daily (96.0%).

Table 4. Symptoms in patients with the post-COVID-19 condition

Persistent symptoms in patients with the post-COVID-19 condition		n (250)	%
General condition	Normal	197	78.8
	Abnormal	53	21.2
Smoldering fever	Yes	17	32.1
	No	36	67.9
Prolonged fatigue	Yes	53	100.0
	No	0	0
Persistent cough		46	86.8
		7	13.2
Dyspnea	Yes	30	56.6
	No	23	43.4

Dyspnea on exertion	Yes	23	43.4
	No	30	56.8
Headache	Yes	37	69.8
	No	16	30.2
Insomnia	Yes	46	86.8
	No	6	13.2
Loss of appetite	Yes	48	90.6
	No	5	9.4
Full-body weakness	Yes	50	94.3
	No	3	5.7
Exhaustion	Yes	35	66.0
	No	18	34.0

There are 197 patients that were fully recovered from COVID-19 (78.9%). Only 53 participants (21.2%) had persistent or post-COVID-19 symptoms. Among the patients with the post-COVID-19 condition, 100% of them had a feeling of prolonged fatigue, followed by full-body weakness symptoms that accounted for a high rate of 94.3%. Anorexia accounted for 90.6% of post-COVID-19 symptoms, persistent cough, insomnia, trouble sleeping accounted for 86.3%, headache 69.5%, dyspnea 56.8%, and other symptoms accounted for a lower rate. However, patients may suffer from several symptoms contemporary, which leads to the percentage of exhaustion is 66.0%.

Table 5. Relationship between demographical characteristics and incidence of the post-COVID-19 condition of participants

Research subjects		Patients with post-COVID-19 symptoms (n=53)		Patients without post-COVID-19 symptoms (n=197)		p
		n	%	n	%	
Age	< 18	0	0	2	100.0	> 0.05
	18 - 60	47	20.6	181	79.4	
	> 60	6	30.0	14	70.0	
Gender	Male	26	21.7	94	78.3	> 0.05
	Female	27	20.8	103	79.2	
Occupation	Student	13	15.1	73	84.9	> 0.05
	Employee	19	25.3	56	74.7	
	Medical worker	14	22.9	47	77.1	
	Retirement, other	6	24.0	19	76.0	
	Farmer	1	33.3	2	66.7	
Residence	Urban	51	33.8	151	66.2	< 0.05
	Rural	2	4.2	46	95.8	

There is no relationship between participants who suffered from the long COVID with their age, gender, and occupation ($p > 0.05$). However, participants living in rural areas had a lower prevalence of long COVID-19 than those living in urban areas ($p < 0.05$).

Table 6. Relationship between care factors and the incidence of the post-COVID-19 condition of participants

Acute COVID-19 characteristics and treatment measures		Participants with post-COVID-19 symptoms (n=53)		Participants without post-COVID-19 symptoms (n=197)		p
		n	%	n	%	
Time of infection	In 2021	4	5.3	72	94.7	< 0.05
	In 2022	49	28.2	125	71.8	
Duration since symptoms onset	Less than 1 week	2	1.3	157	98.7	< 0.05
	Less than 2 weeks	45	55.6	36	44.4	
	More than 2 weeks	6	60.0	4	40.0	
Treatment place	At home	6	3.7	158	96.3	< 0.05
	At isolation area	38	50.0	38	50.0	
	At medical facilities	9	90.0	1	10.0	
Mechanical ventilation	Yes	1	16.7	5	83.3	> 0.05
	No	52	21.3	192	78.7	
Using antipyretic drugs	Yes	10	20.8	38	79.2	> 0.05
	No	43	21.3	159	78.7	
Using antibiotics	Yes	13	20.9	49	79.1	> 0.05
	No	40	21.3	148	78.7	
Using antiretroviral drugs	Yes	10	26.3	28	73.7	> 0.05
	No	43	20.3	169	79.7	
Using supplements and vitamins	Yes	10	20.8	38	79.2	> 0.05
	No	43	21.3	159	78.7	
Herbal sauna	Yes	9	4.7	181	95.3	< 0.05
	No	44	73.3	16	26.7	
Following 5K messages	Yes	49	20.4	191	79.6	< 0.05
	No	4	40.0	6	60.0	
Saltwater mouthwash	Yes	48	20.0	192	80.0	< 0.05
	No	5	50.0	5	50.0	

Patients who were infected with SARS-CoV-2 in 2021 had a lower incidence of long COVID-19 than those in 2022. Patients with a COVID-19 duration of more than 2 weeks had a higher rate of having the post-COVID-19 condition than those that experienced a short duration of illness. Patients who were hospitalized or admitted to isolation areas had higher rates of post-COVID-19 condition than those who had in-home care. In this study cohort, there was a statistically significant relationship between the time of infection, the duration of infection, the treatment place, the use of herbal medicine sauna, the 5k message implement, saltwater mouthwash, and the prevalence of post-COVID-19 condition ($p < 0.05$). Meanwhile, the use of antipyretic

drugs, antiretroviral drugs, antibiotics, vitamins, supplements, and other drugs was not related to the prevalence of post-COVID-19 condition ($p > 0.05$).

4. DISCUSSION

Among 250 patients who participated in our study, the majority were aged 18-60 years old (91.2%). 8.0% of patients were over 60 years old, and only 0.8% of patients were under 18 years old. The ratio of men and women in this study is equivalent, which shared a common demographical characteristic with the study of Bircan Kayaaslan [2]. Participants live mainly in urban areas. People who live in rural areas only account for 19.2% of all participants. The difference in age groups and residences can be explained by

the inconvenience of answering questionnaires online, which makes it difficult for the elderly group and people who live in rural areas. The collecting data method by online survey and the quite modest number of participants are the two main limitations of this study. A recent online survey by Gabriella Imbriano et al [8] also had a modest number of participants with 261 patients, however, their study obtained many practical results [6].

The majority of patients (65.6%) were self-monitored and cared for at home in our survey. Besides, 30.4% were cared for in isolation areas, and only 4.0% of patients had to admit to medical facilities for treatment (at this time, Resolution 128/NQ-CP 2021 of the Vietnam Government on Interim Regulation on safe and flexible adaptation to COVID-19 pandemic was applied) [14]. There were 12.4% of patients who needed to hospitalize for monitoring (which are severe cases, available serious diseases, elderly...) and 13.2% for outpatient care.

In our study, about 50% of COVID-19 patients have no manifestations. Except for cough accounts for 61.2%, fever, dyspnea, and other manifestations are less than 50%. Data on symptoms of COVID-19 patients in our survey shared the same results as the report by Carfi A et al [3]. In the survey of Bircan Kayaaslan [2], although the parameters are more detailed, the rate of main symptoms such as cough, dyspnea, and fever showed a corresponding result. However, it is difficult to compare with our results since Bircan Kayaaslan used a quantitative method in which symptoms were grouped and scored at different levels [2].

The stratification of hospitalized COVID-19 patients has been carried out under the guidance of the Vietnam Ministry of Health, in which only 12.4% were admitted for monitoring and 6 patients (2.4%) required mechanical ventilation. About one-fifth of the participants used antipyretic drugs, antibiotics, antiviral drugs, vitamins, and other supplements. Very few COVID-19 patients used anti-inflammatory and anticoagulant drugs (0.8%). Compared with other studies, drugs used in COVID-19 patients are quite limited since the treatment was in adherence to the guidelines of the Ministry of Health [15]. Interestingly, a lot of participants, mainly those being cared for at home, applied for traditional medicine with 76.0% using the sauna with herbal medicine. Another important thing is that 96.0% of COVID-19 patients complied with the 5k message from the Ministry of Health (including facemask, disinfection, distance, no gathering, health declaration) together with saltwater mouthwash daily. Those activities

showed significant effectiveness in reducing the risk of spreading and the risk of the post-COVID-19 condition [15].

In this study, most patients completely recovered from COVID-19 with a high rate of 78.9%. Only 53 COVID-19 patients, accounting for 21.2%, had persistent symptoms. Various studies worldwide shared a corresponding prevalence of the post-COVID-19 condition [4,5,7,9,10]. According to collected data, prolonged fatigue and full-body weakness accounted for the highest rate of persistent symptoms with 100% and 94.3%, respectively, followed by loss of appetite with 90.6%. There were 86.3% of patients had a persistent cough, insomnia, and sleeping difficulty. Patients who suffered from headaches and dyspnea accounted for 69.5% and 56.8%, respectively, while other symptoms shared a lower rate. However, a patient may suffer from several symptoms simultaneously, therefore, about 66.0% of them felt exhaustion. Obviously, the "long COVID-19" problem is showing more and more seriousness. Regardless of the disease's previous characteristics, intense or mild symptoms, or even no symptoms, many patients still suffered the consequences of various symptoms of COVID-19 after recovering. This issue has gained more and more attention from authors around the world as well as the World Health Organization [4,5,7,9,10].

While evaluating some demographical factors that may be related to the post-COVID-19 condition, we found that there was no relationship between age, gender, and occupation with the post-COVID-19 condition in participants of our study ($p < 0.05$). However, the patients who live in rural areas had a lower rate of long COVID than those in urban areas ($p < 0.05$). This survey result is similar to several authors' findings [2,4,9,11].

The study results showed that the patients infected with SARS-CoV-2 in 2022 had a higher rate of long COVID than those in 2021. Besides, patients infected with a disease duration of more than 2 weeks had a high incidence of long COVID in comparison with patients whose duration of illness is shorter. Patients who were admitted to the isolated area had a higher rate of post-COVID-19 condition than those who were cared for at home. There was a statistically significant relationship between the time of infection, the duration of infection, the treatment place, the use of herbal sauna, the 5k message implement, saltwater mouthwash, and the prevalence of post-COVID-19 condition ($p < 0.05$). This is an important result to guide people who are being infected with SARS-

CoV-2 to reduce their post-COVID-19 condition by following guides by the Ministry of Health [15]. The use of antipyretic, antibiotic, antiviral drugs as well as supplements, vitamins, and other drugs was not related to the post-COVID-19 condition, according to data in our survey group ($p>0.05$). Importantly, it is crucial to use drugs according to the indications and instructions of the Ministry of Health [15].

Clinically, the post-COVID-19 condition can be divided into two stages including ongoing symptomatic COVID-19 (one to two months after infection) and post-COVID-19 syndrome (after two months) [1]. In our survey, we have no concern about which stages the patients were in. The post-COVID-19 condition may cause deterioration to a person's health at any stage, with an impact on their ability to return to work or participate in social life. However, a long-term survey is needed to accurately evaluate the impact of post-COVID condition on patients.

5. CONCLUSIONS

Among 250 patients infected with SARS-CoV-2 in the survey, only 53 patients (21.2%) had

persistent symptoms. Of which, prolonged fatigue and full-body weakness accounted for the highest rate (100% and 94.3%, respectively), followed by losing appetite, and poor eating (90.6%). 86.3% of patients have a persistent cough, insomnia, and difficulty sleeping. Patients with headaches and dyspnea accounted for 69.5% and 56.8%, respectively, while other symptoms accounted for a lower rate.

There was a statistically significant relationship between the time of infection, duration of disease, treatment place, use of sauna with herbal medicine, adherence to the 5K message of the Ministry of Health, saltwater mouthwash daily, and the prevalence of post-COVID-19 condition ($p<0.05$). The use of antipyretic drugs, antibiotics, antiviral drugs, and others was not related to the post-COVID-19 condition in our survey group ($p>0.05$). A long-term survey is needed to accurately evaluate the impact of post-COVID condition on patients.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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