ORIGINAL ARTICLE

Post-Covid-19 Symptoms, an Online Survey in Malaysia

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ABSTRACT

INTRODUCTION: Prolonged COVID-19 symptoms is one of the major challenges in the management of the disease. As the number of COVID-19 cases increased drastically, the number of those with prolonged symptoms are also accumulating, either diagnosed or undiagnosed. This study aimed to identify the long-term clinical symptoms of COVID-19 and the associated risk factors among Malaysian populations. **MATERIALS AND METHODS**: A cross-sectional survey using Google Form link for distribution of a self-administered questionnaire was shared and disseminated via online platforms such as Facebook, WhatsApp, and Telegram. The inclusion criteria included those with a history of positive COVID-19 from 1st March 2020 until one month prior to the survey, and age above 18 years old. **RESULTS:** A total of 215 Malaysians participated, with 74% female respondents and a mean age of 36.4 years. Twenty-seven (12.6%) were asymptomatic when diagnosed with COVID-19. More than half (56%) still had symptoms at one-month of diagnosis, while 39% and 18% still had symptoms at the second and third months respectively. The most reported symptoms were lethargy (45.1%), difficult concentrating (22.3%) and cough (21.9%). Female, chronic lung disease and hypertension were significantly associated with prolonged symptoms at one month of COVID-19 infection. **CONCLUSIONS**: Lethargy, difficulty to concentrate and cough were the most common symptoms reported months after COVID-19 diagnosis. Apart from treating acute conditions, physicians should also be able to recognize and manage those symptoms. The findings of this study will help policymakers better grasp the social and economic consequences of long-term post-COVID-19 symptoms.

Keywords
COVID-19, post-COVID-19 symptom, Malaysia, Online survey

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INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is caused by an enveloped positive-stranded RNA beta coronaviruses, also known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2).[1] The median incubation time for SARS-CoV-2 is 4 to 5 days after exposure, and it is contagious during the early days of the illness.[2] The most common symptoms are cough, fever, lethargy and shortness of breath.[4] However, 3 out of 4 infected persons remain asymptomatic.[5,6]

Earlier in the pandemic, investigations focused on the acute phase of SARS-CoV-2 infection, the respiratory system, hospitalized patients, and those who died from COVID-19.[7,8] However, it is becoming prominent later in the pandemic that COVID-19 patients can present with longer multiple symptoms and long-term effects.[9] Many people have reported prolonged symptoms after being diagnosed with COVID-19, and greater attention is being paid to the experiences of patients with COVID-19 whose symptoms last for four weeks or more.[10] In a systematic review by Lopez-Leon et al. (2021), more than 50 symptoms and abnormal blood tests have been recognized in the long-term effect of COVID-19.[11] Many terms that have been used to describe this condition such as "long COVID", "long-hauler COVID-19", "post COVID-19 syndrome", "persistent COVID-19 symptoms", "chronic COVID-19", persistent COVID-19 symptoms", "chronic COVID-19", and a few other terms.[11,12] This is a complex problem involving heterogeneous physical and psychological symptoms[10], in

which the knowledge of its pathophysiology and risk factors is still incomplete.[13]

As there has been an increased number of cases in Malaysia since early 2021[14], physicians need to prepare for the tsunami of post-COVID-19 survivor patients. This study attempts to identify the long-term clinical symptoms of COVID-19 among the Malaysian population and the associated risk factors. The finding of this study would have significant implications on primary healthcare support, particularly rehabilitation needs and psychosocial aid for COVID-19 survivors.

METHODOLOGY

Study design and participant

This cross-sectional study was conducted online using the Google Form platform. A digital poster and the self-administered Google Form questionnaire link were disseminated via messaging applications (such as WhatsApp and Telegram), particularly to contacts of known ex-COVID-19 patients (family members, colleagues, friends, family members of friends and acquaintances) and to social media platforms such as Facebook, including Malaysian Facebook page support group for ex-COVID-19 patients. The Google Form survey link was collected between 1st March to 30th April 2021.

In the poster advertisement looking for the study participants, it was mentioned that our inclusion criteria for this study were Malaysian residing in Malaysia, with a history of positive COVID-19 since 1st March 2020, age above 18 years old and able to understand English or Malay language. The respondents who filled up and submitted the questionnaire were considered to have consented to participate in this study.

Data collection

The questionnaires for this survey were in dual languages: Malay and English. A pilot study on the questionnaire used in this study was done among 30 respondents prior to the nationwide survey. The internal consistency of the questionnaire was good, with Cronbach's alpha ranging from 0.75 to 0.89. The questionnaire consisted of 3 parts: 1) demographic data such as age, gender, education level, income, background medical illness; 2) information on acute COVID-19 infections (date of diagnosis, symptoms of acute COVID-19 infection, treatment location and treatment received; 3) Symptoms that persisted after acute infection of 14 days and its duration whether still symptomatic or the symptoms already resolved and duration of symptoms if it already resolved. The questionnaire was adapted from a study done by Carfi et al. (2020).[6]

Data analysis

Statistical analysis was done using the SPSS Version 27.0 (IBM Corp., Armonk, NY, USA). Chi-square and Fisher's exact were used in the analysis. Independent sample T-test was used to compare means between groups of symptomatic and asymptomatic respondents at one month.

RESULT

Demographic and clinical characteristic of the respondent

A total of 219 respondents completed the survey. After removal of incomplete data and following the inclusion and exclusion criteria, 215 responses were selected in this study. Among these, 74% (159) were female. The mean age was 36.64 years (SD=7.992), with range between 18 – 63 years. The majority (48.8%) of the age group were within 30-39 years old. Nearly 40% of the respondents have a degree education with 46.6% being in the M40 income category. The majority (94.4%) of the respondents were non-smoker, 10.2% had hypertension and 8.4% were obese.

Most of the study respondents contracted the infection within December 2020 to February 2021. Twenty-seven (12.6%) of the respondents were asymptomatic when diagnosed with COVID-19. The majority reported loss of smell (62.2%), 47.9% had low-grade fever, and 46.8% had sore throat during acute infection. About 45% were admitted to a low-risk treatment center or a quarantine center. Among 215 patients, 19 respondents were in

category 4 and 5 COVID-19 infections (15 and 4 received oxygen support and ventilator support, respectively). The mean duration of hospitalization or quarantine was 9.27 days (SD=3.708), ranging from 1 to 21 days. Table 1 shows the demographic data and clinical background of the respondents.

Table 1: Demographic and Clinical Characteristics of respondents (*N* = 215)

No.	Characteristic		*n*	%
	Age (years)	Mean: 36.64 (*SD*=7.992)[a] Median: 36 (*IQR* = 31-42) Range: 18 - 63		
	Age group (years)	≤29	36	17.2
		30-39	105	48.8
		40-49	59	27.4
		50-59	11	5.1
		≥60	3	1.4
	Gender	Male	56	26.0
		Female	159	74.0
	Education	Primary	1	0.5
		Secondary	63	29.3
		Diploma	46	21.4
		Degree	84	39.1
		Master/PhD	21	9.8
	Employment status [b]	Professional	140	65.1
		Non-professional	42	19.5
		Unemployed	33	15.3
	Income category [c]	B40: Less than MYR 4850	105	48.8
		M40: MYR4851- MYR10970	87	42.2
		T20: Above MYR10971	23	11.2
	Smoking status	No	203	94.4
		Yes	12	5.6
	Chronic diseases#	Hypertension	22	10.2
		Obesity	18	8.4
		Hypercholesterolemia	14	6.5
		Diabetes mellitus	13	6.0
		Chronic lung diseases	9	4.2
		Cancer	2	0.9
		Heart Diseases	1	0.5
		Stroke	1	0.5
		Others [d]	13	0.6
	Symptom of acute COVID-19#	At least 1 symptom of COVID-19	188	87.4
		Loss of smell	117	54.4
		Low grade fever (less than 38 °C)	90	41.5
		Sore throat	88	40.9
		Cough	82	38.1
		Headache	71	33.0
		Loss of appetite	69	32.1
		Joint pain	64	29.8
		Runny nose	63	29.3
		Diarrhoea	45	20.9
		Difficulty in breathing	44	20.4
		Chest pain	35	16.3
		High grade fever (38°C or higher)	28	13.0
		Other symptoms:		
		Lethargy	5	2.3
		Fainted / loss of consciousness	2	0.9
		Loss of taste	1	0.4
		Rash	1	0.4
		Giddiness	1	0.4
		Amenorrhea	1	0.4
		Insomnia	1	0.4
	Hospitalization	COVID-19 ward	50	23.3
		Intensive care / High dependency ward	9	4.2
		Quarantine or Low Risk Treatment Centre	96	44.7
		Home-quarantine	60	27.9
	Duration of hospitalization / quarantine (days)	Mean: 9.27 (SD=3.708) Median:10 (IQR= 7-11) Range: 1 -21 days		
	Treatment	Oxygen therapy	15	7.0
		Ventilator support	4	1.9

[a] Shapiro-Wilk p <0.001, Kolmogorov-Smirnov p <0.001
[b] Malaysian Standard Classification of Occupations (MASCO-20) 2020, Ministry of Human Resources(44)
[c] Household Income & Basic Amenities Survey Report 2019, Department of Statistics, Malaysia (45)
[d] Others chronic illness: Sinusitis (3), Allergic rhinitis (2), Anemia (3), Allergy (1), Gastritis (1), Gouty arthritis (1), Slip disc (1), Thyroid disease (1), Low Blood Pressure (1), Gynecological problem (1)
#Respondents can choose more than 1 option

Post COVID-19 symptoms

More than 50% of the respondents still experienced at least one symptom at the survey time. Seventy-five (43.6%) respondents reported that their symptoms had already resolved when filling up the questionnaire. The majority (80%) experienced persistence of at least one symptom after 14 days of COVID-19 onset (post-acute COVID-19 infection) and slightly more than half (56%) of the respondents still experienced symptoms one month after COVID-19 infection. There were eighteen respondents (8.4%) who reported still symptomatic three months post-acute COVID-19 infection. Table 2 shows the number of symptomatic respondents according to post -acute COVID-19 timeline.

Table 2. Number of symptomatic respondents according to post-acute COVID-19 timeline. (N=215)

Post-acute COVID-19 timeline	*n* (%)
Never had symptom	43 (20%)
Post-acute COVID-19 infection	172 (80%)
Resolved symptoms at the time of questionnaire	75/172 (43.6%)
Still symptomatic	97/172 (56.4%)
At 1-month	121 (56%)
At 2-month	39 (18.1%)
At 3-month	18 (8.4%)

The three most reported symptoms were lethargy, difficulty concentrating and cough, 45.1% , 22,3 % and 21.9 % respectively. Table 3 shows the list of post-COVID-19 symptoms one month after the infection. Female, chronic lung disease and hypertension were significantly associated with prolonged symptoms at one month of COVID-19 infection. Table 4 shows the association of sociodemographic and clinical background to post-COVID-19 symptoms at one month.

DISCUSSION

To the best of our knowledge, this is the first published study presenting post-COVID-19 symptoms among Malaysian COVID-19 survivors. The majority (80%) of the respondents reported persistent symptoms of COVID -19 infection two weeks after diagnosis. This is consistent with a systematic review and meta-analysis study by Lopez -Leon et al.[11], which included 15 studies and reported that 80% of the patients had at least one symptom after two weeks post-acute COVID-19 infection. More than half of

Table 3: Post COVID-19 symptoms at one month (N=215).

Symptoms#	*n*	%
Lethargy	97	45.1
Cough	47	21.9
Headache	44	20.5
Difficult concentration	48	22.3
Difficulty in breathing	30	13.9
Sore throat	17	7.9
Palpitation	31	14.4
Chest pain	24	11.2
Loss of appetite	23	10.7
Depression	11	5.1
Other symptoms:		
Anosmia	8	3.7
Blocked nose	4	1.8
Forgetful	4	1.8
Insomnia	3	1.4
Joint pain	3	1.4
Abdominal pain	2	0.9
Anxiety	1	0.5
Dehydration	1	0.5
Blurred vision	1	0.5
Constipation	1	0.5
Anxiety	1	0.5
Numbness	1	0.5
Hearing loss	1	0.5
Emotional instability	1	0.5

Respondents can choose more than 1 options

Table 4. Association of sociodemographic and clinical background among post-COVID-19 symptom and asymptomatic groups at 1 month.

	Total N= 215	Symptomatic at 1 month N=121 (56.3%)	Asymptomatic N=94 (43.7%)	*p* value
Demographic				
Age (years), mean (SD)	36.64 (7.99)	36.96(7.80)	36.23 (8.25)	0.511
Female, n (%)	159 (74.0%)	96 (79.3%)	25 (51.2%)	**0.030**[b*]
Income status				
B40: Less than MYR4850	105 (48.8%)	63 (52.1%)	42 (44.7%)	0.539
M40: MYR4851-MYR10970	87 (42.2%)	46 (38.0%)	41 (43.6%)	
T20:Above MYR10971	23 (11.2%)	12 (9.9%)	11 (11.7%)	
Premorbid condition				
Smoking, n (%)	12 (5.6%)	4 (3.3%)	6 (14%)	0.089[b]
Hypertension, n (%)	22 (10.2%)	17 (14.0%)	5 (5.3%)	**0.036**[b*]
Diabetes, n (%)	13 (6%)	8 (6.6%)	5 (5.3%)	0.462[a]
Obesity, n (%)	18 (8.4%)	9 (7.4%)	9 (9.6%)	0.575[a]
Hypercholesterole-mia, n (%)	14 (6.5%)	10 (8.3%)	4 (4.3%)	0.237b
Chronic lung disease, n (%)	9 (4.2%)	8 (6.6%)	1 (1.1%)	**0.042**[a*]
Heart disease, n (%)	1 (0.5%)	0 (0.0%)	0 (0%)	0.4327[a]
Stroke, n (%)	1(0.5%)	1 (0.8%)	0 (0%)	0.563[a]
Cancer, n (%)	2 (0.9%)	0 (0.0%)	2 (2.1%)	0.190 [a]
Treatment of acute COVID-19				
Oxygen, n (%)	15(7.0%	10 (8.3%)	5(5.3%)	0.400b
Ventilator support, n (%)	4 (1.9%)	1(0.8%)	3(3.2%)	0.223[a]
Duration of hospitalization/ quarantine (days), Mean (SD)	9.27 (3.708)	9.36 (3.836)	9.16 (3.554)	0.748

SD= Standard deviation.
[a] Fisher's exact test; [b] Chi-square test; * p<0.05

our COVID-19 survivors complained of at least one symptom at one month of the COVID-19 diagnosis. This finding is almost similar to a published report from the United Kingdom, in which 60% of their patients had breathlessness of at least 46 days post-discharge follow-up.[15] On the other hand, a study by Arnold et al.[16] found that 59% of mild COVID-19 group patients had persistent symptoms at a follow-up of 8 to 12 weeks post -COVID-19 admission. This is a higher percentage compared to our result, indicating that only about 18% had persistent symptoms at two months post-COVID-19. A study in Italy also found a higher number of patients (87%) who had persistent, at least one symptom 60 days after the first onset of COVID-19 symptoms.[9] In contrast, one earlier study from Wuhan, China, involving 131 COVID-19 patients reported lower numbers of patients (14%) who had at least one persistent symptom in the third and fourth weeks following acute COVID-19.[17] One study reported that 35% of their patients were disabled due to persistent symptoms after 2 or 3 weeks of COVID -19 infection.[18]

Among our respondents, 16 of them reported having prolonged symptoms of more than three months after the COVID-19 diagnosis. Recently, WHO proposed a temporary clinical case definition for the post-COVID-19 condition of symptoms that last for at least two months with no alternative diagnosis.[19] Prior to this, there had been various suggestions on the duration of "Long COVID." National Institute for Health and Care Excellence (NICE) suggests that "Long COVID" include those with ongoing symptoms of COVID-19 for 4 to 12 weeks and post COVID-19 syndrome of 12 weeks and more.[20] Another study published in March 2021 suggested that individuals with symptoms for 5 to 12 weeks are classified as "Acute post-COVID symptoms", symptoms for 12 to 24 weeks as "long post-COVID symptoms and more than 24 weeks as "persistent post-COVID symptoms".[20]

It had been reported that the acute COVID-19 syndrome typically would last for 2 to 3 weeks.[2] It is still debatable how long the symptoms of acute COVID-19 will last and subsequently be followed with the post-COVID-19 syndrome. Clinical relevance to defining prolonged acute COVID-19 symptoms versus post-COVID-19 syndrome regarding the treatment is yet to be determined.

Post coronavirus infection sequelae are not uncommon. It was noted that the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 has caused limited functional ability and health decline one year after the infection.[22] Long-term complications and organ damage were also noted in patients surviving from Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012.[23] Other viral infections such as dengue, chikungunya and Japanese encephalitis also caused prolonged symptoms.[24-26]

Earlier studies found the five most common prolonged COVID-19 symptoms were fatigue, headache, attention difficulty, loss of hair, and difficulty in breathing, among 50 identified long-term problems of COVID-19.[11] Common prolonged COVID-19 symptoms among our respondents at 1-month post-COVID-19 are lethargy (45.1%), difficult concentration (22.3%) and cough (21.9%). Other studies reported fatigue and dyspnoea were among the most occurred symptoms post-COVID-19 infection.[9,16,27,28] Fatigue, shortness of breath, joint pain, and reduced quality of life were the most common problems seen in an Italian study.[9]

Difficulty concentrating is among neuropsychiatric problems commonly identified in prolonged COVID-19 symptoms. Other neuropsychiatric symptoms include headache, anosmia, anxiety, and insomnia.[29] The causes of fatigue and the neuropsychiatric symptoms among COVID-19 patient are multifactorial and it is often associated with other condition such as depression and apathy.[30] Furthermore, the COVID-19 pandemic has been reported to cause increase anxiety and depression.[31]

Isolation, economic burden, and discrimination increase the likelihood of poor psychological wellness for the already vulnerable groups.[32] In addition, it is not uncommon that patients with post-COVID-19 experience post-raumatic disorder (PTSD), thus increasing the manifestation of fatigue, depression and anxiety.[33,34] Prolonged COVID-19 symptoms are also frequently reported among those who have PTSD.[35] Female gender and those with a pre-existing diagnosis of depression/anxiety were over-represented in those with fatigue.[36]

Cough is the third most common persistent symptom among our respondents (35.5%). Cough occurred in about 30-70% of the patients followed up at one to two months post-acute COVID-19.[9,37,38] A study in Spain found 2.5% persistence of cough after one year among 2100 hospitalized patients.[39] Among our respondents, other common prolonged cardiorespiratory symptoms among our respondents included dyspnoea and chest pain, which constitute 20.9% and 18.6%, respectively. Over 50% of previously hospitalized survivors of SARS-CoV-2 infection had abnormality on CT thorax such as fibrotic changes and ground glass opacity.[40]

Our study found that females and those with hypertension and chronic lung disease are more likely to have persistent at least one symptom at one month of COVID-19 infections. Other studies reported that older age.[27,41,42] and female gender[41] are more likely to develop prolonged COVID-19 symptoms. In comparison, an earlier study in Chine showed no age or gender predilection for prolonged COVID-19 symptoms.[43] Longer hospitalization was also reported as another factor for the prolonged symptoms.[27]

There are several limitations in this study. Firstly, this is a cross-sectional questionnaire survey with no follow-up review. Therefore, the duration of post-COVID-19 was only until the time of survey, even though some of the patients were still having symptoms and continue to have symptoms after that. Thus, for those patients, the total duration of prolonged post-COVID-19 was unable to be measured. The respondents who still have symptoms may have a longer duration of post-COVID-19 symptoms. Secondly, this study is a self-administered questionnaire; therefore, the result is self-reported symptoms. The symptoms and treatment were not confirmed by the

clinicians. There was neither grading of the symptom's severity nor timeline of the resolution of the post-COVID-19 symptoms. Thirdly, the younger generation would spend more time on social media and technology savvy to answer an online questionnaire. We missed the older age generation, which was among the higher group infected with COVID-19 in the earlier months of 2021. Another weakness of our study is we did not document the respondents' Malaysia state of origin and race; therefore, we were unable identify health-seeking behaviours and cultural beliefs among the diverse population of Malaysian. Lastly, the smaller number of respondents is also another weakness of our study. Perhaps more research with a larger number of Malaysian participants studying clinical parameters among equal groups of gender and age with proper follow-ups will be conducted soon. Furthermore, it would be interesting to determine the impact of COVID-19 vaccination to long term COVID-19 infection outcomes.

CONCLUSION

We have found that 80% of the COVID-19 survivors reported at least one symptom after two weeks of acute COVID-19 onset, and about half still have persistent symptoms at one month. Lethargy, loss of concentration, and cough were among the most reported post-COVID-19 symptoms. Female, hypertension, and chronic lung disease were significantly associated with at least one symptom at one month of diagnosis. With a high number of COVID-19 cases in Malaysia, physicians need to prepare and plan for the effective management of COVID-19 long-term consequences. The finding of this study also would allow the policymakers to understand, thus assisting the social and economic impact encountered by the individuals with prolonged post-covid symptoms.

ETHICAL APPROVAL

This study was approved by the Ethics Committee of Universiti Sains Islam Malaysia (USIM/JKEP/2021-156).

DECLARATION OF CONFLICT OF INTEREST

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript.

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