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The Burden of Long COVID on Quality of Life and Daily Functioning

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INTRODUCTION

- Long COVID is defined by the WHO as new, persistent or relapsing signs, symptoms or conditions persisting at least 3 months after an initial COVID-19 infection.[1]
- Long COVID is a heterogenous condition with a broad spectrum of sequelae (including pulmonary, haematologic, cardiovascular, neuropsychiatric, renal, gastrointestinal, hepatobiliary, endocrine and dermatologic manifestations) that can continue to impact patients ' well-being and functioning for months beyond the initial acute infection period.[1]
- The estimated pooled prevalence of long COVID is approximately 42% based on published meta-analyses ; however, estimates vary widely (range: 0% to 93%) depending on methodological differences such as study follow-up time, patient characteristics and disease severity.[2,3]
- The impact of long COVID on health-related quality of life (HRQoL) and functioning is not well understood, nor are the self-report tools used to assess these outcomes.
  - There is a need to characterise the impact of this heterogenous condition on patients' HRQoL to understand broader implications of long COVID beyond symptom burden.

OBJECTIVE

- **To perform a structured targeted literature review (TLR) that identifies and summarises the humanistic burden in adults with long COVID in terms of HRQoL and daily functioning.**

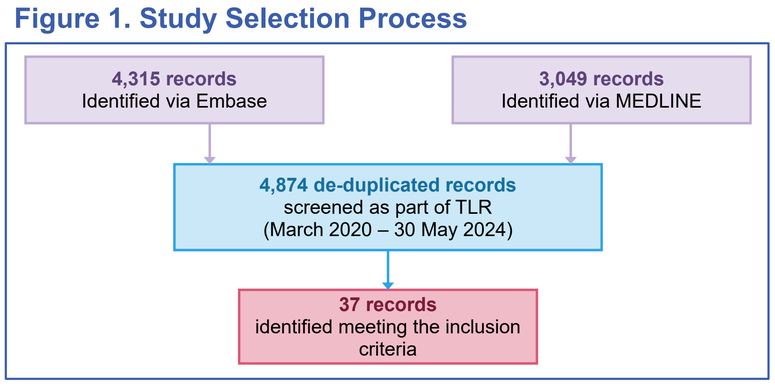
METHODS

- Comprehensive database searches were conducted in Embase and MEDLINE on May 30, 2024 to identify relevant studies of individuals with prior acute COVID-19 published since the beginning of the pandemic (March 2020).
- Inclusion criteria comprised observational studies estimating the impact of long COVID on HRQoL, disabilities and daily functioning using validated measures in >100 participants.

RESULTS

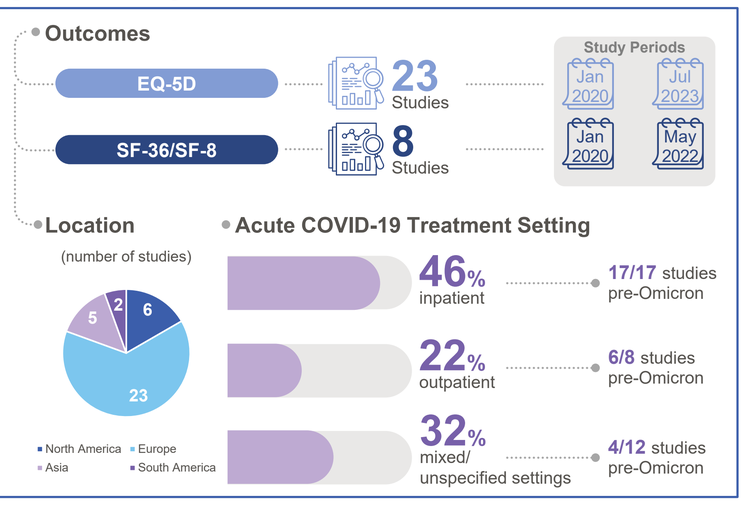
- Thirty-seven studies were included in the TLR (**Figure 1**), representing >570,000 patients with a history of COVID-19 in 17 countries.

Figure 1. Study Selection Process



- Overall, 23 studies used the EQ-5D and eight used the 36- or 8-item Short Form Health Survey (SF-36/SF-8) measures of HRQoL (**Figure 2**).
- Studies identified patients with COVID-19 who had been treated as inpatients (46%), outpatients (22%) and mixed/unspecified settings (32%), mainly for pre-Omicron infections (**Figure 2**).

Figure 2. Study Characteristics



- Duration of follow-up varied substantially across studies (6 weeks to 2 years after acute illness), with the average reported follow-up being 8 months since acute infection or discharge from hospital
  - Few studies (8/37) included the acute infection period within the study follow-up.

RESULTS (continued)

- After having acute COVID-19, patients reported new or worsened fatigue and disabilities/limitations on activities of daily life, with significantly worse functional impairment, more cognitive slowing and greater risk of incident psychiatric disorders than healthy controls.
  - Among patients who had persistent symptoms subsequent to acute COVID-19 infection, post-COVID-19 HRQoL was worse than pre-COVID-19 (5/5 studies)[4-8] as well as compared with healthy controls/general population norms (9/10 studies)[9-17] (**Table 1**).
    - At about 1 month following discharge, there were significant physical impairments reported by patients, including significantly worse scores on most SF-36 domains than the general population (all p=0.0001, excluding the pain domain).[12]
    - At 3–12 months following initial discharge, the dimensions most typically affected were physical impairment or limitations, anxiety/depression or pain and discomfort.[4,12]
    - Among individuals who had been treated in the outpatient setting for acute COVID-19, those with long COVID had significantly worse EQ visual analogue scale (VAS) and EQ-5D utility index scores at 3 and 6 months than pre-COVID-19 (all p<0.001).[5]
  - Aspects of HRQoL at 3–12 months post-COVID-19 were more impaired in patients who had indicators of more severe acute disease (mechanical ventilation, oxygen therapy, hospitalisation).[14]
  - Two studies assessed the impact of vaccination on HRQoL and found that those with ≥2 vaccine doses had significantly lower reduction in HRQoL after COVID-19 compared with those with fewer or no vaccine doses.[5,6]

Table 1. Impacts of Long COVID on HCRU

Author, Year Location	Population (sample size)	Pre-COVID-19	Post-COVID-19	Comparison
Di Fusco, 2023[5] US	Outpatients with symptomatic long COVID (n=130)	EQ VAS, mean: 84.9 (SD 12.2) EQ-5D-5L mean utility index: 0.88 (SD 0.14)	Month 6 EQ VAS, mean: 79.3 (76.3, 82.4) EQ-5D-5L mean utility index: 0.80 (0.77, 0.84)	EQ VAS and EQ-5D-5L mean utility index: Both HRQoL measures were significantly worse at 6 months post-COVID-19 vs. pre-COVID-19 (both p<0.001).
Di Fusco, 2023[6] US	Outpatients with symptomatic long COVID (n=328)	EQ VAS: 84.9 (12.2) EQ-5D-5L mean utility index: 0.879 (SD 0.144)	Month 6 EQ VAS: 74.5 (17.2) EQ-5D-5L mean utility index: 0.727 (SD 0.242)	EQ VAS and EQ-5D-5L mean utility index: Both HRQoL measures were significantly worse at 6 months post-COVID-19 vs. pre-COVID-19 (both p<0.001).
Evans, 2021[7] UK	Patients previously hospitalised for COVID-19 (n=1,077)	NR	NR	EQ VAS: EQ VAS for overall health worsened by 9.8 units (SD 18.9) at follow-up than before hospital admission.
Sigfrid, 2021[4] UK	Hospitalised COVID-19 patients (n=327)	NR	NR	EQ-5D-5L: Overall summary index score was 10% lower overall following COVID-19 (median difference -0.1 points, IQR: -0.2 to 0.0).
d'Ettorre, 2022[8] Italy	Patients previously hospitalised for COVID-19 (n=137)	EQ-5D-5L mean index score: 0.97 (SD 0.06)	EQ-5D-5L mean index score: 0.79 (SD 0.26)	EQ-5D-5L: Significantly worse index score and individual domain scores observed post-COVID-19 (all p<0.01).
van der Sar-van der Brugge, 2021[12] Netherlands	Patients previously hospitalised for COVID-19 (n=101)	NR	NR	SF-36: Significant impairment across all domains, except for bodily pain, was found.
Deana, 2023[17] Italy	Patients previously hospitalised in ICU for COVID-19 (n=343)	NR	1 year SF-36 median scores: PCS: 45.9 (IQR: 36.5–53.5) MCS: 51.7 (IQR: 48.8–54.3)	Median PCS scores were lower for post-COVID-19 individuals compared with the general population (median: 50). Median MCS scores were comparable.
Huang, 2022[16] China	Patients previously hospitalised for COVID-19 (n=2,469)	NR	EQ VAS median score at 6 months, 1 year and 2 years FU: 80.0 (IQR: 70.0–90.0) (approximately the same for all 3 time points) Utility index median score: 1 (IQR: 0.9-1) (same for all 3 years)	NR
Kamata, 2023[14] Japan	Participants post-COVID-19 (n=1,344)	NR	EQ-5D-5L*: Without oxygen therapy: 0.82 (SD 0.17) With oxygen therapy: 0.59 (SD 0.17)	NR
Lemhöfer, 2023[11] Germany	Post-COVID-19 outpatients (n=318)	NR	SF-36 mean scores*: PCS: 36.3 (SD 10.1) MCS: 40.9 (SD 11.6)	SF-36: The MCS and PCS scores were significantly lower in the COVID-19 cohort than the normal population (both p<0.001).
Líška, 2022[10] Slovakia	Long COVID patients (n=469)	NR	SF-36 mean scores: Physical function: 66.2 (SD 25.4) General health: 35.8 (SD 16.1) Overall QoL: 331.9 (SD 126.9)	Compared to pre-COVID-19 SF-36 scores were as follows in patients post-COVID-19: • Somewhat worse: 38.2% • Much worse: 48.8% • Same condition: 8.5% • Better condition: 1.9% • Much better condition: 2.6% Overall QoL scores were 54% lower for those with long COVID compared with participants without COVID-19.
Qu, 2021[13] China	Patients previously hospitalised for COVID-19 (n=311)	NR	3 months post hospital discharge: Poor SF-36 scores: PCS: 15.4% MCS: 32.6%	NR
Sandmann, 2022[15] UK	Participants post-COVID-19 (n=548)	NR	NR	EQ-5D: Compared to pre-COVID-19 baseline, 81% of cases reported a worse health state on the worst day of their illness, which decreased to 27% by month 6.
Carlile, 2024[9] UK	Participants post-COVID-19 (n=6,070)	NR	NR	EQ-5D: Participants self-reporting long COVID were highly likely to report loss of HRQoL compared to participants who did not report long COVID (OR 4.7 (95% CI: 3.72, 5.93).

*Timepoint not reported; Abbreviations: HRQoL = health-related quality of life; MCS = mental component summary; NR = not reported; PCS = physical component summary; SD = standard deviation; SF-36 = 36-Item Short Form Survey; UK = United Kingdom; US = United States; VAS = visual analogue scale

LIMITATIONS

- The humanistic impact of long COVID varied across the included studies.
- Data included mostly relied on self-reported HRQoL and functioning, with some studies lacking comparisons to pre-pandemic status.
- Variable HRQoL assessment tools and reporting methods for humanistic burden were used across studies.
- Studies used different follow-up periods post-acute infection, reflecting poor global consensus on a definition for long COVID.
- The severity of acute COVID-19 across study populations is variable and could influence the severity of long COVID being assessed.
- The impact of different SARS-CoV-2 variants has not been assessed, with few studies including patients who had Omicron infections.

CONCLUSIONS

- **Long COVID has a negative impact on patient HRQoL and daily functioning. Further contemporaneous studies with recently circulating Omicron lineages are needed.**

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Disclosures

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