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Brazilian pulmonology guidelines on Delphi panel for post-coronavirus disease 2019

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The Guidelines Project, an initiative of the Brazilian Medical Association, aims to combine information from the medical field to standardize how to conduct, and to assist in the reasoning and decision-making of doctors. The information provided by this project must be critically evaluated by the physician responsible for the conduct that will be adopted, depending on the conditions and the clinical condition of each patient.
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BACKGROUND

The coronavirus disease 2019 (COVID-19) pandemic has had a direct impact on health care systems worldwide. By February 1, 2023, more than 753 million people had been infected with the virus, and more than 6.8 million deaths had occurred[1]. These death rates are related to the spread of the virus and are currently more common in places where vaccination rates are low. The worldwide incidence still fluctuates, with over 5 million cases per week. Failure to control viral transmission facilitates the occurrence of new mutations and immune escape, which may determine the persistence of the disease for a much longer period than expected[1].

An additional problem is the high prevalence of patients with persistent signs and symptoms after acute COVID-19 infection[2-4]. This condition involves several organs with different severities related to the pathophysiological mechanisms of viral infection[5,6]. Cellular penetration through linkage with angiotensin-converting enzyme (ACE)-2 receptors, which are present in different cell types, can cause damage and lead to the perpetuation of inflammatory processes[7,8]. Additionally, it has been hypothesized that an autoimmune process with an exaggerated innate immune response and activation and persistence of cytokine release may be involved in the pathophysiology of this long-term syndrome. The cross-reactivity of specific antibodies against SARS-CoV-2 with host proteins, resulting in autoimmunity, has been reported. In fact, patients with severe COVID-19 may present elevated serum levels of inflammatory markers, such as interleukins 1, 6, and 1-beta, granulocyte colony-stimulating factor, and alpha tumor necrosis factor. Thus, respiratory, cardiocirculatory, gastrointestinal, hepatic, renal, and other systems can be affected directly and perpetually, even when the acute infection is resolved[7-10].

Other theories have been proposed, which may explain the sequelae of organs during acute infections. Some findings show that patients with COVID-19 with persistent symptoms may stock the virus in various potential tissue reservoirs throughout the body, which may not be identified by nasopharyngeal swabs[11]. Another theory suggests that delayed viral clearance is secondary to immune exhaustion, which may lead to chronic inflammation and inadequate tissue repair. Mitochondrial dysfunction, impaired immunometabolism, and changes in the microbiome may also occur and may be involved in the persistence of symptoms[9].

In this context, the incomparable and long-term impact of signs and symptoms may lead to devastating repercussions, with a reduction in the quality of life, professional performance, and exercise capacity. Evidence from the literature still shows great difficulty and variability in defining this clinical condition, as it is not possible to clearly define whether the long-term manifestations are caused directly or indirectly by the

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virus. In addition, the pathophysiological mechanisms related to these conditions are not yet fully defined[12,13].

The time after acute infection and terms used to define these long-term conditions are also still variable. The National Institute for Health and Care Excellence (NICE) defines long-term COVID-19 as a symptom that continues or develops after COVID-19 infection, which cannot be explained by an alternative diagnosis[12]. This term includes ongoing symptomatic COVID-19 4–12 weeks post-infection and post-COVID-19 syndrome beyond 12 weeks post-infection. On the contrary, the National Institutes of Health (NIH) and the CDC define long COVID-19 as a condition of sequelae that extend beyond 4 weeks after the initial infection[13]. Thus, there is still a need for a more accurate and more standardized definition for all specialists to uniformly use in clinical practice and research. Therefore, we need to understand the best denomination for these conditions to be used, i.e., post-COVID-19, long COVID-19, post-COVID-19 syndrome, or chronic COVID-19[14].

The present study aimed to identify, through the opinion and knowledge of national pulmonologist specialists, the most commonly used nomenclature, symptomatic manifestations, and prevalence of the main symptoms in patients with post-COVID-19 involvement. In this way, national educational actions can be programmed so that health professionals and systems can receive information that can be applied to each local reality.

METHODS

This study was a Delphi consensus-seeking interactive survey that evaluated the impressions of Brazilian pulmonologist experts. The Delphi method is a structured communication technique that was originally developed as a systematic, interactive, and forecasting method that relies on a panel of experts[15]. The participants of this survey on post-COVID-19 conditions included only active members of the Brazilian Thoracic Society. We aimed to represent clinicians with expertise in evaluating patients with post-COVID-19 conditions and their prevalence. There were no specific exclusion criteria for participants. The survey began with a statement explaining the objective of the project, and the answers to the survey implied consent to participate. The participants were allowed to withdraw at any time.

The participants were obtained from the internal database of the Brazilian Thoracic Society after the internal approval of the project. They were invited via an online recruitment letter requiring participation and engagement, along with an explanation of the study objectives, instructions, and outputs. This invitation was extended two times over an interval of 2 months.

The survey was performed using RedCap and contained listed options regarding terms (long COVID-19 and chronic COVID-19) and time (3 or 10 weeks) to consider in the definition, which were kept as broad and comprehensive as possible (Supplementary File). We previously used a list of terms identified in the literature to obtain information and develop the survey (search strategy: long-COVID OR long-haul COVID OR post-acute COVID syndrome OR persistent COVID-19 OR post-acute COVID-19 syndrome OR long-hauler COVID OR long COVID OR post-acute sequelae of SARS-CoV-2 infection OR long-haul COVID OR chronic COVID syndrome).

The domains contained information on the time of experience related to pulmonology assistance, acute COVID-19 and post-COVID-19 management experience, recognition of signs and symptoms related to post-COVID-19, and their prevalence. The survey responses were anonymous and tabulated according to their frequency.

All of the questions were evaluated on a nine-point Likert scale, from 1 (least important/non-agreement) to 9 (most important/high agreement), and the participants were asked to choose the level of importance for each variable in the definition. We considered a Likert scale score of ≥7 or ≤3 as a significant concordant consensus. The participants had the opportunity to add comments to an open question that evaluated their best interpretation of post-COVID-19 infection.

The sample size estimation considered the responses of at least 30 participants from the same panel[15]. Statistical analysis provided a summary of the group's view on each item, with calculated median, mean, and percentage scores for each statement to provide an indication of the level of agreement among the respondents. The description and frequency of qualitative answers were used to demonstrate the experts' best definitions of post-COVID-19 infection terms.

RESULTS

On December 15, 2022, we closed the survey capture, which was initially evaluated by 90 participants. Six participants declined participation, 15 gave consent without answering, and 69 responded to the survey. Among 69 respondents, 47.7% were females, the mean age was 46.5±11.9 years, only 1 participant affirmed being an infectious disease specialist, and 54.5% had between 6 and 29 years of pulmonology practice experience while 25.8% had <6 years of experience. Only 13.0% of the participants did not assist patients with acute COVID-19 in the last 6 months, and only three (4.3%) did not assist patients with post-COVID-19 infection. In total, 58 (84%) participants agreed with the recognition of a pathological condition of post-COVID-19 infection.

Additionally, 24 (41%) participants gave scores ≥7 on whether they agreed they were uncomfortable in treating patients with post-COVID-19, and 20 (34%) participants (Likert ≤3) were comfortable attending to such patients.

The agreement scores for the time to define long COVID-19 were higher with 10 weeks at 7.0 (1.8–9.0) compared to 3 weeks at 6.0 (1.0–9.0). The agreement score for chronic COVID-19 time definitions was moderately low in both times used, with 3 and 10 weeks at 4.0 (1.0–9.0) and 6.5 (1.0–9.0), respectively. We observed that an equal number of participants agreed or did not agree regarding the difference between the definition of long COVID-19 (29 participants) and chronic COVID-19 (29 participants).

Regarding the qualitative definition for post-COVID-19 conditions, 34 (49%) participants suggested the term "long COVID-19," followed by 18 (26%) with "post-COVID-19 syndrome," 3 (4%) with "chronic COVID-19," and 2 (2%) with "sequelae post-COVID-19." According to the duration to define post-COVID-19 conditions, 24 (34%) participants considered after 3 months and 20 (28%) considered after 4 weeks. One participant (1%) considered 15 days; four (5%) considered 3 weeks; two (2%) considered 2 months; two (2%) considered 6 months; and one (1%) considered several months.

The agreement of possible risk factors for the post-COVID-19 condition is presented in Table 1. We observed that smoking, age >60 years, obesity, previous diagnosis of lung disease, cardiovascular disease, kidney disease, diabetes mellitus, use of mechanical ventilation, and high-flow oxygen presented an agreement with a median Likert score of ≥7 points.

The agreement on the recognition of each sign or symptom related to the post-COVID-19 condition is shown in Table 2. The agreement with a median Likert score of ≥7 points was fatigue, cough, anosmia, anxiety/depression, loss of concentration, dysgeusia, headache, loss of memory, loss of peripheral muscle function, loss of strength, myalgia, autonomic dysfunction, and telogen effluvium. The concordant non-signs

Table 1. Agreement of possible risk factors of the post-coronavirus disease 2019 condition according to Likert score (concordant agreement considered median of ≥7 or ≤3).

	Median (interquartile interval) n=53
Allergy	4 (1.5–8)
Age >60 years	7 (6–9)
Cardiovascular disease	7 (5–8)
Diabetes mellitus	7(5–8)
High flow oxygen	8 (6–9)
Hypertension	6 (4–8)
Inflammatory bowel disease	5 (2–7)
Kidney disease	7 (5–9)
Liver disease	6 (4–7)
Mechanical ventilation	8 (7–9)
Obesity	8 (6–9)
Peripheric vascular disease	5 (3–7)
Respiratory disease	7 (6–9)
Rheumatologic disease	6 (4–8)
Smoking	7 (5–8)
Unvaccinated/incomplete vaccine – COVID-19	8 (7–9)

Table 2. Agreement of signs and symptoms related to the post-coronavirus disease 2019 condition according to Likert score (concordant agreement considered median of ≥7 or ≤3).

	Median (interquartile interval) n=57
Ageusia/Dysgeusia	7 (5–9)
Anorexia	4 (2–7)
Anosmia	8 (6–9)
Anxiety/Depression	8 (7–9)
Arthralgia	6 (4–7)
Auditive loss	4 (2–5)
Autonomic dysfunction	7 (5–7)
Chills	2 (1–5)
Communication abnormality	6 (4–8)
Cough	8 (7–9)
Diarrhea	3 (1.5–5)
Dizziness	4 (2–6.8)
Fatigue	9 (8–9)
Fever	2 (1–4)
Functional loss	7 (5–8.5)
Headache	7 (5–8.5)
Memory loss	8 (6–9)
Mental concentration abnormality	8 (7–9)
Myalgia	7 (5–8)
Rhinitis	3 (5.5–7.8)
Sicca syndrome	3.5 (1–5)
Sinusitis	5 (2–7)
Strength loss	7 (5–9)
Skin lesions	4 (2–5)
Telogen effluvium	7 (3–9)
Tremor	4 (2–6)
Thoracic pain	5 (3.5–7)
Visual abnormality	4 (2–6)
Voice abnormality	5 (3–7)

or non-symptoms presented in the post-COVID-19 condition with a median Likert score of ≤3 points were chills, fever, and diarrhea.

The agreement on the prevalence of each sign or symptom is shown in Table 3. The agreement with a high concordant Likert score of ≥7 points was fatigue, cough, dysgeusia, anxiety/depression, loss of concentration, and loss of memory. The agreement with a high concordance of infrequent signs or symptoms (Likert score of ≤3 points) was chills, fever, skin lesions, tremors, visual loss, auditive loss, dizziness, Sicca syndrome, and diarrhea.

Table 3. Agreement of sign and symptom prevalence related to the post-coronavirus disease 2019 condition according to Likert score (concordant agreement considered median of ≥7 or ≤3).

	Median (interquartile interval) n=53
Ageusia/Dysgeusia	7 (5–8)
Anorexia	4 (1.5–5.5)
Anosmia	6 (5–8)
Anxiety/Depression	8 (7–9)
Arthralgia	5 (3–6.5)
Auditive loss	2 (1–4)
Autonomic dysfunction	6 (5–8)
Chills	2 (1–4)
Communication abnormality	4 (2–6.5)
Cough	8 (6–9)
Diarrhea	2(1–4)
Dizziness	3 (2–5)
Fatigue	9 (8–9)
Fever	2 (1–3)
Functional loss	6 (4–8)
Headache	6 (5–7)
Memory loss	8 (6–8)
Mental concentration abnormality	8 (6–8.5)
Myalgia	6 (4–8)
Rhinitis	4 (2–7)
Sicca syndrome	2 (1–4)
Sinusitis	4 (2–6.5)
Strength loss	6 (4–8)
Skin lesions	2 (1.5–5)
Telogen effluvium	6 (3–8.5)
Tremor	3 (1–5)
Thoracic pain	4 (2–6)
Visual abnormality	3 (1–4.5)
Voice abnormality	4 (1–5)

DISCUSSION

A large proportion of patients continue to experience health-related consequences after acute COVID-19 infection, regardless of disease severity, and this number continues to increase, with a heavy impact on health care systems and work and educational activities[12,16]. Even non-hospitalized patients with mild COVID-19 during the acute phase may develop post-COVID-19 syndrome[13,16]. Available studies on the long-term outcomes of COVID-19 infections are heterogeneous. Different names have been used to define the occurrence of long-term symptoms secondary to COVID-19, such as long COVID-19, post-acute COVID-19 syndrome, chronic COVID-19, long haul COVID-19, and post-COVID-19 condition, which reinforces the lack of a unified definition[3,13].

The main findings of this Delphi study about the post-COVID-19 condition, which were based on the impression and knowledge of Brazilian pulmonologists, were as follows: (1) the vast majority of the participants attended to patients with acute and post-COVID-19 infection; (2) the majority recognized the existence of the post-COVID-19 condition; (3) several respondents were uncomfortable attending to patients with post-COVID-19 condition; (4) there was no profuse agreement regarding the time point in the follow-up that defines chronic and long COVID-19; (5) there was no consensus in the terms used to define the occurrence of long-term symptoms secondary to COVID-19; (6) risk factors for the post-COVID-19 condition were smoking, age >60 years, obesity, previous diagnosis of lung disease, cardiovascular disease, kidney disease, diabetes mellitus, the use of mechanical ventilation, and high-flow oxygen; and (7) clinical manifestations of the post-COVID-19 condition were fatigue, cough, anosmia, anxiety/depression, loss of concentration, dysgeusia, headache, loss of memory, loss of function, loss of strength, myalgia, autonomic dysfunction, and telogen effluvium.

There is still no consensus on the definition and time points of post-COVID-19 conditions[12]. The CDC defined post-COVID-19 conditions as a wide range of new, returning, or ongoing health problems experienced by patients with COVID-19 4 weeks after infection[13]. The NICE guidelines and an international Delphi consensus panel defined post-COVID-19 condition for adults as the presence of symptoms for at least 3 months from the onset of probable or confirmed SARS-CoV-2 infection that cannot be explained by an alternative diagnosis[12,14]. Onset of new symptoms may be identified

after initial recovery from an acute COVID-19 episode or persist from the initial illness and may fluctuate or relapse over time[12,14]. The heterogeneous definitions and time points in the literature regarding post-COVID-19 conditions are similar to the results of our Brazilian Delphi study, since there was no consensus among our participants about a standardized term and time points to define this situation.

In this post-COVID-19 scenario, patients may present with several symptoms involving multiple organs or even autoimmune conditions, with various durations[8,13,17]. In a study from Germany, the main manifestations of post-COVID-19 syndrome 4 and 7 months after the acute infection were anosmia (12%), ageusia (11%), fatigue (10%), and dyspnea (9%), and anosmia (15%), fatigue (15%), and dyspnea (14%), respectively[16]. In a systematic review and meta-analysis, Alkodaymi et al. demonstrated that the most common symptoms after acute respiratory syndrome due to COVID-19 were fatigue (32%), dyspnea (25%), and sleep disorder (24%) from 3 to <6 months; effort intolerance (45%), fatigue (36%), and sleep disorders from 6 to <9 months; fatigue (37%) and dyspnea (21%) from 9 to <12 months; and fatigue (45%) ≥12 months[4]. Additionally, according to the NICE guidelines, fatigue (47%), sleep disturbances (36%), and anxiety or depression (23%) were the most common symptoms ≥12 weeks after COVID-19 diagnosis[12]. Our study demonstrated some similarities between the clinical manifestations of post-COVID-19 condition in previous studies, since our participants reported that fatigue, anosmia, anxiety/depression, and dysgeusia were common in this context.

The estimates of the prevalence of post-COVID-19 conditions vary widely among studies[17,18]. In a systematic review and meta-analysis by Chen et al., the prevalence of the post-COVID-19 condition at least 28 days after acute infection was 43% (54% in hospitalized and 34% in non-hospitalized patients)[3]. This condition may develop in children and adolescents of different ages and in patients with different severities during the acute phase[3,13,16,17]. Risk factors for long COVID-19 include female sex; the presence of comorbidities such as diabetes, asthma, connective tissue disorders; obesity; smoking; lower income; more symptoms during the acute phase; higher severity during the acute infection, especially those who were hospitalized or needed ICU care; and people who did not get a COVID-19 vaccine[3,12,16,17]. Several risk factors for the post-COVID-19 condition demonstrated in previous studies, such as smoking, obesity, the presence of comorbidities, and higher severity during acute infection, were also reported by the participants of our study.

Additionally, the mechanism of persistent COVID-19 infection, especially in immunosuppressed individuals is still unknown. Persistent infection can lead to the development of a range of disease severities with persistent symptoms for a long time, and this condition may be more relevant in defining the chronic COVID-19 condition[11]. However, it is a challenge to propose continuous virus identification and quantification in these scenarios to determine the relationship between persistent symptoms and viral infections, and we may still confuse different post-COVID-19 infections in the same way.

This Delphi study had some limitations that need to be addressed. First, the study population was restricted to pulmonologists from Brazil. However, they are representative of the entire country, as they are registered with the Brazilian Thoracic Society. Although the number of responses reached was sufficient for the consistency of the results, the response rate was low despite the questionnaire being sent to all the members of the society. Moreover, the questionnaire was developed only in Portuguese, which limited its applicability to other languages.

RECOMMENDATIONS

- Long COVID-19 is the term to be used for post-COVID-19 condition after 10 weeks.
- Chronic COVID-19 is the term to be used for persistent COVID-19 infection after 10 weeks.
- Smoking, age >60 years, obesity, previous diagnosis of lung disease, cardiovascular disease, kidney disease, diabetes mellitus, the use of mechanical ventilation, and high flow oxygen are considered risk factors to develop long COVID-19.
- Fatigue, cough, anosmia, anxiety/depression, loss of concentration, dysgeusia, headache, loss of memory, function, and strength, myalgia, autonomic dysfunction, and telogen effluvium are considered the main long-COVID-19 symptoms.

CONCLUSIONS

This Delphi study demonstrated the need of continuous medical educational program offered by different institutions to amplify the knowledge of long COVID-19, including clinical manifestations and risk factors. It is urgent to standardize the terms and time points in the follow-up that define post-COVID-19 conditions in order to properly determine its prevalence, best method of prevention and management, and impact on the health care systems. This concept needs to be continuously reviewed and updated based on the availability of more information.

AUTHORS' CONTRIBUTIONS

SET: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **WMB:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **BGB:** Data curation, Formal Analysis, Investigation, Methodology, Project administration, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **IG:** Data curation, Formal Analysis, Investigation, Project administration, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **HAB:** Data curation, Investigation, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. **ANB:** Writing – review & editing.

REFERENCES

1. World Health Organization. Report of the WHO global situation. [cited on Feb 22, 2023] Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
2. Bell ML, Catalfamo CJ, Farland LV, Ernst KC, Jacobs ET, Klimentidis YC, et al. Post-acute sequelae of COVID-19 in a non-hospitalized cohort: results from the Arizona CoVHORT. PLoS One. 2021;16(8):e0254347. https://doi.org/10.1371/journal.pone.0254347
3. Chen C, Haupert SR, Zimmermann L, Shi X, Fritsche LG, Mukherjee B. Global prevalence of post-coronavirus disease 2019 (COVID-19) condition or long COVID: a meta-analysis and systematic review. J Infect Dis. 2022;226(9):1593-607. https://doi.org/10.1093/infdis/jiac136.
4. Alkodaymi MS, Omrani OA, Fawzy NA, Shaar BA, Almamlouk R, Riaz M, et al. Prevalence of post-acute COVID-19 syndrome symptoms at different follow-up periods: a systematic review and meta-analysis. Clin Microbiol Infect. 2022;28(5):657-66. https://doi.org/10.1016/j.cmi.2022.01.014
5. Datta SD, Talwar A, Lee JT. A proposed framework and timeline of the spectrum of disease due to SARS-CoV-2 infection: illness beyond acute infection and public health implications. JAMA. 2020;324(22):2251-2. https://doi.org/10.1001/jama.2020.22717
6. 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. 2021;397(10270):220-32. https://doi.org/10.1016/S0140-6736(20)32656-8
7. Crook H, Raza S, Nowell J, Young M, Edison P. Long covid-mechanisms, risk factors, and management. BMJ. 2021;374:n1648. https://doi.org/10.1136/bmj.n1648
8. Tanni SE, Fabro AT, Albuquerque A, Ferreira EVM, Verrastro CGY, Sawamura MVY, et al. Pulmonary fibrosis secondary to COVID-19: a narrative review. Expert Rev Respir Med. 2021;15(6):791-803. https://doi.org/10.1080/17476348.2021.1916472
9. Castanares-Zapatero D, Chalon P, Kohn L, Dauvrin M, Detollenaere J, Maertens Noordhout C, et al. Pathophysiology and mechanism of long COVID: a comprehensive review. Ann Med. 2022;54(1):1473-87. https://doi.org/10.1080/07853890.2022.2076901
10. Silva Andrade B, Siqueira S, Assis Soares WR, Souza Rangel F, Santos NO, Dos Santos Freitas A, et al. Long-COVID and post-COVID health complications: an up-to-date review on clinical conditions and their possible molecular mechanisms. Viruses. 2021;13(4):700. https://doi.org/10.3390/v13040700
11. Choudhary MC, Crain CR, Qiu X, Hanage W, Li JZ. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) sequence characteristics of coronavirus disease 2019 (COVID-19) persistence and reinfection. Clin Infect Dis. 2022;74(2):237-45. https://doi.org/10.1093/cid/ciab380
12. National Institute for Health and Care Excellence. COVID-19 rapid guideline: managing the long-term effects of the COVID-19 NICE guideline; 2020. Available from: https://www.nice.org.uk/guidance/ng188
13. Center of Disease Control and Prevention. Long COVID or Post-COVID conditions. Available from: https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html
14. Soriano JB, Murthy S, Marshall JC, Relan P, Diaz JV; WHO Clinical Case Definition Working Group on Post-COVID-19 Condition. A clinical case definition of post-COVID-19 condition by a Delphi consensus. Lancet Infect Dis. 2022;22(4):e102-7. https://doi.org/10.1016/S1473-3099(21)00703-9
15. Villiers MR, Villiers PJ, Kent AP. The Delphi technique in health sciences education research. Med Teach. 2005;27(7):639-43. https://doi.org/10.1080/13611260500069947
16. Augustin M, Schommers P, Stecher M, Dewald F, Gieselmann L, Gruell H, et al. Post-COVID syndrome in non-hospitalised patients with COVID-19: a longitudinal prospective cohort study. Lancet Reg Health Eur. 2021;6:100122. https://doi.org/10.1016/j.lanepe.2021.100122
17. Davies HE, McCornell L, Vogel JM, Topol EJ. Long Covid: major findings, mechanisms and recommendations. Nat Rev Microbiol. 2023;21(3):133-46. https://doi.org/10.1038/s41579-022-00846-2.
18. Munblit D, Nicholson T, Akrami A, Apfelbacher C, Chen J, Groote W, et al. A core outcome set for post-COVID-19 condition in adults for use in clinical practice and research: an international Delphi consensus study. Lancet Respir Med. 2022;10(7):715-24. https://doi.org/10.1016/S2213-2600(22)00169-2