

Individuals with COVID-19 incur a greater risk of Cardiovascular Sequelae

The association of short-, medium and long-term cardiovascular sequelae with COVID-19 infection: a multinational pilot study

Background: Emerging evidence has reported that COVID-19 infection could lead to severe cardiovascular disorders and associated mortality.^{1,2} Nevertheless, the risk of cardiovascular sequelae associated COVID-19 infection remained inconclusive due to the large variability in effect estimates and contrasting evidence in the risk association of certain diseases from existing studies which differs in study design, selection of controls and the follow-up duration of these study.³

Figure 1. Flow diagram on the selection of study population

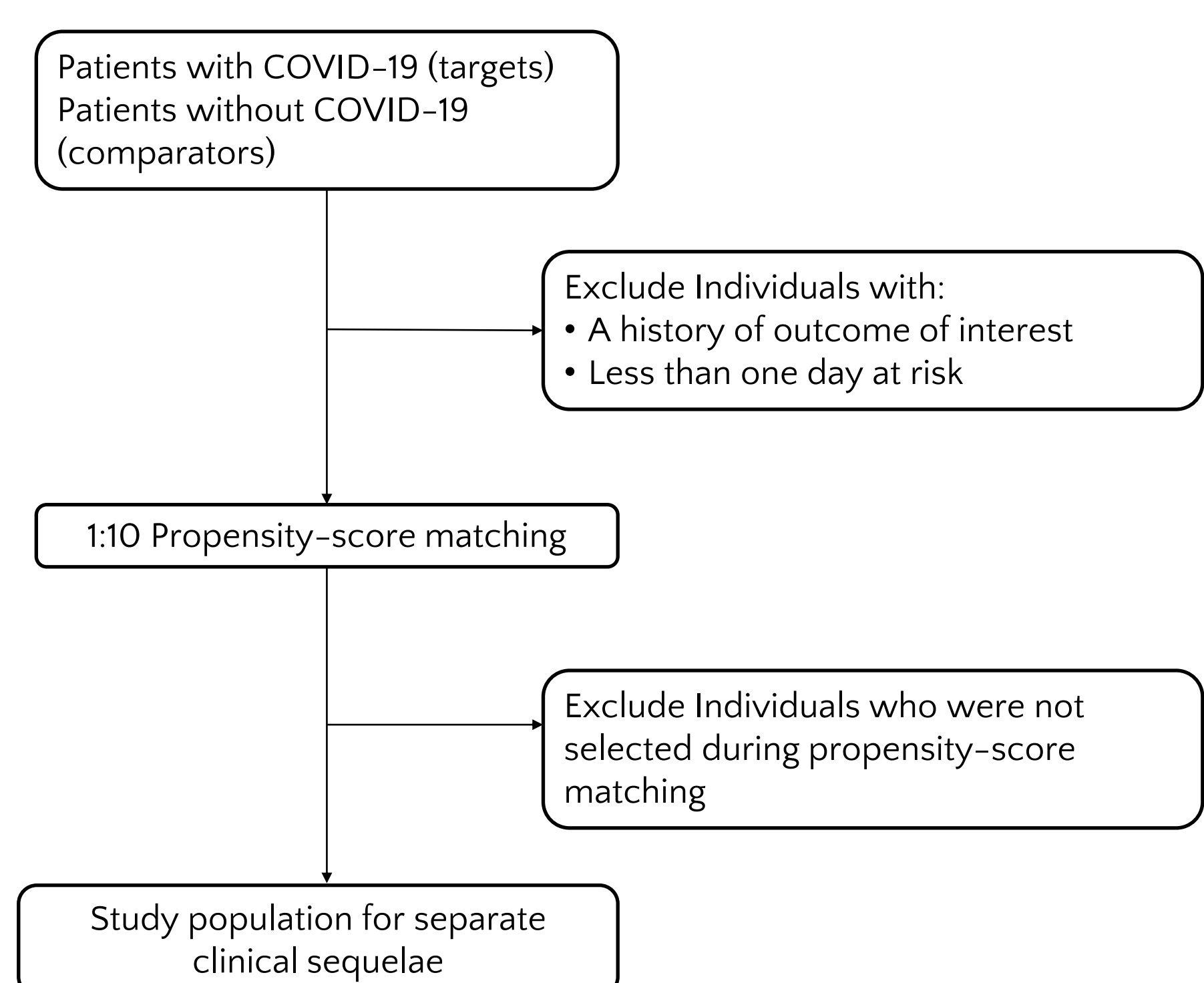


Table 1. Preliminary results on the incidence rate, hazard ratio of cardiovascular sequelae between patients with COVID-19 and matched comparator

	Subjects	Follow-up (person-years)	Events	Hazard ratio (95% CI)	Calibrated hazard ratio (95% CI)	Hazard Ratio	Calibrated Hazard Ratio
Angina							
Targets	17,296	14,918	35	Reference	Reference		
Comparators	128,711	110,983	142	1.31 (1.17-1.47)	0.98 (0.85-1.13)		
Arrhythmia							
Targets	16,454	14,030	349	Reference	Reference		
Comparators	122,267	104,592	1,917	1.30 (1.15-1.46)	0.97 (0.83-1.13)		
Myocardial infarction							
Targets	17,246	14,879	34	Reference	Reference		
Comparators	128,381	110,679	149	1.76 (1.17-2.58)	1.32 (0.88-1.98)		
Heart failure							
Targets	17,168	14,804	86	Reference	Reference		
Comparators	127,727	110,073	415	1.36 (1.05-1.74)	1.02 (0.78-1.33)		
Hypertension							
Targets	13,082	10,837	650	Reference	Reference		
Comparators	98,490	82,360	4,102	1.21 (1.10-1.32)	0.90 (0.79-1.02)		
Myocarditis and pericarditis							
Targets	17,363	14,972	36	Reference	Reference		
Comparators	129,209	111,432	115	2.22 (1.46-3.32)	1.66 (1.09-2.53)		
Endocarditis							
Targets	17,383	15,012	8	Reference	Reference		
Comparators	129,400	111,631	34	1.62 (0.65-3.64)	1.00 (0.86-1.16)		
Cardiomyopathy							
Targets	17,357	14,989	15	Reference	Reference		
Comparators	129,134	111,385	54	2.29 (1.19-4.12)	1.71 (0.91-3.20)		
Arteriosclerosis							
Targets	17,193	14,824	63	Reference	Reference		
Comparators	127,891	110,145	344	1.35 (1.00-1.78)	1.00 (0.74-1.36)		

Methods

Study design

- Retrospective cohort study
- Propensity score matching

Data source

- Multinational healthcare databases mapped to OMOP CDM (Table 2)

Study population

- Individuals with COVID-19 between Dec 1st 2019-20 and their matched controls

Follow-up

- Short (Up to 6 months),
- Medium (6 months to 1 year)
- Long term (1 to 3 years)

Table 2. Electronic health records consisted in databases mapped to the Observational Medical Outcomes Partnership (OMOP) common data model

Database	Electronic health records
US Open-claim IQVIA	Pre-adjudicated health insurance claims collected from general practitioners and specialists
Germany DA IQVIA ^a , France LPD IQVIA ^b	Proprietary practice management software used by general practitioners and selected specialists
Italy LPD IQVIA ^b , UK IMRD IQVIA ^c	Patient records from general practitioners

^a DA = Disease Analyser, ^b LPD = Longitudinal Patient Database, ^c IMRD = IQVIA Medical Research Data

- Preliminary analysis was conducted on the Italy LPD database between December 1st 2019-2022
- The hazard ratio (HR) and 95% confidence interval (CI) of each outcome will be estimated using Cox proportional hazard regression.
- Empirical calibration was performed based on negative control outcomes which were not expected to be associated with the COVID-19 infection

Conclusion: An increased risk of cardiovascular sequelae was observed amongst individuals recovering from COVID-19 from our empirical findings. Evidence generated from this study could generate highly generalizable evidence to aid clinical decision making and inform public health policy



[1]. Xie Y, Xu E, Bowe B, Al-Aly Z. Long-term cardiovascular outcomes of COVID-19. Nat Med. 2022;28(3):583-90. [2]. Wan YF, Mathur S, Zhang R, Yan VKC, Lai FTT, Chui CSL, et al. Association of COVID-19 with short- and long-term risk of cardiovascular disease and mortality: a prospective cohort in UK Biobank. Cardiovasc Res. 2023. [3]. Peter RS, Nieters A, Krausslich HG, Brockmann SO, Coppel S, Kindle G, et al. Post-acute sequelae of covid-19 six to 12 months after infection: population based study. BMJ. 2022;379:e071050.



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