



Spaulding REhabilitation and COVID Recovery study (RECOVER): 6- to 12-month trajectories and outcomes

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Background

Neuropsychiatric symptoms and functional impairments are reported by people with COVID-19 well beyond the acute phase of illness^{1,2,3}; however, little is known regarding recovery of patients who were hospitalized with COVID-19 and then received acute rehabilitation hospital care—a patient group with severe acute disease.

Objectives

- Identify recovery phenotypes 6- and 12-months after hospitalization in a group of patients with severe disease
- Examine the relationship between 6- and 12-month recovery phenotypes and 12-month employment

Methods

- Prospective longitudinal cohort study of COVID positive patients acutely hospitalized at a Mass General Brigham facility *and* then transferred to Spaulding Hospital Cambridge or Spaulding Rehabilitation Hospital for rehabilitation.
- Self-reported and performance-based physical, cognitive, and psychological measures were administered 6 and 12 months after hospitalization in English or Spanish
- Latent profile analysis was used to identify recovery phenotypes at 6 and 12 months
- Logistic regression was used to examine associations with 6-month phenotype and 12-month employment status controlling for age, race, comorbidity, and pre-morbid employment

Results

- Median age of the sample (n=62) was 60.8 years; 59% male, 72% non-Hispanic, 26% preferred Spanish-speaking, 83% required mechanical ventilation in acute care, and mean length of stay in acute rehabilitation hospital was 14 days. (Table 1)
- 50% of the sample had multiple comorbidities
- Most common co-morbidities hypertension (60%), obesity (56%), hyperlipidemia (44%)

At 6 months, 3 phenotypes were identified: (Figure 1)

- i) least symptomatic group: minimal symptom endorsement across cognitive, emotional and physical domains, (22.95%, n=14)
- ii) moderately symptomatic group: elevated physical symptoms with minimal cognitive and emotional symptoms (47.54%, n=29)
- iii) elevated symptom group: endorsed more symptoms in cognitive, emotional, and physical domains compared to least symptomatic group (29.5%, n=18)

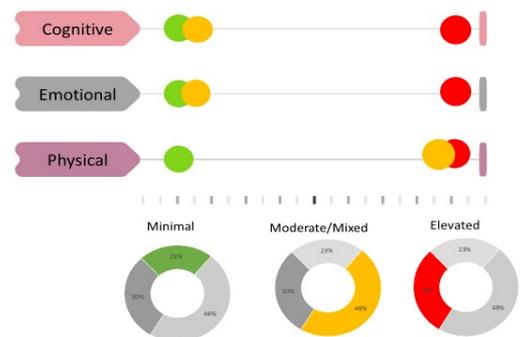


Figure 1. Latent profiles by domains at 6-months

Age (median [QR1,QR3])	60.8 [46.33, 71.88]
Sex (n [%])	
Male	36 [59%]
Female	25 [41%]
Race (n [%])	
White	44 [72.1%]
Black	11 [18%]
Asian	4 [7%]
Multi-racial	3 [5%]
Other	3 [5%]
Ethnicity (n [%])	
Hispanic	16 [26%]
Non-Hispanic	44 [72%]
Preferred Language (n [%])	
English	45 [74%]
Spanish	16 [26%]

Table 1. Sample demographics (N=62)

At 12-months, phenotype structure was similar but there was bi-directional movement between phenotypes (Figure 2)

- 67% of the sample fell into the same phenotype; 18% declined (n=11) and 13% (n=13) improved. (Figure 2)

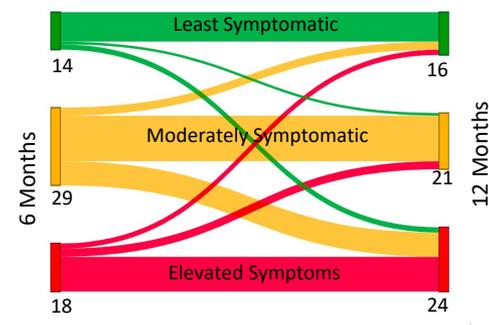


Figure 2. 6- and 12-Month Phenotypes and Trajectory over Time

- **12-month employment:** 24% were employed at 12-months compared to 51% at disease onset
- After controlling for confounding factors, 6-month phenotype was a significant predictor of employment at 12-months (B=2.26, p=.05, OR=9.6. (Figure 3)

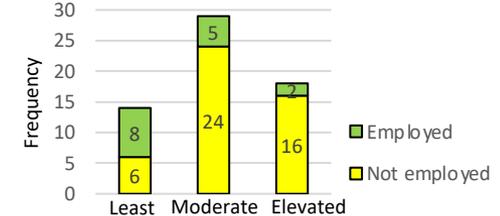


Figure 3. 6- and 12-Month Phenotypes and Transitions Across Time

Discussion

- Recovery at 6 and 12 months shows severe COVID illness appears presents as 3 distinct phenotypes.
- Symptom expression remains dynamic between 6 and 12 months as approximately 30% of patients continue to either improve or decline during this interval.
- Persistent symptoms impact employment at 12 months.
- Results suggest the need for comprehensive assessment and tailored treatment for physical, emotional, and cognitive symptoms.

Limitations

Sample size (n=62)
 Selection bias - Single center; Non-English/Spanish speakers excluded; Enrollment deferred for patients without decision-making capacity; 30% refusal rate

References

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