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Physical and psychological effects of post-COVID-19 syndrome on patients in Bandar Lampung, Indonesia: a descriptive prospective study

Dyah Wulan Sumekar Rengganis Wardani, Bayu Anggileo Pramesona*, and Yuni Nirmala

Department of Public Health, Faculty of Medicine, Universitas Lampung,
Bandar Lampung 35145, Indonesia

*Corresponding author; E-mail: bayu.pramesona@fk.unila.ac.id

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Abstract

Although there have been many cases of reports on post-COVID-19 syndrome (PCS) worldwide, studies related to the long-term physical and psychological effects of COVID-19 have not been widely conducted in Indonesia. This study aimed to identify PCS's long-term physical and psychological symptoms in patients who had confirmed COVID-19. This descriptive prospective study was conducted from April to June 2022 with 79 respondents who had been confirmed positive for COVID-19 and whose medical records were reported at one of the public health centers in Bandar Lampung, Indonesia, from January to December 2020 by purposive sampling. The COVID-19 Yorkshire Rehabilitation Screening Scale (C19-YRS) was used to identify PCS symptoms. Descriptive analysis was used to analyze the frequency distribution data and the percentage of PCS cases. The results showed that 20.3% of respondents had at least one PCS symptom. Nearly a third (32.9%) of the respondents had deteriorated general health conditions after being infected with COVID-19. The most common physical symptoms of PCS were shortness of breath when climbing stairs (6.3%), resting, dressing, changes in throat sensitivity, voice (each 5.1%), swallowing problems, and pain (each 2.5%). At the same time, the most psychological effects of PCS were illness-related nightmares (12.6%), PTSD (11.4%), anxiety (7.6%), still avoiding thoughts of their illness (2.5%), and depression (1.3%). With varying severity, the physical and psychological symptoms of PCS were still felt by respondents. Although the symptoms of PCS are relatively mild, the follow-up treatment of post-recovery patients after being diagnosed with COVID-19 is crucial.

Keywords**:** *Bandar Lampung; covid-19; Indonesia; patient; physical; psychological; syndrome.*

1. Introduction

Currently, the world continues to deal with the COVID-19 pandemic, which was caused by the spread of severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) (Dai, Bao, Chen, Zhang, & Jian, 2020). The pandemic of COVID-19 poses a threat to global public health (World Health Organization (WHO), 2020a). Globally, there were 364,191,494 confirmed cases of COVID-19 as of January 28, 2022, including 5,631,457 deaths (World Health Organization, 2022).

As time has passed since the beginning of the COVID-19 pandemic, it has become increasingly apparent that some infected individuals have suffered from post-COVID-19 syndrome (PCS) or long-term complications. These complications include shortness of breath, fatigue, brain fog, and weakness (Marshall, 2020a, 2020b; Yong, 2020a, 2020b). Longitudinal studies of hospitalized COVID-19 patients revealed that 74-88% had symptoms lasting more than 50-80 days, with fatigue and dyspnea (difficulty breathing) being the most common (Arnold et al., 2020; Carfì,

Bernabei, & Landi, 2020). Another longitudinal study revealed that CT scan findings in hospitalized COVID-19 patients demonstrated progression and persistence of lung abnormalities up to 24 days after disease onset (Wang et al., 2020). Furthermore, a study of COVID-19 patients using cardiac magnetic resonance (CMR) imaging found that 78% had abnormal findings 2-3 months after COVID-19 onset (Puntmann et al., 2020). According to a separate study, up to 40% of COVID-19 patients developed pericarditis or myocarditis more than 70 days after infection (Eiros et al., 2022). It has also been reported that COVID-19 patients experience kidney dysfunction (Chan et al., 2021).

Even though there are numerous case reports of PCS, including cases of severe post-infection, most of the population does not experience symptoms severe enough to necessitate hospitalization. It is well known that patients infected with COVID-19 experience a range of symptoms, from asymptomatic to mild, moderate, severe, and critical (Ministry of Health of Indonesia, 2021; World Health Organization, 2020b). From a psychological point of view, epidemic outbreaks of infectious diseases can have profound psychological effects on patients, including anxiety, fear, and depression (Hong et al., 2009; James, Wardle, Steel, & Adams, 2019; Luyt et al., 2012). In severe cases, post-traumatic stress disorder (PTSD) and other mental disorders also occur (Mak, Chu, Pan, Yiu, & Chan, 2009). However, studies on the long-term physical and psychological effects of COVID-19, particularly the degree of symptoms experienced when infected, have not been widely studied in Indonesia.

2. Objectives

This study aimed to identify PCS's long-term physical and psychological symptoms in patients who had confirmed COVID-19.

3. Methodology

3.1 Research design and respondents

This prospective study was conducted from April to June 2022 on 79 respondents who had been confirmed positive for COVID-19 and had medical records reported at one of the public health centers in Bandar Lampung, Indonesia from January to December 2020. The inclusion criteria consisted of the following: age of at least 18 years; confirmed COVID-19 with moderate, severe, or critical symptoms; had been declared cured of COVID-19 for at least three months after the last confirmed case; currently had or had been experiencing PCS symptoms; and not in a state of illness related to COVID-19. Those who were unwilling to become respondents were excluded from this study.

3.2 Research instruments

Information related to respondents' demographic characteristics, such as age, gender, education, occupation, and monthly income, was collected through interviews. The COVID-19 Yorkshire Rehabilitation Screening Scale (C19-YRS) was used to identify PCS symptoms in the respondents (Sivan, Halpin, & Gee, 2020). PCS symptoms were grouped according to the following system: general (fatigue, myalgia, and weight loss), respiratory (dyspnea, chest pain, coughing, and wheezing), neuropsychiatric (headache or insomnia), hypersomnia, nightmares, concentration or memory deficits, mood changes (e.g., depression and anxiety), gastrointestinal (abdominal pain, diarrhea, and constipation), and genitourinary (uncontrolled bladder). To evaluate the severity levels of the symptoms, respondents were asked to answer 19 questions with yes/no answer responses on a numerical scale of 0-10 for each symptom, from 0 (no problem) to 10 (very extreme; (Sivan et al., 2020). Informed consent was requested at the beginning of the interview, either by telephone or face-to-face. This survey took approximately 20-25 minutes for each respondent to answer all the questions. Ethical clearance was obtained from the Health Research Ethics Committee, Faculty of Medicine, Universitas Lampung, Indonesia (No. 1217/UN26.18/PP.05.02.00/2022).

3.3 Statistical analysis

The IBM SPSS V. 21 software was used to analyze the data. Descriptive test results are presented as frequencies and percentages for categorical data, while numerical data are presented as means and standard deviations (SD).

4. Results

Based on Table 1, the average age of the respondents was 40.1 years, and the majority (63.3%) were male, had higher education background (70.9%), most (67.1%) worked in the private sectors, and had monthly income more than USD 198 (86.1%).

Table 1 Sociodemographic of respondents (n = 79)

Sociodemographic of respondents	Subtype	n	Percentage (%)
Age (years), Mean ± SD	40.1 ± 14.9		
Gender	Male	50	63.3
	Female	29	36.7
Education	Lower education	23	29.1
	Higher education	56	70.9
Occupation	Unemployed or retired	14	17.7
	Private sector	53	67.1
	Government official	12	15.2
Monthly income	Lower income (≤198 USD)	11	13.9
	Higher income (>198 USD)	68	86.1

In addition, it was determined that 16 respondents (20.3%) had PCS symptoms (Table 2). Only about two-thirds of respondents (67.1%) said their general condition was very healthy after being infected with COVID-19, while the rest (32.9%) said their general health condition had decreased. Regarding general questions, most respondents (93.7%) did not have advanced medical problems after hospitalization and did not use other health services since leaving the hospital (91.1%) (Table 3).

Regarding the physical symptoms of PCS, particularly in the respiratory system, five respondents (6.3%) experienced shortness of breath of varying scales when climbing stairs, as well as when resting (5.1%) and dressing (5.1%) after being infected with COVID-19. The results also showed that several respondents (5.1%) experienced changes in throat sensitivity, voice, and swallowing problems. Even though all respondents (100%) did not have problems in the gastrointestinal or genitourinary system, especially in controlling defecation and urination, it was noted that for the neuropsychiatric system disorders, several respondents (2.5%) experienced pain after recovering from COVID-19. While the most psychological effects of PCS experienced by respondents were illness-related nightmares (12.6%), PTSD (11.4%), anxiety (7.6%), still avoiding thoughts of their illness (2.5%), and depression (1.3%). Furthermore, we also found that several respondents had fatigue (10.1%), problems with their activities of daily living (6.3%), physical mobility issues (2.5%), and self-care problems (2.5%) after being infected with COVID-19 (Table 3).

5. Discussion

This study aimed to identify the physical and psychological symptoms of PCS in patients who had confirmed COVID-19. Several problems experienced by respondents after being infected with COVID-19 were indicative of at least one PCS symptom, such as shortness of breath, changes in throat sensitivity, changes in voice, swallowing disorders, weight loss, impaired physical mobility, fatigue, and self-care issues. In addition, the problems of pain and disruption of daily activities were also complained about by a small number of respondents after being infected with COVID-19. The psychological effects of COVID-19 can also be observed in the presence of impaired concentration, impaired short-term memory, anxiety, depression, and nightmares in those infected with COVID-19. In addition, about a fifth of the respondents had negative feelings after being treated for COVID-19 and were worried about being infected again.

In our study, we found that 20.3% of respondents had at least one PCS symptom. Previous studies have shown that the majority of patients have at least one sequela after infection with COVID-19 (Frontera et al., 2021; Sykes et al., 2021). A study in Germany found that 27.8% of patients had PCS after four months of being infected with COVID-19, and this increased to 34.8% after seven months of infection. Some of the symptoms felt by patients included anosmia, shortness of breath, fatigue, ageusia, headaches, alopecia, and diarrhea (Augustin et al., 2021).

Table 2 Post-COVID-19 syndrome (n = 79)

PCS	n	Percentage (%)
Present	16	20.3
Absent	63	79.7

Table 3 Types of PCS (n = 79)

Variables	Scale before COVID-19	n (%)	Current scale	n (%)
General questions				
Have advanced post-treatment medical problems				
No	74 (93.7)			
Yes	5 (6.3)			
Using other health services since leaving the hospital				
No	72 (91.1)			
Yes	7 (8.9)			
Physical effects				
Respiratory system				
Shortness of breath when resting	0	79 (100)	0	75(94.9)
			4	1 (1.3)
			8	2 (2.5)
			9	1 (1.3)
Shortness of breath when dressing	0	79 (100)	0	75(94.9)
			4	1 (1.3)
			8	2 (2.5)
			9	1 (1.3)
Shortness of breath when climbing stairs	0	79 (100)	0	74(93.7)
			1	1 (1.3)
			6	1 (1.3)
			7	2 (2.5)
			10	1 (1.3)
Gastrointestinal system				
Problems controlling defecation				
No		79 (100)		
Yes				
Genitourinary system				
Problems controlling urination				
No		79 (100)		
Yes				
Neuropsychiatric system				
Pain	0	79 (100)	0	77(97.5)
			8	2 (2.5)
Concentration disorders				
No		73 (92.4)		
Yes		6 (7.6)		
Short-term memory impairment				
No		75 (94.9)		
Yes		4 (5.1)		
Cognitive-communication changes				
No		78 (98.7)		
Yes		1 (1.3)		
***Psychological* effects**				
Anxiety			0	73(92.4)
			1	4 (5.1)
			3	2 (2.5)
Depression	0	79 (100)	0	78(98.7)
			9	1 (1.3)
Post-traumatic stress disorder screen				

Table 3 Types of PCS (n = 79) Cont.

Variables	Scale before COVID-19	n (%)	Current scale	n (%)
Unwanted memory related to illness				
No				70 (88.6)
Yes				9 (11.4)
Light				9 (11.4)
Medium				0 (0)
Heavy				0 (0)
Very heavy				0 (0)
Nightmares related to illness				
No				69 (87.3)
Yes				10 (12.6)
Light				7 (8.8)
Medium				3 (3.8)
Heavy				0 (0)
Very heavy				0 (0)
Avoiding thoughts of illness				
No				77 (97.5)
Yes				2 (2.5)
Light				2 (2.5)
Medium				0 (0)
Heavy				0 (0)
Very heavy				0 (0)
Thoughts of self-harm				
No				79 (100)
Yes				0 (0)
General health	10	79(100)	0	2 (2.5)
			6	7 (8.9)
			7	6 (7.6)
			8	5 (6.3)
			9	6 (7.6)
			10	53(67.1)

Research at four hospitals in New York, USA, found that 56% of patients who had been treated for COVID-19 with neurological complications experienced limitations in daily activities, another 50% experienced cognitive impairment, and 47% were unable to return to work and experienced anxiety and depression, with sleep disturbances being worse six months after hospitalization (Frontera et al., 2021). This suggests that the initial description of PCS effectively describes the different symptoms of patients recovering from COVID-19 after hospitalization (Nabavi, 2020).

Although in our study, it was found that less than 10% of respondents complained of shortness of breath, infection with COVID-19 can have far-reaching implications. COVID-19 infection can result in long-term pulmonary complications such as dyspnea, ventilator dependence, oxygen dependence, abnormal pulmonary function test (PFT) results, and fibrotic lung disease. After two months of infection, approximately 22.9-53.0% of patients report dyspnea as the most prevalent symptom of pulmonary complications associated with COVID-19 (Carfì et al., 2020; Chopra, Flanders, O'Malley, Malani, & Prescott, 2021; Mandal et al., 2021). A three-month follow-up PFT evaluation revealed abnormalities in 25% of patients, with decreased carbon monoxide diffusion capacity being the most prevalent (16%) (Zhao et al., 2020). While, 81 percent of patients evaluated three months after hospitalization for severe COVID-19 pneumonia had abnormal chest CT findings (Balbi et al., 2021).

While we found that only 2.5% of respondents experienced impaired physical mobility after being infected with COVID-19, musculoskeletal symptoms are one of the most common complaints in patients after being infected, both at the beginning of the disease and in the post-acute phase (Abdullahi et al., 2020; Aiyegbusi et al., 2021; Stokes et al., 2020). This suggests that viral invasion of the synovial tissue and skeletal muscle contributes to the development of PCS symptoms (Li, Li, Zhang, & Wang, 2020). At the six-month follow-up, COVID-19 survivors with more severe

acute illness had more muscle weakness, more mobility issues, and shorter walking distances in six minutes (Huang et al., 2021). Urgently required is the optimization of nutrition and rehabilitation in both the acute and post-acute phases of COVID-19.

In our study, although only 10.1% of respondents complained of fatigue after being infected with COVID-19, this fatigue problem was one that most patients with PCS complained about (Sudre et al., 2021; Townsend et al., 2020). The possible cause of this fatigue is endothelial dysfunction in the brain capillaries, which has been described in previous studies (Nauen, Hooper, Stewart, & Solomon, 2021). If this fatigue continues for up to four months, it can be categorized as chronic fatigue syndrome (CFS), which induces the experience of post-activity fatigue, cognitive difficulties, sleep disturbances, and chronic pain (National Institute for Health and Care Excellence (NICE), 2021). This is what may cause other PCS symptoms, such as the impaired concentration, short-term memory impairment, and disease-related nightmares experienced by the respondents in our study. Although the origins of CFS are still unclear, viral infection is suspected to be one of the causes (Yancey, & Thomas, 2012). It should be noted, however, that fatigue can vary from person to person, and no single test confirms the diagnosis of fatigue. In general, female patients and individuals with a previous diagnosis of depression or anxiety have a higher risk of suffering from fatigue (Townsend et al., 2020).

Various long-term sources report neurological symptoms in the form of fatigue, muscle weakness, sleep disturbance, myalgia, and headache in patients two months after acute infection (Carfì et al., 2020; Huang et al., 2021). These symptoms are now characteristic of PCS. Long-term follow-up at two months revealed that 11% to 13% of patients had sustained loss of taste and smell (Chopra et al., 2021; Huang et al., 2021). One year after infection, patients with acute respiratory distress syndrome (ARDS) had reduced memory (13%) and verbal fluency (16%) (Mikkelsen et al., 2012). COVID-19 infection has also been associated with long-term psychiatric complications. Previous studies have reported rates as high as 28% for PTSD, 31% for depression, 42% for anxiety, and 40% for insomnia in patients treated for COVID-19 (Mazza et al., 2020). CFS services in the United Kingdom offer individualized patient management. Patients with long-term COVID may benefit from a variety of services, including symptom management, psychological care, occupational support, and education about patient conditions (National Institute for Health and Care Excellence (NICE), 2021).

Among the limitations of this study is the small number of samples collected from a single research site. In addition, the questionnaire used was based on the respondents' self-reports, so that there may be differences in tolerance and understanding of PCS symptoms that remain unaccounted for here.

6. Conclusion

With varying severity, PCS's physical and psychological symptoms were still felt by respondents who had been treated for COVID-19 infection. Some identified physical effects of PCS were reported in the respiratory system (i.e., shortness of breath, changes in throat sensitivity, voice, and swallowing problems) and in the neuropsychiatric system (i.e., pain). While the most psychological effects of PCS in our study were illness-related nightmares, PTSD, anxiety, still avoiding thoughts of their illness, and depression. Although the symptoms of PCS are relatively mild, the follow-up treatment of post-recovery patients after being diagnosed with COVID-19 is crucial. In order to optimize patient rehabilitation, adequate information and education about the long-term effects of COVID-19 must be provided.

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