Response to "Was the rate of Long Covid as high as 45%–a scary report with flaw"

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We would like to thank Dr Yao and colleagues for their interest in our systematic review and for taking the time to express their concerns, which were listed in four key questions.

In relation to point one, the concern related to the calculation of a different and lower prevalence estimate than reported in our systematic review based on re-calculation of data presented in the supplementary material (Table S3). As stated in the methods section of our paper, symptom prevalence data from individual studies were pooled and meta-analysed using a random effects model. When calculating an average this method weights the pooled estimate by study size, and therefore different prevalence estimates will be attained by simply totalling numbers across studies to calculate a simple percentage (as per the data provided by Yao and colleagues). When calculating a pooled effect size, random effects meta-analysis assigns larger studies with more precise effect size estimates greater weight than smaller studies with less reliable estimates.[1] The formula for random effects models can be found in full in a 2010 paper by Borenstein et al.[2] When we report in our study "With an average study follow-up time of 126 days, the pooled prevalence of COVID-19 survivors experiencing at least one unresolved symptom, regardless of hospitalisation status, was 45%"? We have used random effects meta-analyses to calculate the pooled prevalence of experiencing at least one resolved symptom across all studies, and then we have calculated the mean follow-up time across all studies.

In addition to this, the data used as the basis of Yao and colleagues' re-analysis – 'at least one or more symptom' was not presented in Table S3. When creating this descriptive table, we provided symptom specific data in the table. Following their comment, we have amended Table S3 to remove this column to avoid any confusion. To provide further clarity we have presented the data extracted and used in our review (i.e. study values) for the three exemplar studies identified by Yao and colleagues (Table 1). Two of the three papers (O'Keefe et al. and Tessitore et al.) did not report 'at least one symptom at follow up' the data presented by Yao and colleagues in their Table 1 relates to individual symptoms by the corresponding studies and therefore would not have been extracted. We would like to thank the authors for highlighting that Venturelli et al., did report data for 'At Least 1 Symptom at Follow-up' (i.e., "51.4% still complained of symptoms). This symptom was not extracted in our original analysis. Adding this data point did not change the associated pooled estimates, but the CI changed marginally; 52.6 (95% CI: 43.5, 61.6) to 52.6 (95% CI: 43.6 to 61.5). We would like to take this opportunity to highlight that a 10% random sample of the extracted data was cross-checked by a second reviewer.

We would also like to note that although Dr Yao and colleagues suggest our prevalence estimates differ from a credible recent publication, the publication that they reference is not a meta-analysis. When compared to other meta-analyses, our prevalence estimates are similar.[3,4] Specifically, the study by Chen and colleagues found a pooled prevalence of 49% at 120 days which very similar to our finding of 45% at a mean follow-up 126 days.[3] Additionally, as the authors acknowledge in their paper, a key limitation of the study referred to is that coded symptom data in primary records is likely to underrepresent the true symptom burden experienced by individuals with persistent symptoms. Moreover, the authors explicitly state that "the symptom data we used for the study thus cannot be used to make inferences about the absolute prevalence of these symptoms", as has been done by Yao and colleagues.

In point two, Yao and colleagues discussed the impact of follow-up duration on prevalence estimates. As stated above, a meta-analysis was used which weights study estimates depending on sample size. A simple percentage based on total numbers of patients across studies will result in a different estimate. In addition, the prevalence estimates presented in our paper relate to the average follow-up time of all studies. We did not

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Author	Total	With symptom	Males (%)	Age	Hospital status	Time to FU	FU time point	Continent	Symptom
O'Keefe (A)[a]	304	16	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Cough
O'Keefe (A)	304	7	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Headache/Migraine
O'Keefe (A)	304	10	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Exertional Breathlessness
O'Keefe (A)	304	4	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Sore Throat
O'Keefe (A)	304	7	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Chest Pain/Tightness
O'Keefe (A)	304	4	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Abdominal Pain
O'Keefe (A)	304	7	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Joint Pain
O'Keefe (A)	304	10	31.8	45.7	Non-hospitalised	≥30	Symptom Onset	North America	Nasal Symptoms
Tessitore	165	10	62	58	Hospitalised	365	Discharge	Europe	Muscles Weakness/Pain
Tessitore	165	1	62	58	Hospitalised	365	Discharge	Europe	Fever
Tessitore	165	4	62	58	Hospitalised	365	Discharge	Europe	Gastro-intestinal Problems
Tessitore	165	45	62	58	Hospitalised	365	Discharge	Europe	Fatigue
Tessitore	165	1	62	58	Hospitalised	365	Discharge	Europe	Sputum
Tessitore	165	8	62	58	Hospitalised	365	Discharge	Europe	Headache/Migraine
Tessitore	165	23	62	58	Hospitalised	365	Discharge	Europe	Breathlessness
Tessitore	165	1	62	58	Hospitalised	365	Discharge	Europe	Nasal Symptoms
Tessitore	165	5	62	58	Hospitalised	365	Discharge	Europe	Cough
Venturelli	767	395	67.1	63	Hospitalised	81	Discharge	Europe	At Least 1 Symptom at Follow-up[b]
Venturelli	767	39	67.1	63	Hospitalised	81	Discharge	Europe	Arrhythmia
Venturelli	767	23	67.1	63	Hospitalised	81	Discharge	Europe	Cough
Venturelli	767	24	67.1	63	Hospitalised	81	Discharge	Europe	Chest Pain/Tightness
Venturelli	767	16	67.1	63	Hospitalised	81	Discharge	Europe	Impaired Kidney Function
Venturelli	767	4	67.1	63	Hospitalised	81	Discharge	Europe	Headache/Migraine
Venturelli	767	33	67.1	63	Hospitalised	81	Discharge	Europe	Depression
Venturelli	767	222	67.1	63	Hospitalised	81	Discharge	Europe	PTSD
Venturelli	767	4	67.1	63	Hospitalised	81	Discharge	Europe	Fever
Venturelli	767	2	67.1	63	Hospitalised	81	Discharge	Europe	Cognitive Dysfunction
Venturelli	767	121	67.1	63	Hospitalised	81	Discharge	Europe	Impaired Usual Activity
Venturelli	767	228	67.1	63	Hospitalised	81	Discharge	Europe	Breathlessness
Venturelli	767	30	67.1	63	Hospitalised	81	Discharge	Europe	Palpitations
Venturelli	767	186	67.1	63	Hospitalised	81	Discharge	Europe	Fatigue
Venturelli	767	23	67.1	63	Hospitalised	81	Discharge	Europe	Confusion/Brain Fog
Venturelli	767	82	67.1	63	Hospitalised	81	Discharge	Europe	Anxiety

Note: Since all data related to the prevalence of people, when the calculated n value was not a whole number it was rounded up to the next highest whole number. [a]Converted from % to absolute values. [b]Not extracted in the original data extraction but added now. Converted from %.

Table 1: **Data extraction for three exemplar studies.**

limit the analysis to studies with follow-up longer than 111 days. As all studies covered a period of time, limiting the analysis to studies >4 months (or 111 days) would not provide a prevalence estimate for an average of 4 months. Rather it would provide an approximate prevalence estimate across studies with a follow-up of at least 4 months, resulting in an average follow-up that is necessarily longer than 4 months. It is reasonable to expect that symptom prevalence will reduce over time since acute infection, as some patients' symptoms will resolve (either spontaneously or with intervention from healthcare services). Thus, by only including studies with follow-up longer than 4 months, it is not surprising that Yao and colleagues produced a prevalence estimate that is lower than our own. However, we do agree that the variability in prevalence estimates is high and previously acknowledged this within the manuscript on Page 5 "Between studies heterogeneity was high for the majority of meta-analyses, ranging from 2 to 99.9%." We also provide confidence intervals for the pooled prevalence of any symptom across all groups 44.8% (95% CI 38.6%–51.2%).

In point three, Yao and colleagues discuss the accuracy of data extraction. We do appreciate it is difficult to identify the correct corresponding publication based on the names of the author alone. Therefore, we have now included full references in our corrigendum (and in Table 2 below) for all studies included in the analysis. With regards to the three papers that were crosschecked by the authors for accuracy,[5] as discussed above, the data included in Table S3 was not specific to at least one symptom at follow up, rather it was a range of varying

Lead Author	Full Reference
Ahmed	Ahmed GK, Khedr EM, Hamad DA, Meshref TS, Hashem MM, Aly MM. Long term impact of Covid-19 infection on sleep and mental health: A cross-sectional study. Psychiatry Res. 2021;305:114243.
Akter	Akter F, Mannan A, Mehedi HMH, Rob MA, Ahmed S, Salauddin A, et al. Clinical characteristics and short term outcomes after recovery from COVID-19 in patients with and without diabetes in Bangladesh. Diabetes Metab Syndr. 2020;14(6):2031-8.
Armange	Armange L, Bénézit F, Picard L, Pronier C, Guillot S, Lentz PA, et al. Prevalence and characteristics of persistent symptoms after non-severe COVID-19: a prospective cohort study. Eur J Clin Microbiol Infect Dis. 2021;40(11):2421-5.
Arnold	Arnold DT, Hamilton FW, Milne A, Morley AJ, Viner J, Attwood M, et al. Patient outcomes after hospitalisation with COVID-19 and implications for follow-up: results from a prospective UK cohort. Thorax. 2021;76(4):399-401.
Asadi-Pooya	Asadi-Pooya AA, Akbari A, Emami A, Lotfi M, Rostamihosseinkhani M, Nemati H, et al. Risk Factors Associated with Long COVID Syndrome: A Retrospective Study. Iran J Med Sci. 2021;46(6):428-36.
Augustin	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.
Aul	Aul DR, Gates DJ, Draper DA, Dunleavy DA, Ruickbie DS, Meredith DH, et al. Complications after discharge with COVID-19 infection and risk factors associated with development of post-COVID pulmonary fibrosis. Respir Med. 2021;188:106602.
Aydin	Aydin S, Unver E, Karavas E, Yalcin S, Kantarci M. Computed tomography at every step: Long coronavirus disease. Respir Investig. 2021;59(5):622-7.
Ayoubkhani	Ayoubkhani D, Bermingham C, Pouwels KB, Glickman M, Nafilyan V, Zaccardi F, et al. Trajectory of long covid symptoms after covid-19 vaccination: community based cohort study. Bmj. 2022;377:e069676.
Babaei	Babaei A, Iravani K, Malekpour B, Golkhar B, Soltaniesmaeili A, Hosseinialhashemi M. Factors associated with anosmia recovery rate in COVID-19 patients. Laryngoscope Investig Otolaryngol. 2021;6(6):1248-55.
Baricich	Baricich A, Borg MB, Cuneo D, Cadario E, Azzolina D, Balbo PE, et al. Midterm functional sequelae and implications in rehabilitation after COVID-19: a cross-sectional study. Eur J Phys Rehabil Med. 2021;57(2):199-207.
Barry	Barry HC. More than One-Half of Adults Hospitalized for COVID-19 Still Report Significant Symptoms at Four Months Postdischarge. American Family Physician. 2021 2021/08//:206+.
Bell (Includes children)	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.
Bellan	Bellan M, Baricich A, Patrucco F, Zeppegno P, Gramaglia C, Balbo PE, et al. Long-term sequelae are highly prevalent one year after hospitalization for severe COVID-19. Sci Rep. 2021;11(1):22666.
Blanco	Blanco JR, Cobos-Ceballos MJ, Navarro F, Sanjoaquin I, Arnaiz de Las Revillas F, Bernal E, et al. Pulmonary long-term consequences of COVID-19 infections after hospital discharge. Clin Microbiol Infect. 2021;27(6):892-6.
Blomberg (Includes children)	Blomberg B, Mohn KG, Brokstad KA, Zhou F, Linchausen DW, Hansen BA, et al. Long COVID in a prospective cohort of home-isolated patients. Nat Med. 2021;27(9):1607-13.
Boglione	Boglione L, Meli G, Poletti F, Rostagno R, Moglia R, Cantone M, et al. Risk factors and incidence of long-COVID syndrome in hospitalized patients: does remdesivir have a protective effect? Qjm. 2022;114(12):865-71.
Boscolo-Rizzo (A)	Boscolo-Rizzo P, Guida F, Polesel J, Marcuzzo AV, Capriotti V, D'Alessandro A, et al. Sequelae in adults at 12 months after mild-to-moderate coronavirus disease 2019 (COVID-19). Int Forum Allergy Rhinol. 2021;11(12):1685-8.
Boscolo-Rizzo (B)	Boscolo-Rizzo P, Hummel T, Hopkins C, Dibattista M, Menini A, Spinato G, et al. High prevalence of long-term olfactory, gustatory, and chemesthesis dysfunction in post-COVID-19 patients: a matched case-control study with one-year follow-up using a comprehensive psychophysical evaluation. Rhinology. 2021;59(6):517-27.
Bozzetti	Bozzetti S, Ferrari S, Zanzoni S, Alberti D, Braggio M, Carta S, et al. Neurological symptoms and axonal damage in COVID-19 survivors: are there sequelae? Immunol Res. 2021;69(6):553-7.
Buonsenso	Buonsenso D, Munblit D, De Rose C, Sinatti D, Ricchiuto A, Carfi A, et al. Preliminary evidence on long COVID in children. Acta Paediatr. 2021;110(7):2208-11.
Buttery	Buttery S, Philip KEJ, Williams P, Fallas A, West B, Cumella A, et al. Patient symptoms and experience following COVID-19: results from a UK-wide survey. BMJ Open Respir Res. 2021;8(1).
Carfi	Carfì A, Bernabei R, Landi F. Persistent Symptoms in Patients After Acute COVID-19. Jama. 2020;324(6):603-5.
Carvalho-Schneider	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.
Cheng	Cheng D, Calderwood C, Skyllberg E, Ainley A. Clinical characteristics and outcomes of adult patients admitted with COVID-19 in East London: a retrospective cohort analysis. BMJ Open Respir Res. 2021;8(1).
Chevinsky	Chevinsky JR, Tao G, Lavery AM, Kukielka EA, Click ES, Malec D, et al. Late Conditions Diagnosed 1-4 Months Following an Initial Coronavirus Disease 2019 (COVID-19) Encounter: A Matched-Cohort Study Using Inpatient and Outpatient Administrative Data-United States, 1 March-30 June 2020. Clin Infect Dis. 2021;73(Suppl 1):S5-s16.
Clavario	Clavario P, De Marzo V, Lotti R, Barbara C, Porcile A, Russo C, et al. Cardiopulmonary exercise testing in COVID-19 patients at 3 months follow-up. Int J Cardiol. 2021;340:113-8.
COMEBAC Study Group	Writing Committee for the COMEBAC Study Group. Morin L, Savale L, Pham T, Colle R, Figueiredo S, Harrois A, et al. Four-Month Clinical Status of a Cohort of Patients After Hospitalization for COVID-19. Jama. 2021;325(15):1525-34.
Crankson	Crankson S, Pokhrel S, Anokye NK. Determinants of COVID-19-Related Length of Hospital Stays and Long COVID in Ghana: A Cross-Sectional Analysis. Int J Environ Res Public Health. 2022;19(1).
Cristillo	Cristillo V, Pilotto A, Cotti Piccinelli S, Zoppi N, Bonzi G, Gipponi S, et al. Age and subtle cognitive impairment are associated with long-term olfactory dysfunction after COVID-19 infection. J Am Geriatr Soc. 2021;69(10):2778-80.
D'Cruz	D'Cruz RF, Waller MD, Perrin F, Periselneris J, Norton S, Smith LJ, et al. Chest radiography is a poor predictor of respiratory symptoms and functional impairment in survivors of severe COVID-19 pneumonia. ERJ Open Res. 2021;7(1).

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Desdiani	Desdiani D, Sutarto AP, Kharisma AN, Safitri H, Hakim AF, Rusyda SH. Sequelae in COVID-19 patients 3 months after hospital discharge or completion of self-isolation. Health Sci Rep. 2021;4(4):e444.
Divanoglou	Divanoglou A, Samuelsson APK, Sjödahl PER, Andersson C, Levi PR. Rehabilitation needs and mortality associated with the Covid-19 pandemic: a population-based study of all hospitalised and home-healthcare individuals in a Swedish healthcare region. EClinicalMedicine. 2021;36:100920.
Eggert (Includes children)	Eggert LE, He Z, Collins W, Lee AS, Dhondalay G, Jiang SY, et al. Asthma phenotypes, associated comorbidities, and long-term symptoms in COVID-19. Allergy. 2022;77(1):173-85.
Einvik	Einvik G, Dammen T, Ghanima W, Heir T, Stavem K. Prevalence and Risk Factors for Post-Traumatic Stress in Hospitalized and Non-Hospitalized COVID-19 Patients. Int J Environ Res Public Health. 2021;18(4).
Eloy	Eloy P, Tardivon C, Martin-Blondel G, Isnard M, Turnier PL, Marechal ML, et al. Severity of self-reported symptoms and psychological burden 6-months after hospital admission for COVID-19: a prospective cohort study. Int J Infect Dis. 2021;112:247-53.
Evans	Evans RA, McAuley H, Harrison EM, Shikotra A, Singapuri A, Sereno M, et al. Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study. Lancet Respir Med. 2021;9(11):1275-87.
Faverio	Faverio P, Luppi F, Rebora P, Busnelli S, Stainer A, Catalano M, et al. Six-Month Pulmonary Impairment after Severe COVID-19: A Prospective, Multicentre Follow-Up Study. Respiration. 2021;100(11):1078-87.
Fernandez-de-Las-Penas (A)	Fernández-de-Las-Peñas C, Gómez-Mayordomo V, Cuadrado ML, Palacios-Ceña D, Florencio LL, Guerrero AL, et al. The presence of headache at onset in SARS-CoV-2 infection is associated with long-term post-COVID headache and fatigue: A case-control study. Cephalalgia. 2021;41(13):1332-41.
Fernandez-de-Las-Penas (B)	Fernández-de-Las-Peñas C, Gómez-Mayordomo V, de-la-Llave-Rincón AI, Palacios-Ceña M, Rodríguez-Jiménez J, Florencio LL, et al. Anxiety, depression and poor sleep quality as long-term post-COVID sequelae in previously hospitalized patients: A multicenter study. J Infect. 2021;83(4):496-522.
Fernandez-de-Las-Penas (C)	Fernández-de-Las-Peñas C, Gómez-Mayordomo V, García-Azorín D, Palacios-Ceña D, Florencio LL, Guerrero AL, et al. Previous History of Migraine Is Associated With Fatigue, but Not Headache, as Long-Term Post-COVID Symptom After Severe Acute Respiratory SARS-CoV-2 Infection: A Case-Control Study. Front Hum Neurosci. 2021;15:678472.
Froidure	Froidure A, Mahsouli A, Liistro G, De Greef J, Belkhir L, Gérard L, et al. Integrative respiratory follow-up of severe COVID-19 reveals common functional and lung imaging sequelae. Respir Med. 2021;181:106383.
Fu	Fu L, Fang Y, Luo D, Wang B, Xiao X, Hu Y, et al. Pre-hospital, in-hospital and post-hospital factors associated with sleep quality among COVID-19 survivors 6 months after hospital discharge: cross-sectional survey in five cities in China. BJPsych Open. 2021;7(6):e191.
Garcia-Abellan	García-Abellán J, Padilla S, Fernández-González M, García JA, Agulló V, Andreo M, et al. Antibody Response to SARS-CoV-2 is Associated with Long-term Clinical Outcome in Patients with COVID-19: a Longitudinal Study. J Clin Immunol. 2021;41(7):1490-501.
Garrigues	Garrigues E, Janvier P, Kherabi Y, Le Bot A, Hamon A, Gouze H, et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. J Infect. 2020;81(6):e4-e6.
Gautam	Gautam N, Madathil S, Tahani N, Bolton S, Parekh D, Stockley J, et al. Medium-Term Outcomes in Severely to Critically Ill Patients With Severe Acute Respiratory Syndrome Coronavirus 2 Infection. Clin Infect Dis. 2022;74(2):301-8.
Gerard	Gérard M, Mahmutovic M, Malgras A, Michot N, Scheyer N, Jaussaud R, et al. Long-Term Evolution of Malnutrition and Loss of Muscle Strength after COVID-19: A Major and Neglected Component of Long COVID-19. Nutrients. 2021;13(11).
Gherlone	Gherlone EF, Polizzi E, Tetè G, De Lorenzo R, Magnaghi C, Rovere Querini P, et al. Frequent and Persistent Salivary Gland Ectasia and Oral Disease After COVID-19. J Dent Res. 2021;100(5):464-71.
Ghosn	Ghosn J, Piroth L, Epaulard O, Le Turnier P, Mentré F, Bachelet D, et al. Persistent COVID-19 symptoms are highly prevalent 6 months after hospitalization: results from a large prospective cohort. Clin Microbiol Infect. 2021;27(7):1041.e1-.e4.
Glück	Glück V, Grobecker S, Tydykov L, Salzberger B, Glück T, Weidlich T, et al. SARS-CoV-2-directed antibodies persist for more than six months in a cohort with mild to moderate COVID-19. Infection. 2021;49(4):739-46.
González-Hermosillo	González-Hermosillo JA, Martínez-López JP, Carrillo-Lampón SA, Ruiz-Ojeda D, Herrera-Ramírez S, Amezcua-Guerra LM, et al. Post-Acute COVID-19 Symptoms, a Potential Link with Myalgic Encephalomyelitis/Chronic Fatigue Syndrome: A 6-Month Survey in a Mexican Cohort. Brain Sci. 2021;11(6).
Gouraud	Gouraud C, Bottemanne H, Lahlou-Laforêt K, Blanchard A, Günther S, Batti SE, et al. Association Between Psychological Distress, Cognitive Complaints, and Neuropsychological Status After a Severe COVID-19 Episode: A Cross-Sectional Study. Front Psychiatry. 2021;12:725861.
Goyal	Goyal R, Kapoor A, Goyal MK, Singh R. Alteration of Smell and Taste Sensations in Covid-19 Positive Patients: A Prospective Cohort Study in Western India. Indian J Otolaryngol Head Neck Surg. 2021;73(3):371-7.
Gramaglia	Gramaglia C, Gambaro E, Bellan M, Balbo PE, Baricich A, Sainaghi PP, et al. Mid-term Psychiatric Outcomes of Patients Recovered From COVID-19 From an Italian Cohort of Hospitalized Patients. Front Psychiatry. 2021;12:667385.
Grover	Grover S, Sahoo S, Mishra E, Gill KS, Mehra A, Nehra R, et al. Fatigue, perceived stigma, self-reported cognitive deficits and psychological morbidity in patients recovered from COVID-19 infection. Asian J Psychiatr. 2021;64:102815.
Hall	Hall J, Myall K, Lam JL, Mason T, Mukherjee B, West A, et al. Identifying patients at risk of post-discharge complications related to COVID-19 infection. Thorax. 2021;76(4):408-11.
Halpin	Halpin SJ, McIvor C, Whyatt G, Adams A, Harvey O, McLean L, et al. Postdischarge symptoms and rehabilitation needs in survivors of COVID-19 infection: A cross-sectional evaluation. J Med Virol. 2021;93(2):1013-22.
Hirschtick	Hirschtick JL, Titus AR, Slocum E, Power LE, Hirschtick RE, Elliott MR, et al. Population-Based Estimates of Post-acute Sequelae of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection (PASC) Prevalence and Characteristics. Clin Infect Dis. 2021;73(11):2055-64.
Hodgson	Hodgson CL, Higgins AM, Bailey MJ, Mather AM, Beach L, Bellomo R, et al. The impact of COVID-19 critical illness on new disability, functional outcomes and return to work at 6 months: a prospective cohort study. Crit Care. 2021;25(1):382.
Horwitz	Horwitz LI, Garry K, Prete AM, Sharma S, Mendoza F, Kahan T, et al. Six-Month Outcomes in Patients Hospitalized with Severe COVID-19. J Gen Intern Med. 2021;36(12):3772-7.
Hossain	Hossain MA, Hossain KMA, Saunders K, Uddin Z, Walton LM, Raigangar V, et al. Prevalence of Long COVID symptoms in Bangladesh: a prospective Inception Cohort Study of COVID-19 survivors. BMJ Glob Health. 2021;6(12).

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Howard	Howard LM, Garguilo K, Gillon J, LeBlanc K, Seegmiller AC, Schmitz JE, et al. The first 1000 symptomatic pediatric SARS-CoV-2 infections in an integrated health care system: a prospective cohort study. BMC Pediatr. 2021;21(1):403.
Huang (A)	Huang Y, Pinto MD, Borelli JL, Asgari Mehrabadi M, Abrahim HL, Dutt N, et al. COVID Symptoms, Symptom Clusters, and Predictors for Becoming a Long-Hauler Looking for Clarity in the Haze of the Pandemic. Clin Nurs Res. 2022;31(8):1390-8.
Huang (B)	Huang L, Yao Q, Gu X, Wang Q, Ren L, Wang Y, et al. 1-year outcomes in hospital survivors with COVID-19: a longitudinal cohort study. Lancet. 2021;398(10302):747-58.
Imran	Imran J, Nasa P, Alexander L, Upadhyay S, Alanduru V. Psychological distress among survivors of moderate-to-critical COVID-19 illness: A multicentric prospective cross-sectional study. Indian J Psychiatry. 2021;63(3):285-9.
Italia	Italia L, Ingallina G, Napolano A, Boccellino A, Belli M, Cannata F, et al. Subclinical myocardial dysfunction in patients recovered from COVID-19. Echocardiography. 2021;38(10):1778-86.
Jacobs	Jacobs LG, Gourna Paleoudis E, Lesky-Di Bari D, Nyirenda T, Friedman T, Gupta A, et al. Persistence of symptoms and quality of life at 35 days after hospitalization for COVID-19 infection. PLoS One. 2020;15(12):e0243882.
Jacobson	Jacobson KB, Rao M, Bonilla H, Subramanian A, Hack I, Madrigal M, et al. Patients With Uncomplicated Coronavirus Disease 2019 (COVID-19) Have Long-Term Persistent Symptoms and Functional Impairment Similar to Patients with Severe COVID-19: A Cautionary Tale During a Global Pandemic. Clin Infect Dis. 2021;73(3):e826-e9.
Ju	Ju Y, Liu J, Ng RMK, Liu B, Wang M, Chen W, et al. Prevalence and predictors of post-traumatic stress disorder in patients with cured coronavirus disease 2019 (COVID-19) one month post-discharge. Eur J Psychotraumatol. 2021;12(1):1915576.
Karaarslan	Karaarslan F, Demircioğlu Güneri F, Kardeş S. Postdischarge rheumatic and musculoskeletal symptoms following hospitalization for COVID-19: prospective follow-up by phone interviews. Rheumatol Int. 2021;41(7):1263-71.
Kashif	Kashif A, Chaudhry M, Fayyaz T, Abdullah M, Malik A, Anwer JMA, et al. Follow-up of COVID-19 recovered patients with mild disease. Sci Rep. 2021;11(1):13414.
Kaur	Kaur K, Patel V, Kumar P, Vasavada D, Nerli L, Tiwari D. A prospective study of major depressive disorder among COVID 19 survivors at a tertiary care hospital. Archives of Mental Health. 2021;22(1):23-7.
Kayaaslan	Kayaaslan B, Eser F, Kalem AK, Kaya G, Kaplan B, Kacar D, et al. Post-COVID syndrome: A single-center questionnaire study on 1007 participants recovered from COVID-19. J Med Virol. 2021;93(12):6566-74.
Khademi	Khademi M, Vaziri-Harami R, Shams J. Prevalence of Mental Health Problems and Its Associated Factors Among Recovered COVID-19 Patients During the Pandemic: A Single-Center Study. Front Psychiatry. 2021;12:602244.
Khasawneh	Laith Khasawneh KA-O, Amjed Adnan Tarifi, Dua'a Mohammad Khalil Shaout, Sara Yaser Awni Abu-Ghazal, Thshreen Sultan The correlation between BMI and COVID-19. Journal of Applied Pharmaceutical Science. 2020;11(6):1236-9.
Kim	Kim YJ, Bae JY, Bae S, Hwang S, Kwon KT, Chang HH, et al. Neutralizing Antibody Responses to SARS-CoV-2 in Korean Patients Who Have Recovered from COVID-19. Yonsei Med J. 2021;62(7):584-92.
Kozak	Kozak R, Armstrong SM, Salvant E, Ritzker C, Feld J, Biondi MJ, et al. Recognition of Long-COVID-19 Patients in a Canadian Tertiary Hospital Setting: A Retrospective Analysis of Their Clinical and Laboratory Characteristics. Pathogens. 2021;10(10).
Landi	Landi F, Carfì A, Benvenuto F, Brandi V, Ciciarello F, Lo Monaco MR, et al. Predictive Factors for a New Positive Nasopharyngeal Swab Among Patients Recovered From COVID-19. Am J Prev Med. 2021;60(1):13-9.
Lechien	Lechien JR, Chiesa-Estomba CM, Beckers E, Mustin V, Ducarme M, Journe F, et al. Prevalence and 6-month recovery of olfactory dysfunction: a multicentre study of 1363 COVID-19 patients. J Intern Med. 2021;290(2):451-61.
Lehmann	Lehmann A, Prosch H, Zehetmayer S, Gysan MR, Bernitzky D, Vonbank K, et al. Impact of persistent D-dimer elevation following recovery from COVID-19. PLoS One. 2021;16(10):e0258351.
Lerum	Lerum TV, Aaløkken TM, Brønstad E, Aarli B, Ikdahl E, Lund KMA, et al. Dyspnoea, lung function and CT findings 3 months after hospital admission for COVID-19. Eur Respir J. 2021;57(4).
Li	Li X, Shen C, Wang L, Majumder S, Zhang D, Deen MJ, et al. Pulmonary fibrosis and its related factors in discharged patients with new corona virus pneumonia: a cohort study. Respir Res. 2021;22(1):203.
Liao (A)	Liao B, Liu Z, Tang L, Li L, Gan Q, Shi H, et al. Longitudinal clinical and radiographic evaluation reveals interleukin-6 as an indicator of persistent pulmonary injury in COVID-19. Int J Med Sci. 2021;18(1):29-41.
Liao (B)	Liao X, Wang Y, He Z, Yun Y, Hu M, Ma Z, et al. Three-Month Pulmonary Function and Radiological Outcomes in COVID-19 Survivors: A Longitudinal Patient Cohort Study. Open Forum Infect Dis. 2021;8(9):ofaa540.
Liyanage-Don	Liyanage-Don NA, Cornelius T, Sanchez JE, Trainor A, Moise N, Wainberg M, et al. Psychological Distress, Persistent Physical Symptoms, and Perceived Recovery After COVID-19 Illness. J Gen Intern Med. 2021;36(8):2525-7.
Lombardo	Lombardo MDM, Foppiani A, Peretti GM, Mangiavini L, Battezzati A, Bertoli S, et al. Long-Term Coronavirus Disease 2019 Complications in Inpatients and Outpatients: A One-Year Follow-up Cohort Study. Open Forum Infect Dis. 2021;8(8):ofab384.
Lopes	Lopes AJ, Mafort TT, da Cal MS, Monnerat LB, Litrento PF, Ramos I, et al. Impulse Oscillometry Findings and Their Associations With Lung Ultrasound Signs in COVID-19 Survivors. Respir Care. 2021;66(11):1691-8.
Maestre-Muñiz	Maestre-Muñiz MM, Arias Á, Mata-Vázquez E, Martín-Toledano M, López-Larramona G, Ruiz-Chicote AM, et al. Long-Term Outcomes of Patients with Coronavirus Disease 2019 at One Year after Hospital Discharge. J Clin Med. 2021;10(13).
Maestrini	Maestrini V, Birtolo LI, Francone M, Galardo G, Galea N, Severino P, et al. Cardiac involvement in consecutive unselected hospitalized COVID-19 population: In-hospital evaluation and one-year follow-up. Int J Cardiol. 2021;339:235-42.
Mahajan	Mahajan S, Kunal S, Shah B, Garg S, Palleda GM, Bansal A, et al. Left ventricular global longitudinal strain in COVID-19 recovered patients. Echocardiography. 2021;38(10):1722-30.
Mahmud	Mahmud R, Rassel MA, Monayem FB, Sayeed S, Islam MS, Islam MM, et al. Association of ABO blood groups with presentation and outcomes of confirmed SARS CoV-2 infection: A prospective study in the largest COVID-19 dedicated hospital in Bangladesh. PLoS One. 2021;16(4):e0249252.

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Mallia	Mallia P, Meghji J, Wong B, Kumar K, Pilkington V, Chhabra S, et al. Symptomatic, biochemical and radiographic recovery in patients with COVID-19. BMJ Open Respir Res. 2021;8(1).
Mancuzo	Mancuzo EV, Marinho CC, Machado-Coelho GLL, Batista AP, Oliveira JF, Andrade BH, et al. Lung function of patients hospitalized with COVID-19 at 45 days after hospital discharge: first report of a prospective multicenter study in Brazil. J Bras Pneumol. 2021;47(6):e20210162.
Mandal	Mandal S, Barnett J, Brill SE, Brown JS, Denneny EK, Hare SS, et al. 'Long-COVID': a cross-sectional study of persisting symptoms, biomarker and imaging abnormalities following hospitalisation for COVID-19. Thorax. 2021;76(4):396-8.
Marasco	Marasco G, Cremon C, Barbaro MR, Salvi D, Cacciari G, Kagramanova A, et al. Prevalence of Gastrointestinal Symptoms in Severe Acute Respiratory Syndrome Coronavirus 2 Infection: Results of the Prospective Controlled Multinational GI-COVID-19 Study. Am J Gastroenterol. 2022;117(1):147-57.
Matteudi (Children)	Matteudi T, Luciani L, Fabre A, Minodier P, Boucekine M, Bosdure E, et al. Clinical characteristics of paediatric COVID-19 patients followed for up to 13 months. Acta Paediatr. 2021;110(12):3331-3.
Mazza	Mazza MG, Palladini M, De Lorenzo R, Bravi B, Poletti S, Furlan R, et al. One-year mental health outcomes in a cohort of COVID-19 survivors. J Psychiatr Res. 2021;145:118-24.
Mei (A)	Mei Q, Wang F, Bryant A, Wei L, Yuan X, Li J. Mental health problems among COVID-19 survivors in Wuhan, China. World Psychiatry. 2021;20(1):139-40.
Mei (B)	Mei Q, Wang F, Yang Y, Hu G, Guo S, Zhang Q, et al. Health Issues and Immunological Assessment Related to Wuhan's COVID-19 Survivors: A Multicenter Follow-Up Study. Front Med (Lausanne). 2021;8:617689.
Meije	Meije Y, Duarte-Borges A, Sanz X, Clemente M, Ribera A, Ortega L, et al. Long-term outcomes of patients following hospitalization for coronavirus disease 2019: a prospective observational study. Clin Microbiol Infect. 2021;27(8):1151-7.
Mendez (A)	Méndez R, Balanzá-Martínez V, Luperdi SC, Estrada I, Latorre A, González-Jiménez P, et al. Short-term neuropsychiatric outcomes and quality of life in COVID-19 survivors. J Intern Med. 2021;290(3):621-31.
Mendez (B)	Méndez R, Latorre A, González-Jiménez P, Feced L, Bouzas L, Yépez K, et al. Reduced Diffusion Capacity in COVID-19 Survivors. Ann Am Thorac Soc. 2021;18(7):1253-5.
Menges	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):e0254523.
Mittal	Mittal C, Mishra A, Jain S, Gautam NS. Post COVID-19 Symptoms: A Neglected Domain. Indian Journal of Community Health. 2021;33(2):325 - 8.
Mohamed-Hussein	Mohamed-Hussein AAR, Amin MT, Makhlouf HA, Makhlouf NA, Galal I, Abd-Elaal HK, et al. Non-hospitalised COVID-19 patients have more frequent long COVID-19 symptoms. Int J Tuberc Lung Dis. 2021;25(9):732-7.
Mohiuddin Chowdhury	Mohiuddin Chowdhury ATM, Karim MR, Ali MA, Islam J, Li Y, He S. Clinical Characteristics and the Long-Term Post-recovery Manifestations of the COVID-19 Patients-A Prospective Multicenter Cross-Sectional Study. Front Med (Lausanne). 2021;8:663670.
Molteni	Molteni E, Sudre CH, Canas LS, Bhopal SS, Hughes RC, Antonelli M, et al. Illness duration and symptom profile in symptomatic UK school-aged children tested for SARS-CoV-2. Lancet Child Adolesc Health. 2021;5(10):708-18.
Moradian	Moradian ST, Parandeh A, Khalili R, Karimi L. Delayed Symptoms in Patients Recovered from COVID-19. Iran J Public Health. 2020;49(11):2120-7.
Moreno-Pérez	Moreno-Pérez O, Merino E, Leon-Ramirez JM, Andres M, Ramos JM, Arenas-Jiménez J, et al. Post-acute COVID-19 syndrome. Incidence and risk factors: A Mediterranean cohort study. J Infect. 2021;82(3):378-83.
Morin	Morin L, Savale L, Pham T, Colle R, Figueiredo S, Harrois A, et al. Four-Month Clinical Status of a Cohort of Patients After Hospitalization for COVID-19. Jama. 2021;325(15):1525-34.
Motiejunaite	Motiejunaite J, Balagny P, Arnoult F, Mangin L, Bancal C, Vidal-Petiot E, et al. Hyperventilation as one of the mechanisms of persistent dyspnoea in SARS-CoV-2 survivors. Eur Respir J. 2021;58(2).
Munblit	Munblit D, Bobkova P, Spiridonova E, Shikhaleva A, Gamirova A, Blyuss O, et al. Incidence and risk factors for persistent symptoms in adults previously hospitalized for COVID-19. Clin Exp Allergy. 2021;51(9):1107-20.
Naidu	Naidu SB, Shah AJ, Saigal A, Smith C, Brill SE, Goldring J, et al. The high mental health burden of "Long COVID" and its association with on-going physical and respiratory symptoms in all adults discharged from hospital. Eur Respir J. 2021;57(6).
Naik	Naik S, Haldar SN, Soneja M, Mundadan NG, Garg P, Mittal A, et al. Post COVID-19 sequelae: A prospective observational study from Northern India. Drug Discov Ther. 2021;15(5):254-60.
Navarro	Navarro-Font X, Kales SN, Vicente-Herrero MT, Rueda-Garrido JC, Del Campo MT, Reinoso-Barbero L, et al. Association Between the "COVID-19 Occupational Vulnerability Index" and COVID-19 Severity and Sequelae Among Hospital Employees. J Occup Environ Med. 2021;63(10):895-900.
Nehme	Nehme M, Braillard O, Chappuis F, Courvoisier DS, Guessous I. Prevalence of Symptoms More Than Seven Months After Diagnosis of Symptomatic COVID-19 in an Outpatient Setting. Ann Intern Med. 2021;174(9):1252-60.
Nesan	Nesan G, Keerthana D, Yamini R, Jain T, Kumar D, Eashwer A, et al. 3-Month Symptom-Based Ambidirectional Follow-up Study Among Recovered COVID-19 Patients from a Tertiary Care Hospital Using Telehealth in Chennai, India. Inquiry. 2021;58:469580211060165.
Neto	Brandão Neto D, Fornazieri MA, Dib C, Di Francesco RC, Doty RL, Voegels RL, et al. Chemosensory Dysfunction in COVID-19: Prevalences, Recovery Rates, and Clinical Associations on a Large Brazilian Sample. Otolaryngol Head Neck Surg. 2021;164(3):512-8.
Núñez-Fernández	Núñez-Fernández M, Ramos-Hernández C, García-Río F, Torres-Durán M, Nodar-Germiñas A, Tilve-Gómez A, et al. Alterations in Respiratory Function Test Three Months after Hospitalisation for COVID-19 Pneumonia: Value of Determining Nitric Oxide Diffusion. J Clin Med. 2021;10(10).
O'Keefe (A)	O'Keefe JB, Tong EJ, O'Keefe GD, Tong DC. Description of symptom course in a telemedicine monitoring clinic for acute symptomatic COVID-19: a retrospective cohort study. BMJ Open. 2021;11(3):e044154.
O'Keefe (B)	O'Keefe JB, Minton HC, Morrow M, Johnson C, Moore MA, O'Keefe GAD, et al. Postacute Sequelae of SARS-CoV-2 Infection and Impact on Quality of Life 1-6 Months After Illness and Association With Initial Symptom Severity. Open Forum Infect Dis. 2021;8(8):ofab352.
Ong	Ong SWX, Fong SW, Young BE, Chan YH, Lee B, Amrun SN, et al. Persistent Symptoms and Association With Inflammatory Cytokine Signatures in Recovered Coronavirus Disease 2019 Patients. Open Forum Infect Dis. 2021;8(6):ofab156.

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Ordinola Navarro	Ordinola Navarro A, Cervantes-Bojalil J, Cobos Quevedo OJ, Avila Martínez A, Hernández-Jiménez CA, Pérez Álvarez E, et al. Decreased quality of life and spirometric alterations even after mild-moderate COVID-19. Respir Med. 2021;181:106391.
Osmanov	Osmanov IM, Spiridonova E, Bobkova P, Gamirova A, Shikhaleva A, Andreeva M, et al. Risk factors for post-COVID-19 condition in previously hospitalised children using the ISARIC Global follow-up protocol: a prospective cohort study. Eur Respir J. 2022;59(2).
Park	Park HY, Song IA, Oh TK. Insomnia Disorder Among Coronavirus Disease Survivors: A South Korean Nationwide Cohort Study. Psychiatry Investig. 2021;18(11):1082-90.
Peghin	Peghin M, Palese A, Venturini M, De Martino M, Gerussi V, Graziano E, et al. Post-COVID-19 symptoms 6 months after acute infection among hospitalized and non-hospitalized patients. Clin Microbiol Infect. 2021;27(10):1507-13.
Peluso (A)	Peluso MJ, Lu S, Tang AF, Durstenfeld MS, Ho HE, Goldberg SA, et al. Markers of Immune Activation and Inflammation in Individuals With Postacute Sequelae of Severe Acute Respiratory Syndrome Coronavirus 2 Infection. J Infect Dis. 2021;224(11):1839-48.
Peluso (B)	Peluso MJ, Kelly JD, Lu S, Goldberg SA, Davidson MC, Mathur S, et al. Persistence, Magnitude, and Patterns of Postacute Symptoms and Quality of Life Following Onset of SARS-CoV-2 Infection: Cohort Description and Approaches for Measurement. Open Forum Infect Dis. 2022;9(2):ofab640.
Petersen	Petersen MS, Kristiansen MF, Hanusson KD, Danielsen ME, B ÁS, Gaini S, et al. Long COVID in the Faroe Islands: A Longitudinal Study Among Nonhospitalized Patients. Clin Infect Dis. 2021;73(11):e4058-e63.
Poncet-Megemont	Poncet-Megemont L, Paris P, Tronchere A, Salazard JP, Pereira B, Dallel R, et al. High Prevalence of Headaches During Covid-19 Infection: A Retrospective Cohort Study. Headache. 2020;60(10):2578-82.
Printza	Printza A, Katotomichelakis M, Valsamidis K, Metallidis S, Panagopoulos P, Panopoulou M, et al. Smell and Taste Loss Recovery Time in COVID-19 Patients and Disease Severity. J Clin Med. 2021;10(5).
Puntmann	Puntmann VO, Carerj ML, Wieters I, Fahim M, Arendt C, Hoffmann J, et al. Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered From Coronavirus Disease 2019 (COVID-19). JAMA Cardiol. 2020;5(11):1265-73.
Qin	Qin W, Chen S, Zhang Y, Dong F, Zhang Z, Hu B, et al. Diffusion capacity abnormalities for carbon monoxide in patients with COVID-19 at 3-month follow-up. Eur Respir J. 2021;58(1).
Qu	Qu G, Zhen Q, Wang W, Fan S, Wu Q, Zhang C, et al. Health-related quality of life of COVID-19 patients after discharge: A multicenter follow-up study. J Clin Nurs. 2021;30(11-12):1742-50.
Radtke	Radtke T, Ulyte A, Puhan MA, Kriemler S. Long-term Symptoms After SARS-CoV-2 Infection in Children and Adolescents. Jama. 2021;326(9):869-71.
Rahmani	Rahmani H, Davoudi-Monfared E, Nourian A, Nabiee M, Sadeghi S, Khalili H, et al. Comparing outcomes of hospitalized patients with moderate and severe COVID-19 following treatment with hydroxychloroquine plus atazanavir/ritonavir. Daru. 2020;28(2):625-34.
Rashidi	Rashidi F, Barco S, Kamangar F, Heresi GA, Emadi A, Kaymaz C, et al. Incidence of symptomatic venous thromboembolism following hospitalization for coronavirus disease 2019: Prospective results from a multi-center study. Thromb Res. 2021;198:135-8.
Righi	Righi E, Mirandola M, Mazzaferri F, Razzaboni E, Zaffagnini A, Erbogasto A, et al. Long-Term Patient-Centred Follow-up in a Prospective Cohort of Patients with COVID-19. Infect Dis Ther. 2021;10(3):1579-90.
Roge	Roge I, Smane L, Kivite-Urtane A, Pucuka Z, Racko I, Klavina L, et al. Comparison of Persistent Symptoms After COVID-19 and Other Non-SARS-CoV-2 Infections in Children. Front Pediatr. 2021;9:752385.
Romero-Duarte	Romero-Duarte Á, Rivera-Izquierdo M, Guerrero-Fernández de Alba I, Pérez-Contreras M, Fernández-Martínez NF, Ruiz-Montero R, et al. Sequelae, persistent symptomatology and outcomes after COVID-19 hospitalization: the ANCOHVID multicentre 6-month follow-up study. BMC Med. 2021;19(1):129.
Rosales-Castillo	Rosales-Castillo A, García de Los Ríos C, Mediavilla García JD. Persistent symptoms after acute COVID-19 infection: importance of follow-up. Med Clin (Barc). 2021;156(1):35-6.
Saad	Saad MA, El Khateeb AF, Ahmed MI, Magdy AM. Semi-quantitative CT severity scoring as a predictor of development of post-COVID syndrome. The Egyptian Journal of Radiology and Nuclear Medicine. 2021;52(1):102.
Say	Say D, Crawford N, McNab S, Wurzel D, Steer A, Tosif S. Post-acute COVID-19 outcomes in children with mild and asymptomatic disease. Lancet Child Adolesc Health. 2021;5(6):e22-e3.
Sechi	Sechi LA, Colussi G, Bulfone L, Brosolo G, Da Porto A, Peghin M, et al. Short-term cardiac outcome in survivors of COVID-19: a systematic study after hospital discharge. Clin Res Cardiol. 2021;110(7):1063-72.
Shang (A)	Shang YF, Liu T, Yu JN, Xu XR, Zahid KR, Wei YC, et al. Half-year follow-up of patients recovering from severe COVID-19: Analysis of symptoms and their risk factors. J Intern Med. 2021;290(2):444-50.
Shang (B)	Shang L, Wang L, Zhou F, Li J, Liu Y, Yang S. Long-term effects of obesity on COVID-19 patients discharged from hospital. Immun Inflamm Dis. 2021;9(4):1678-85.
Shoucri	Shoucri SM, Purpura L, DeLaurentis C, Adan MA, Theodore DA, Irace AL, et al. Characterising the long-term clinical outcomes of 1190 hospitalised patients with COVID-19 in New York City: a retrospective case series. BMJ Open. 2021;11(6):e049488.
Sigfrid	Sigfrid L, Drake TM, Pauley E, Jesudason EC, Olliaro P, Lim WS, et al. Long Covid in adults discharged from UK hospitals after Covid-19: A prospective, multicentre cohort study using the ISARIC WHO Clinical Characterisation Protocol. Lancet Reg Health Eur. 2021;8:100186.
Simani	Simani L, Ramezani M, Darazam IA, Sagharichi M, Aalipour MA, Ghorbani F, et al. Prevalence and correlates of chronic fatigue syndrome and post-traumatic stress disorder after the outbreak of the COVID-19. J Neurovirol. 2021;27(1):154-9.
Skjorten	Skjørten I, Ankerstjerne OAW, Trebinjac D, Brønstad E, Rasch-Halvorsen Ø, Einvik G, et al. Cardiopulmonary exercise capacity and limitations 3 months after COVID-19 hospitalisation. Eur Respir J. 2021;58(2).
Smet	Smet J, Stylemans D, Hanon S, Ilsen B, Verbanck S, Vanderhelst E. Clinical status and lung function 10 weeks after severe SARS-CoV-2 infection. Respir Med. 2021;176:106276.
Song	Song J, Deng YK, Wang H, Wang ZC, Liao B, Ma J, et al. Self-reported Taste and Smell Disorders in Patients with COVID-19: Distinct Features in China. Curr Med Sci. 2021;41(1):14-23.

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Sonnweber	Sonnweber T, Sahanic S, Pizzini A, Luger A, Schwabl C, Sonnweber B, et al. Cardiopulmonary recovery after COVID-19: an observational prospective multicentre trial. Eur Respir J. 2021;57(4).
Soraas	Søraas A, Kalleberg KT, Dahl JA, Søraas CL, Myklebust T, Axelsen E, et al. Persisting symptoms three to eight months after non-hospitalized COVID-19, a prospective cohort study. PLoS One. 2021;16(8):e0256142.
Stavem	Stavem K, Ghanima W, Olsen MK, Gilboe HM, Einvik G. Prevalence and Determinants of Fatigue after COVID-19 in Non-Hospitalized Subjects: A Population-Based Study. Int J Environ Res Public Health. 2021;18(4).
Sudre	Sudre CH, Murray B, Varsavsky T, Graham MS, Penfold RS, Bowyer RC, et al. Attributes and predictors of long COVID. Nat Med. 2021;27(4):626-31.
Sun	Sun LL, Wang J, Wang YS, Hu PF, Zhao ZQ, Chen W, et al. Symptomatic features and prognosis of 932 hospitalized patients with coronavirus disease 2019 in Wuhan. J Dig Dis. 2021;22(5):271-81.
Sykes	Sykes DL, Holdsworth L, Jawad N, Gunasekera P, Morice AH, Crooks MG. Post-COVID-19 Symptom Burden: What is Long-COVID and How Should We Manage It? Lung. 2021;199(2):113-9.
Tarsitani	Tarsitani L, Vassalini P, Koukopoulos A, Borrazzo C, Alessi F, Di Nicolantonio C, et al. Post-traumatic Stress Disorder Among COVID-19 Survivors at 3-Month Follow-up After Hospital Discharge. J Gen Intern Med. 2021;36(6):1702-7.
Taylor	Taylor RR, Trivedi B, Patel N, Singh R, Ricketts WM, Elliott K, et al. Post-COVID symptoms reported at asynchronous virtual review and stratified follow-up after COVID-19 pneumonia. Clin Med (Lond). 2021;21(4):e384-e91.
Tessitore	Tessitore E, Handgraaf S, Poncet A, Achard M, Höfer S, Carballo S, et al. Symptoms and quality of life at 1-year follow up of patients discharged after an acute COVID-19 episode. Swiss Med Wkly. 2021;151:w30093.
Tiwari	Tiwari B, Ghimire M, Bhatta G, Banstola H, Tiwari B, Twayana A, et al. Persistent Symptoms in Non-critical COVID-19 Patients at Two Months Follow-Up in a District Hospital: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2021;59(238):550-3.
Tleyjeh	Tleyjeh IM, Saddik B, Ramakrishnan RK, AlSwaidan N, AlAnazi A, Alhazmi D, et al. Long term predictors of breathlessness, exercise intolerance, chronic fatigue and well-being in hospitalized patients with COVID-19: A cohort study with 4 months median follow-up. J Infect Public Health. 2022;15(1):21-8.
Todt	Todt BC, Szlejf C, Duim E, Linhares AOM, Kogiso D, Varela G, et al. Clinical outcomes and quality of life of COVID-19 survivors: A follow-up of 3 months post hospital discharge. Respir Med. 2021;184:106453.
Tomasoni	Tomasoni D, Bai F, Castoldi R, Barbanotti D, Falcinella C, Mulè G, et al. Anxiety and depression symptoms after virological clearance of COVID-19: A cross-sectional study in Milan, Italy. J Med Virol. 2021;93(2):1175-9.
Townsend (A)	Townsend L, Dyer AH, Jones K, Dunne J, Mooney A, Gaffney F, et al. Persistent fatigue following SARS-CoV-2 infection is common and independent of severity of initial infection. PLoS One. 2020;15(11):e0240784.
Townsend (B)	Townsend L, Dowds J, O'Brien K, Sheill G, Dyer AH, O'Kelly B, et al. Persistent Poor Health after COVID-19 Is Not Associated with Respiratory Complications or Initial Disease Severity. Ann Am Thorac Soc. 2021;18(6):997-1003.
Townsend (C)	Townsend L, Fogarty H, Dyer A, Martin-Loeches I, Bannan C, Nadarajan P, et al. Prolonged elevation of D-dimer levels in convalescent COVID-19 patients is independent of the acute phase response. J Thromb Haemost. 2021;19(4):1064-70.
Townsend (D)	Townsend L, Dyer AH, McCluskey P, O'Brien K, Dowds J, Laird E, et al. Investigating the Relationship between Vitamin D and Persistent Symptoms Following SARS-CoV-2 Infection. Nutrients. 2021;13(7).
Trinkmann	Trinkmann F, Müller M, Reif A, Kahn N, Kreuter M, Trudzinski F, et al. Residual symptoms and lower lung function in patients recovering from SARS-CoV-2 infection. Eur Respir J. 2021;57(2).
Trunfio	Trunfio M, Venuti F, Alladio F, Longo BM, Burdino E, Cerutti F, et al. Diagnostic SARS-CoV-2 Cycle Threshold Value Predicts Disease Severity, Survival, and Six-Month Sequelae in COVID-19 Symptomatic Patients. Viruses. 2021;13(2).
Turunc	Turunc O, Emecen A, Keskin S, Basoğlu E, Suner A, Siyve N, et al. Three months follow-up of children infected with COVID-19. European Journal of Public Health. 2021;31(Supplement_3).
Vaes	Vaes AW, Machado FVC, Meys R, Delbressine JM, Goertz YMJ, Van Herck M, et al. Care Dependency in Non-Hospitalized Patients with COVID-19. J Clin Med. 2020;9(9).
Van den Borst	van den Borst B, Peters JB, Brink M, Schoon Y, Bleeker-Rovers CP, Schers H, et al. Comprehensive Health Assessment 3 Months After Recovery From Acute Coronavirus Disease 2019 (COVID-19). Clin Infect Dis. 2021;73(5):e1089-e98.
Vassalini	Vassalini P, Serra R, Tarsitani L, Koukopoulos AE, Borrazzo C, Alessi F, et al. Depressive Symptoms among Individuals Hospitalized with COVID-19: Three-Month Follow-Up. Brain Sci. 2021;11(9).
Venturelli	Venturelli S, Benatti SV, Casati M, Binda F, Zuglian G, Imeri G, et al. Surviving COVID-19 in Bergamo province: a post-acute outpatient re-evaluation. Epidemiol Infect. 2021;149:e32.
Vlake	Vlake JH, Wesselius S, van Genderen ME, van Bommel J, Boxma-de Klerk B, Wils EJ. Psychological distress and health-related quality of life in patients after hospitalization during the COVID-19 pandemic: A single-center, observational study. PLoS One. 2021;16(8):e0255774.
Walle-Hansen	Walle-Hansen MM, Ranhoff AH, Mellingsæter M, Wang-Hansen MS, Myrstad M. Health-related quality of life, functional decline, and long-term mortality in older patients following hospitalisation due to COVID-19. BMC Geriatr. 2021;21(1):199.
Wang	Wang L, Foer D, MacPhaul E, Lo YC, Bates DW, Zhou L. PASCLex: A comprehensive post-acute sequelae of COVID-19 (PASC) symptom lexicon derived from electronic health record clinical notes. J Biomed Inform. 2022;125:103951.
Wanga	Wanga V, Chevinsky JR, Dimitrov LV, Gerdes ME, Whitfield GP, Bonacci RA, et al. Long-Term Symptoms Among Adults Tested for SARS-CoV-2 - United States, January 2020–April 2021. MMWR Morb Mortal Wkly Rep. 2021;70(36):1235-41.
Weber	Weber B, Siddiqi H, Zhou G, Vieira J, Kim A, Rutherford H, et al. Relationship Between Myocardial Injury During Index Hospitalization for SARS-CoV-2 Infection and Longer-Term Outcomes. J Am Heart Assoc. 2022;11(1):e022010.
Weerahandi	Weerahandi H, Hochman KA, Simon E, Blaum C, Chodosh J, Duan E, et al. Post-Discharge Health Status and Symptoms in Patients with Severe COVID-19. J Gen Intern Med. 2021;36(3):738-45.

(Table 2 continues on next page)

Lead Author	Full Reference
(Continued from previous page)	
Weng	Weng J, Li Y, Li J, Shen L, Zhu L, Liang Y, et al. Gastrointestinal sequelae 90 days after discharge for COVID-19. Lancet Gastroenterol Hepatol. 2021;6(5):344-6.
Whitaker (A)	Whitaker M, Elliott J, Chadeau-Hyam M, Riley S, Darzi A, Cooke G, et al. Persistent COVID-19 symptoms in a community study of 606,434 people in England. Nature Communications. 2022;13(1):1957.
Whitaker (B)	Whittaker HR, Gulea C, Koteci A, Kallis C, Morgan AD, Iwundu C, et al. GP consultation rates for sequelae after acute covid-19 in patients managed in the community or hospital in the UK: population based study. Bmj. 2021;375:e065834.
Wu	Wu Q, Hou X, Li H, Guo J, Li Y, Yang F, et al. A follow-up study of respiratory and physical function after discharge in patients with redetectable positive SARS-CoV-2 nucleic acid results following recovery from COVID-19. Int J Infect Dis. 2021;107:5-11.
Xie	Xie Y, Bowe B, Al-Aly Z. Burdens of post-acute sequelae of COVID-19 by severity of acute infection, demographics and health status. Nat Commun. 2021;12(1):6571.
Xion	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.
Yan	Yan X, Huang H, Wang C, Jin Z, Zhang Z, He J, et al. Follow-up study of pulmonary function among COVID-19 survivors 1 year after recovery. J Infect. 2021;83(3):381-412.
Yang	Yang ZL, Chen C, Huang L, Zhou SC, Hu YN, Xia LM, et al. Fibrotic Changes Depicted by Thin-Section CT in Patients With COVID-19 at the Early Recovery Stage: Preliminary Experience. Front Med (Lausanne). 2020;7:605088.
Yomogida	Yomogida K, Zhu S, Rubino F, Figueroa W, Balanji N, Holman E. Post-Acute Sequelae of SARS-CoV-2 Infection Among Adults Aged ≥18 Years - Long Beach, California, April 1-December 10, 2020. MMWR Morb Mortal Wkly Rep. 2021;70(37):1274-7.
Zhang	Zhang X, Wang F, Shen Y, Zhang X, Cen Y, Wang B, et al. Symptoms and Health Outcomes Among Survivors of COVID-19 Infection 1 Year After Discharge From Hospitals in Wuhan, China. JAMA Netw Open. 2021;4(9):e2127403.
Zhou (A)	Zhou F, Tao M, Shang L, Liu Y, Pan G, Jin Y, et al. Assessment of Sequelae of COVID-19 Nearly 1 Year After Diagnosis. Front Med (Lausanne). 2021;8:717194.
Zhou (B)	Zhou M, Xu J, Liao T, Yin Z, Yang F, Wang K, et al. Comparison of Residual Pulmonary Abnormalities 3 Months After Discharge in Patients Who Recovered From COVID-19 of Different Severity. Front Med (Lausanne). 2021;8:682087.

***Table 2*: List of included study references.**

symptom codes. We appreciate that this may cause confusion and as mentioned previously, we have removed the column for clarity.

Points four and five related to the impact of different strains of SARS-CoV-2 and vaccination on prevalence estimates. Whilst we agree different strains of SARS-CoV-2 may have had differing effects on prevalence rates very few (if any) included studies included information on strains and therefore this was beyond the scope of our review. We agree that vaccination status is an important issue and previously acknowledge this within the manuscript "As of July 2022, over 12 billion vaccine doses have been administered globally; however, assessing the impact of vaccination status on Long Covid prevalence was beyond the scope of the current review. Future reviews should seek to investigate the prevalence of Long Covid across vaccination status and different variants of SARS-CoV-2."

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Contributors

LLO, AR, CG and KK conceptualised the manuscript. All authors critically revised the manuscript for intellectual content. All authors had final responsibility for the decision to submit for publication.

Declaration of interests

KK is Chair of the Ethnicity Subgroup of the UK Scientific Advisory Group for Emergencies (SAGE) and Member of SAGE and also Chair of the National Long Covid working group which reports to the Chief Medical Officer.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.eclinm.2023.101950.

References

1 Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to meta-analysis*. John Wiley & Sons; 2021.
2 Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res Synth Methods*. 2010;1(2):97–111.
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):1593–1607.
4 Groff D, Sun A, Ssentongo AE, et al. Short-term and long-term rates of postacute sequelae of SARS-CoV-2 infection: a systematic review. *JAMA Netw Open*. 2021;4(10):e2128568.
5 Venturelli S, Benatti SV, Casati M, et al. Surviving COVID-19 in Bergamo province: a post-acute outpatient re-evaluation. *Epidemiol Infect*. 2021;149:e32.