Sianty Dewi

POST COVID-19 SYNDROME EFFECT ON DAILY LIFE ACTIVITIES

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POST COVID-19 SYNDROME EFFECT ON DAILY LIFE ACTIVITIES

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ABSTRACT

The Covid-19 pandemic had a big impact on the world over the past two years., and it is estimated that 1 in 10 people have been infected. The development of prevention and treatment systems can reduce mortality, but a new problem has emerged in the group of survivors. New clinical complaints, Getting COVID-19 again or having ongoing symptoms of COVID-19 for four weeks after the first infection, can affect a wide variety of organ functions. The long-term effects of having COVID-19, like feeling tired, having trouble breathing, chest pain, difficulty thinking, and joint pain, can make life worse. The study was conducted using a qualitative descriptive method using an online questionnaire. The results showed that some residual symptomsthat respondents still felt after four weeks since being infected with COVID-19, such as fatigue easily (80%), joint pain (63.3%), insomnia (56.7%), depressive symptoms (53.3%), shortness of breath (50%), impaired concentration and memory (50%), livelihood disorders (43.3%), cough (40%), respiratory disorders (36.7%), weight loss and appetite (33.3%), fever (26.7%). Overall, it was found that 20% of COVID-19 survivors experienced daily activity disruptions assessed using the Modifications of Barthel Index and EQ-5D-5L questionnaires.

Keywords : *Long COVID Syndrome, Activity Daily Living, Quality of Life*

ABSTRAK

Pandemi Covid-19 telah mengubah kehidupan masyarakat dunia dalam 2 tahun terakhir, diperkirakan 1 dari 10 orang pernah terinfeksi. Perkembangan sistem pencegahan dan perawatan dapat menurunkan angka kematian, namun muncul pontensi masalah barupada kelompok penyintas

Gangguan baru, berulang atau berkelanjutan 4 minggu paska infeksi terjadi pada fungsi organ, mengakibatkan keluhan seperti kelelahan, sesak nafas, nyeri dada, gangguan kognitif,

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artralgia dapat mengakibatkan penurunan kualitas hidup. Penelitian dilakukan dengan metode deskriptif kualitatif pada masyarakat Jawa Timur, dengan instrument kuesioner yang telah divalidasi. Hasil penelitian didapatkan data 80 responden dengan 30 orang menunjukkan keluhan setelah 4 minggu sejak terinfeksi COVID-19. Keluhan yang dirasakan seperti mudah lelah (80%), nyeri sendi (63,3%), insomnia (56,7%), gejala depresi (53,3%), sesak nafas (50%), gangguan konsentrasi dan memori (50%), gangguan penghidu (43,3%), batuk (40%), gangguan pernafasan (36,7%), penurunan berat badan dan nafsu makan (33,3%), demam (26,7%). Secara keseluruhan, didapatkan 20% dari penyintas COVID-19 mengalami gangguan aktivitas sehari-hari yang dinilai dengan menggunakan kuesionerModifications of Barthel Index dan EQ-5D-5L

Kata kunci : Long COVID Syndrome, Activity Daily Living, Quality of Life

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BACKGROUND

As of July 24, 2022, the global pandemic caused COVID-19 has been reported to have infected over 567 million people and caused more than 6. 3 million deaths globally.(1) Some people who have COVID-19 experience new or ongoing symptoms for at least four weeks after they first started feeling better. After having COVID, some patients may experience different levels of the disease while they are acutely infected. This includes people with mild or no symptoms. Scientists and doctors are still studying these long-lasting symptoms and what they find in patients during medical examinations. (2,3)

Researchers have been gathering information about the lasting impacts of COVID-19 on different parts of the body over time. (4) Early reports indicate that after having COVID-19, people may still experience problems like feeling tired, having trouble breathing, chest pain, difficulty thinking clearly, joint pain, and a lower quality of life.(2,5,6) In the past, other coronaviruses like SARS in 2003 and MERS in 2012 also caused long-lasting symptoms. This shows that COVID-19 could have similar effects. We need to do more research to understand what happens to people after they recover from COVID-19. This will help us improve the way we care for patients and decide what things we should focus on studying. To better prepare COVID-19

clinics for taking care of patients after the initial phase, it's important to fully understand their ongoing needs. This will allow the clinics to have the necessary resources and support to provide a wide range of specialized care in outpatient settings. The medical community has learned that some people continue to have symptoms or new health problems for more than 3 or 4 weeks after they first get sick with COVID-19. This is now considered part of the post-acute stage of the illness..(10–12)

The way COVID-19 causes harm to the body involves various processes, such as the virus itself being harmful, damage to the cells lining the blood vessels, injury to small blood vessels, disruption of the immune system, and triggering of excessive inflammation, hypercoagulability that causes thrombosis, macro thrombosis and maladaptation in ACE Pathway (4). The after-effects of COVID-19 that are severe and come on suddenly are similar to those seen in SARS and MERS. This can be explained by how similar the coronavirus pathogens are to each other. The genetic code of the SARS-CoV-2 virus is similar to 79% of the SARS-CoV-1 virus and 50% of the MERS-CoV virus.(13,14)

In addition, SARS-CoV1 and SARS-CoV-2 have the same cell receptor called the ACE2 receptor. However, there are noticeable differences between SARS-CoV-2 and SARS-CoV-1. One notable difference is that SARS-CoV-2 has a stronger attraction to ACE2 compared to SARS-CoV-1. This may be because the spike protein's receptor binding domain, which allows it to attach to ACE2, is different in each virus. The spike gene in SARS-CoV-2 is different from other structural genes. It is only 73% similar to SARS-CoV-1 in terms of the amino acids in the spike protein receptor binding domain. Moreover, the extra splitting of S1-S2 in SARS-CoV-2 enables the host protease to split it more efficiently and helps in better binding capability. (15,16) There may be different reasons why COVID-19 can continue to cause medical problems even after the acute phase is over. The text can be rewritten as: There are three main reasons why viruses can make us sick: (1) changes in how the virus affects our body, (2) problems with our immune system and inflammation when we first get infected, and (3) effects that continue after we recover from a serious illness. Post-intensive care syndrome is a condition that is becoming more

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recognized. It includes new or worsening problems in the body, the way we think, and our mental health after a serious illness. (18)

METHOD

This research uses a qualitative descriptive research method using a Google Form questionnaire. Questionnaires related to Long COVID Syndrome are made according to the symptoms. For ADL questionnaires using Modifications of Barthel Index and EQ-5D- 5L. The Population included in this research was all patients who experienced symptoms/ complaints after being infected with COVID for more than 90 days. We used the total sampling method in this research.

Inclusion criteria: COVID-19 survivors over 17 years old who had been infected more than 90 days before the study and were ready to participate in the study

Exclusion criteria:

1. Not being treated at home or hospital due to severe/ critical illness
2. Not having a disturbance of consciousness Data analysis is performed with using SPSS 25

RESULTS

Table 1. Characteristics of Respondents

Characteristics	n	%
Age (year)		
<20	2	6,7
20-40	8	26,7
40-60	20	66,7
Comorbid		
Hypertension	3	10,0
Diabetes mellitus	1	3,3
Asthma	2	6,7
Autoimmune	1	3,3
thyroid function disorders	2	6,7
ischemic heart disease	1	3,3
Vaccination status when first time infected with COVID-19		
not vaccinated	11	36,7
First vactination	7	23,3
Second vactination	12	40,0

A total of 30 respondents experienced symptoms of Long COVID Syndrome, with The most people who participated were between the ages of 40 and 60.

Table 2. Symptoms of Long COVID Syndrome Sufferers

Patien symptoms	n	%
Easily tired		
nothing	6	20,0
Mild	19	63,3
Moderate	3	10,0
Severe	2	6,7
Dyspnea		
N/A	15	50,0
Mild	15	50,0
Moderate	0	0
Severe	0	0

Memory and Concentration Disorders		
Nothing	15	50,0
Exist	15	50,0
insomnia		
N/A	13	43,3
Mild	5	16,7
Moderate	8	26,7
Severe	4	13,3
Depressive Symptoms		
Nothing	14	46,7
Exist	16	53,3
Joint Pain		
N/A	11	36,7
Mild	5	16,7
Moderate	11	36,7
Severe	3	10,0
Weight Loss and Appetite		
Nothing	20	66,7
Exist	10	33,3
Fever		
Tidak Ada	22	73,3
Exist	8	26,7
Cough		
Nothing	18	60,0
Exist	12	40,0
Respiratory Disorders		
Nothing	19	63,7
Exist	11	36,7
Smell Disturbance		
Nothing	17	56,7
Exist	13	43,3
ADL Disorders		
12	1	3,3
13	5	16,7
14	24	80,0

Accompanied by several comorbidities respondents withhypertension were the most comorbidities.Vaccination status when first infected with COVID-19, as many as 12 people have received two doses of vaccination A population-based cohort study conducted by Menges et al. in Zurich showed that most patient with post-COVID syndrome were around 47 years old, the age group with the most patient was between 40 and 64 years old, spesifically 205with people(22)

DISCUSSION

The research by Davis et al The study conducted by Davis and colleagues. Participants from 56 various countries were involved in the survey conducted in 2020 showed demographic data that the majority of long COVID sufferers are between the ages of 30– 60, years with the highest age range being 40 – 49 years (33.7%). (23) Another study bySugiyama et al. between August 2020 and March 2021 in Japan also showed that the highest population of patients experiencing Long COVID was 40 – 59 years. Certain findings from this research support the notion that getting older is a notable risk factor for developing Long COVID syndrome after getting infected with COVID-19..

After studying the research data, it was discovered that out of the 30 people who were asked, 10 of them had Long COVID Syndrome had a history of

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comorbidities such as hypertension, diabetes mellitus, asthma, autoimmune diseases, thyroid function disorders, and ischemic heart disease. The age category of respondents with comorbidities is between the ages of 40-60 years (with an average value of 42.8 years), It is important to know that getting older can make you more likely to have certain diseases and not be as physically capable. (24) The results of a multivariate analysis conducted by researchers in

In 2021, it was found that people in Indonesia who had other health conditions were 14. 5 times more likely to have Long COVID syndrome.(25) The most common comorbidity found in this study was hypertension (10%). This is in line with case-control studies that compared the relationship of hypertension suffered by patients before experiencing COVID-19 infection occurred among individuals in Spain in 2020, leading to the development of persistent symptoms, which showed that patients with comorbid hypertension experienced more Long COVID symptoms than the control group. (26)
Another study in Egypt in 2021 also proved that having hypertension along with COVID-19 is strongly linked symptoms (p=0.039). (27) This is likely related to The impact of the ACE 2 receptor on the Renin Angiotensin Aldosterone System and the existence of inflammation during COVID-19 infection. (28)

Based on analyzing research data, it was found that 40% of respondents had received vaccination two times (as many as 12 people), followed by 36.7% of respondents who had not received vaccination when infected with COVID-19. Research conducted in 2021 showed that the decrease in the incidence of sequelae after being infected with COVID-19 only decreased by 15% in patients who had received complete vaccination compared to the group who had not received the vaccination. Although vaccination is only able to provide partial protection against the onset of Long COVID Syndrome, getting vaccinated helps to decrease the likelihood of needing intense medical care and possibly dying. (29)

The main symptom felt by peoplewith Long COVID Syndrome is persistent fatigue. Based on the study's results, it was found that 80% of respondents (20 people) still complained of fatigue after being infected with COVID-19. Tiredness felt by individuals with Long COVID Syndrome is

in the form of continuous fatigue accompanied by a decrease in energy, motivation, and concentration, this means that the condition is not connected to how serious a person's COVID-19 infection is. (30)

Dennis et al. in the UK in, conducted on 163 patients who did not require hospitalization and 37 patients who needed hospitalization, a study discovered that 98% of patients had Post COVID Syndrome symptoms like feeling tired all the time.. (31) Another study conducted by Goertz In the Netherlands and Belgium, a study looked at 112 COVID-19 patients who needed to go to the hospital and 2001 patients who did not need hospitalization. After 79 days of being infected with COVID-19, they found that 87% of patients still felt tired..(2)

In this study, it was found that 63.3% of respondents had an average age of 45 years and experiencing complaints of mild fatigue.Namely, respondents could carry out daily activities but needed several breaks. 52.6% ofrespondents who experienced mild fatiguehad received vaccination two times, and 89% of respondents had no previous history of comorbidities. Respondents who experienced moderate fatigue had an average age of 33 years, and 66.7% had not received vaccinations. Respondents who experienced severe fatigue, namely there were disturbances in carrying out daily activities, had an average age of 44.5 years, 50% had other long-term diseases like diabetes, high blood pressure, and heart disease, and they hadn't gotten any vaccines.

The fatigue that someone with COVID-19 feels is believed to be caused by an interruption in their body's normal response to inflammation, which causes the occurrence of "cytokine storm". In addition, it is suspected that single nucleotide polymorphisms occur in the cytokine gene so as to cause complications in the form of fatigue. (30) Another hypothesis suggests that Post COVID-19 Fatigue Syndrome could be caused by harm to the cells in our sense of smell, which then leads to a reduction in the flow of fluid around our brain. This fluid congestion happens because of a build-up of harmful substances in the central nervous system.(32)

Symptoms of shortness of breath are one of the symptoms that are quite often found in Long COVID Syndrome. In this study, it was found that 50% of respondents experienced complaints of mild shortness of breath where respondents experienced

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shortness of breath while doing activities butimproved with rest. In line with research in Italy in 2020, out of 143 respondents, 43.4% of patients still experienced complaints of shortness of breath in the follow-up period carried out 60 days after being infected with COVID-19 (33). This is suspected to be related to abnormalities in lung function after being infected with COVID-19 in the form ofimpaired diffusion capacity and restrictive ventilatory defects (34).

A lot of people, about 85. 1%, had problems with their thinking abilities like paying attention, making decisions, and solving problems. Even after seven months, 55. 5% still had these problems. 728% of the people who were asked said they had problems with forgetting things, both in the short-term and in the long-term. (23). Cognitive impairments that happen in COVID-19 patients may be caused by conditions like brain inflammation, low blood pressure, low oxygen levels, and blood clots. It could also be related to the immune system responding in a harmful way, including the activation of certain brain cells and abnormal levels of certain immune molecules. (35)

Symptoms of insomnia and depression occurred in 56.7% and 53.3% of all patients in this study. A cohort study in China A study in China found that many people experienced symptoms of anxiety, depression, and trouble sleeping for up to six months after getting sick with COVID-19. The reason for this mental health problem is believed to be connected to the direct effects of the SARS-CoV-2 virus infection, the body's immune response, the use of corticosteroid medication, being treated in the intensive care unit, being isolated from others, and the negative views associated with being a COVID-19 patient. (36)

Joint pain is a very common symptom of long COVID that patients often have.(37). A meta-analysis reported Researchers analyzed data from multiple studies and found that 19% of patients who had long COVID experienced joint pain symptoms. (38). Another study showed that joint pain was felt in 9.8%of patients on day 30 and 16.3% of patients on day 60 after diagnosed with COVID-19(39). Patients percentageof our study who experienced joint pain symptoms was greater (63.3%) than in several previous studies. COVID-19 infection is suspected of causing rheumatoid arthritis (RA) or reactivation of previous RA(40).

One-third (33.3%) of samples from this study experienced weight and appetite

loss after being infected with COVID-19. Weight loss was reported in 17.2% of patients after 60 days of infected with COVID-19(39). Cross-sectional study also showed that decreased appetite is one of the most frequent symptoms of COVID-19 (42.6%) felt by patients in the long term(27). Weight loss in COVID-19 patients is believed to happen because of a few different reasons, such as inflammatory reactions that cause metabolic disorders; malnutrition due to decreased appetite, ageusia, fever, and sedation; and immobilization(41).

Nearly half (46.7%) of the total respondents in this study experienced persistent symptoms of indigestion as a symptom of Long COVID Syndrome. This percentage is more when compared to a prospective cohort study by Blackett et al., which showed that 220 out of 749 (29%) patients experienced gastrointestinal symptoms such as diarrhea, constipation, abdominal pain, nausea or vomiting, and heartburn within six months of being infectedwith COVID-19 (42). The RNA of the SARS-CoV-2 virus can still be detected up to5 weeks after the onset of symptoms; this is suspected of causing long-term damage to the gastrointestinal tract. Other studies have shown digestive tract dysfunction due to infiltration of inflammatory cells in intestinal tissues, imbalance of microbial community of the gastrointestinal tract, and a high number of cytokines (12).

The percentage of patients who developed fever as a symptom of long COVID in this study was more significant then in several previous studies. In the study by Carvalho-Schneider et al., previously, only 3.6% of patients diagnosed with COVID-19 complained of fever after 30 days of the onset of symptoms. On the 60th day, no more patients complained of fever(39). Similar results were also reported by Goërtz et al., who showed that only 2% of patients complained of fever after 79 days since beingdiagnosed with COVID-19 (2).

Cough is included in the most ten frequent symptoms of long COVID, with a prevalence of 18% (43). Similar results were also reported by a meta-analysis involving 2108 with a prevalence of 19% of patients who experienced coughing as a symptom of long COVID (38). The hypothesis that issuspected to be the cause of chronic cough in long COVID is a hypersensitive state due to

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neuroinflammatory in the nervous system in the brain (44).

The previous systematic review showed that 13.5% of patients experienced taste disorders up to 12 weeks after infected with COVID-19 (45). In this study, the percentage of patients taste disorders was more than 36.7%. ACE2 receptors are also found on the mucous membrane of the mouth, especially on the tongue. This thing might make your sense of taste worse if you have a SARS-CoV-2 infection. (46). Another theory suggests that if your sense of smell is disrupted, it can also disrupt your ability to taste things. (47).

Based on research conducted by Carvalho et al., in 2020 on 53 respondents who underwent hospitalization and 97 respondents who did not undergo hospitalization 30 days after being infected with COVID-19, it was found that 27.8% of respondents had anosmia ageusia (39). Reasons for loss of smell and taste in COVID-19 patients include problems with the nasal passage, inflammation in the nose, cell damage in the nose, changes in how odors are detected, brain cell damage, and harm to the parts of the brain that control smell. (48).

This study found that 80% of respondents who experienced Long COVID-19 Syndrome did not experience a decrease in the Activity Daily Living (ADL) score. However, the remaining 20% experienced a decrease. One 42-year-old respondent without comorbidities said he could not eat, earning an ADL score of 12 points. Five other respondents who obtained an ADL score of 13 complained about not being able to hold urination a maximum of one time a day (2 respondents), not being able to hold defecation once per week (1 respondent), moving or moving requires the help of 1 person (1 respondent), being able to eat but needing the help of others (1 respondent).
In contrast to the results of the systematic review conducted by Pennarolli etal., were obtained from all studies that included a decrease in physical function and ADL performance (the majority of whichwere measured using the Barthel Index and ADL Score) in all patients after COVID-19 infection so that there was a decrease in patient independence (49). This ADL is a general measuring tool to assess the ability tocarry out daily activities. Post-COVID patients who experience complaints do not affect the patient's ability to do daily activities

CONCLUSION

Sequele felt by COVID-19 survivors that cann be felt in carius organ systems cause varying degress of disturbances in individuals dailuy activities. Based on this study, 20% of COVID Survivors experienced a decreased ability to carry out daily activities

BIBLIOGRAPHY

1. World Health Organization. COVID-19 Weekly Epidemiological Update. World Heal Organ [Internet]. 2022;(June):1–33. Available from: https://www.who.int/publications/m/item/covid-19-weekly-epidemiological-update
2. GOËRTZ, Yvonne MJ et al. Persistent symptoms 3 months after a SARS-CoV- 2 infection: the post-COVID-19 syndrome? ERJ Open Res. 2020;6(4):1–21.
3. Xiong Q, Xu M, Li J, Liu Y, Zhang J, Xu Y, et al. Clinical sequelae of COVID-19 survivors in Wuhan, China: a single-centre longitudinal study. Clin Microbiol Infect. 2021;27(1):89–95.
4. Gupta A, Madhavan M V., Sehgal K, Nair N, Mahajan S, Sehrawat TS, et al. Extrapulmonary manifestations of COVID-19. Nat Med [Internet]. 2020;26(7):1017–32. Available from: http://dx.doi.org/10.1038/s41591-020-0968-3
5. Huang C, Huang L, Wang Y, Li X, Ren L, Gu X, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. Lancet [Internet]. 2021;397(10270):220–32. Available from: http://dx.doi.org/10.1016/S0140-6736(20)32656-8
6. Tenforde MW, Kim SS, Lindsell CJ,Billig Rose E, Shapiro NI, Files DC,et al. Symptom Duration and Risk Factors for Delayed Return to Usual Health Among Outpatients with COVID-19 in a Multistate Health Care Systems Network — United States, March–June 2020. MMWR Morb Mortal Wkly Rep. 2020;69(30):993–8.
7. Ahmed H, Patel K, Greenwood DC, Halpin S, Lewthwaite P, Salawu A, etal. Long-term clinical outcomes in survivors of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) coronavirus outbreaks after

Online ISSN 2623-2723
Print ISSN: 2338-0373
Jurnal Widya Medika Vol. 9 No 2 October 2023
https://doi.org/10.33508/jwm.v9i2.5061

hospitalisation or ICU admission: A systematic review and meta-analysis. J Rehabil Med. 2020;52(5).

8. Moldofsky H, Patcai J. Chronic widespread musculoskeletal pain, fatigue, depression and disorderedsleep in chronic post-SARS syndrome; a case-controlled study. BMC Neurol. 2011;11.
9. Lee SH, Shin HS, Park HY, Kim JL, Lee JJ, Lee H, et al. Depression as a mediator of chronic fatigue and post-traumatic stress symptoms in middle east respiratory syndrome survivors. Psychiatry Investig. 2019;16(1):59–64.
10. Greenhalgh T, Knight M, A'Court C, Buxton M, Husain L. Management of post-acute covid-19 in primary care. BMJ. 2020;370.
11. Datta SD, Talwar A, Lee JT. A Proposed Framework and Timeline of the Spectrum of Disease Due to SARS-CoV-2 Infection. JAMA. 2020 Nov;
12. Nalbandian A, Sehgal K, Gupta A, Madhavan M V., McGroder C, Stevens JS, et al. Post-acute COVID-19 syndrome. Nat Med [Internet]. 2021;27(4):601–15. Available from: http://dx.doi.org/10.1038/s41591-021-01283-z
13. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus : implications for virus origins and receptor binding. Lancet. 2020;395(10224):565–74.
14. Hu B, Guo H, Zhou P, Shi ZL. Characteristics of SARS-CoV-2 and COVID-19. Nat Rev Microbiol [Internet]. 2021;19(3):141–54. Available from: http://dx.doi.org/10.1038/s41579-020-00459-7
15. Shang J, Ye G, Shi K, Wan Y, Luo C, Aihara H, et al. Structural basis of receptor recognition by SARS-CoV-2. Nature [Internet]. 2020;581(7807):221–4. Available from: http://dx.doi.org/10.1038/s41586-020-2179-y
16. Wrobel AG, Benton DJ, Xu P, Roustan C, Martin SR, Rosenthal PB, et al. SARS-CoV-2 and bat RaTG13 spike glycoprotein structures inform on virus evolution and furin-cleavage effects. Nat Struct Mol Biol. 2020;27(8):763–7.

17. Needham DM, Dinglas VD, Morris PE, Jackson JC, Hough CL, Mendez-Tellez PA, et al. Physical and cognitive performance of patients with acute lung injury 1 year after initial trophic versus full enteral feeding EDEN Trial follow-up. Am J Respir Crit Care Med. 2013;188(5):567–76.
18. Inoue S, Hatakeyama J, Kondo Y, Hifumi T, Sakuramoto H, Kawasaki T, et al. Post-intensive care syndrome: its pathophysiology, prevention, and future directions. Acute Med Surg. 2019;6(3):233–46.
19. Kress JP, Hall JB. ICU-Acquired Weakness and Recovery from Critical Illness. N Engl J Med. 2014;370(17):1626-35.
20. Hosey MM, Needham DM. Survivorship after COVID-19 ICU stay. Nat Rev Dis Prim [Internet]. 2020;6(1). Available from: http://dx.doi.org/10.1038/s41572-020-0201-1
21. Pandharipande PP, Girard TD, Jackson JC, Morandi A, Thompson JL, Pun BT, et al. Long-Term Cognitive Impairment after Critical Illness. N Engl J Med. 2013;369(14):1306–16.
22. Menges D, Ballouz T, Anagnostopoulos A, Aschmann HE, Domenghino A, Fehr JS, et al. Burden of post-COVID-19 syndrome and implications for healthcare service planning: A population-based cohort study. PLoS One. 2021;16(7 July):1–19.
23. Davis HE, Assaf GS, McCorkell L, Wei H, Low RJ, Re'em Y, et al. Characterizing long COVID in an international cohort: 7 months of symptoms and their impact. eClinicalMedicine. 2021;38.
24. Sieck GC. Physiology in perspective: Aging and underlying pathophysiology. Physiology. 2017;32(1):7–8.
25. Dery Puspitasari A, Ardianto N, Aina L, Sicilia Kundiman EM, Zahra F, Satryo O, et al. Factors Associated with Long-Term COVID-19: An Observational Cross-Sectional Study in Indonesia. Warmadewa Med Journal) [Internet]. 2022;7(1):2527– 4627. Available from: https://doi.org/10.22225/wmj.7.1.4

Online ISSN 2623-2723
Print ISSN: 2338-0373
Jurnal Widya Medika Vol. 9 No 2 October 2023
https://doi.org/10.33508/jwm.v9i2.5061

784.33-39

26. Fernández-de-las-Peñas C, Torres-Macho J, Velasco-Arribas M, Plaza-Canteli S, Arias-Navalón JA, Hernández-Barrera V, et al. Preexisting hypertension is associatedwith a greater number of long-term post-COVID symptoms and poor sleep quality: a case–control study. J Hum Hypertens. 2022;36(6):582–4.
27. Galal I, Hussein AARM, Amin MT, Saad MM, Zayan HEE, Abdelsayed MZ, et al. Determinants of persistent post-COVID-19 symptoms: value of anovel COVID-19 symptom score. Egypt J Bronchol. 2021;15(1).
28. Azevedo RB, Botelho BG, Hollanda JVG de, Ferreira LVL, Junqueira de Andrade LZ, Oei SSML, et al. Covid-19 and the cardiovascular system: a comprehensive review. J Hum Hypertens [Internet]. 2021;35(1):4– Available from: http://dx.doi.org/10.1038/s41371-020-0387-4
29. Al-Aly Z, Bowe B, Xie Y. Long COVID after breakthrough SARS-CoV-2 infection. Nat Med. 2022;28(July).
30. Crook H, Raza S, Nowell J, Young M, Edison P. Long covid - Mechanisms, risk factors, and management. BMJ. 2021;374:1–18.
31. Dennis A, Wamil M, Alberts J, Oben J, Cuthbertson DJ, Wootton D, et al. Multiorgan impairment in low-risk individuals with post-COVID-19 syndrome: A prospective, community-based study. BMJ Open. 2021;11(3):2–7.
32. Wostyn P. COVID-19 and chronic fatigue syndrome: Is the worst yet to come? Med Hypotheses [Internet]. 2021;146(December 2020):110469. Available from: https://doi.org/10.1016/j.mehy.2020.110469
33. Schneider EC. Failing the Test — The Tragic Data Gap Undermining the U.S. Pandemic Response. N EnglJ Med. 2020;383(4):299–302.
34. Mo X, Jian W, Su Z, Chen M, Peng H, Peng P, et al. Abnormal pulmonary function in COVID-19 patients at time of hospital discharge. Eur Respir J. 2020;55(6):2–5.
35. Needham EJ, Chou SHY, Coles AJ, Menon DK. Neurological Implications of COVID-19 Infections.Neurocrit Care [Internet].

2020;32(3):667–71. Available from: https://doi.org/10.1007/s12028-020-00978-4

36. Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, et al. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. The Lancet Psychiatry [Internet]. 2020;7(7):611–27. Available from: http://dx.doi.org/10.1016/S2215-0366(20)30203-0
37. Petersen MS, Kristiansen MF, Hanusson KD, Danielsen ME, Á Steig B, Gaini S, et al. Long COVID in the Faroe Islands: A Longitudinal Study among Nonhospitalized Patients. Clin Infect Dis. 2021;73(11):E4058–63.
38. Lopez-Leon S, Wegman-Ostrosky T, Perelman C, Sepulveda R, Rebolledo PA, Cuapio A, et al. More than 50 long-term effects of COVID-19: a systematic review and meta-analysis. Sci Rep [Internet]. 2021;11(1):1–12. Available from: https://doi.org/10.1038/s41598-021-95565-8
39. Carvalho-Schneider C, Laurent E, Lemaignen A, Beaufils E, Bourbao-Tournois C, Laribi S, et al. Follow-up of adults with noncritical COVID-19 two months after symptom onset. Clin Microbiol Infect. 2021;27(2):258–63.
40. Sapkota HR, Nune A. Long COVID from rheumatology perspective — a narrative review. Clin Rheumatol [Internet]. 2022;41(2):337–48. Available from: https://doi.org/10.1007/s10067-021-06001-1
41. Anker MS, Landmesser U, von Haehling S, Butler J, Coats AJS, Anker SD. Weight loss, malnutrition, and cachexia in COVID-19: facts and numbers. J Cachexia Sarcopenia Muscle. 2021;12(1):9–13.
42. Blackett JW, Wainberg M, Elkind MSV, Freedberg DE. Potential Long Coronavirus Disease 2019 Gastrointestinal Symptoms 6 MonthsAfter Coronavirus Infection Are Associated With Mental Health Symptoms. Gastroenterology. 2022;162(2):648-650.e2.
43. Aiyegbusi OL, Hughes SE, Turner G,Rivera SC, McMullan C, Chandan

Online ISSN 2623-2723
Print ISSN: 2338-0373
Jurnal Widya Medika Vol. 9 No 2 October 2023
https://doi.org/10.33508/jwm.v9i2.5061

JS, et al. Symptoms, complications and management of long COVID: a review. J R Soc Med. 2021;114(9):428–42.

44. Song WJ, Hui CKM, Hull JH, Birring SS, McGarvey L, Mazzone SB, et al. Confronting COVID-19-associated cough and the post-COVID syndrome: role of viral neurotropism, neuroinflammation, and neuroimmune responses. Lancet Respir Med [Internet]. 2021;9(5):533–44. Available from: http://dx.doi.org/10.1016/S2213-2600(21)00125-9
45. Michelen M, Manoharan L, Elkheir N, Cheng V, Dagens A, Hastie C, et al. Characterising long COVID: A living systematic review. BMJ Glob Heal. 2021;6(9):1–12.
46. Xu H, Zhong L, Deng J, Peng J, Dan H, Zeng X, et al. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. Int J Oral Sci [Internet]. 2020;12(1):1–5. Available from: http://dx.doi.org/10.1038/s41368-020-0074-x
47. Small DM, Prescott J. Odor/taste integration and the perception of flavor. Exp Brain Res. 2005;166(3–4):345–57.
48. Najafloo R, Majidi J, Asghari A, Aleemardani M, Kamrava SK, Simorgh S, et al. Mechanism of Anosmia Caused by Symptoms of COVID-19 and Emerging Treatments. ACS Chem Neurosci. 2021;12(20):3795–805.
49. Pizarro-Pennarolli C, Sánchez-Rojas C, Torres-Castro R, Vera-Uribe R, Sanchez-Ramirez DC, Vasconcello-Castillo L, et al. Assessment of activities of daily living in patients post COVID-19: A systematic review. PeerJ. 2021;9:1–17.