Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the editor

Prevalence of psychiatric morbidity following discharge after COVID-19 hospitalization

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To the Editor:

As the novel coronavirus disease 2019 (COVID-19) pandemic has progressed, there has been an increasing awareness on its impact on mental health [1]. Hospitalization due to COVID-19 is a uniquely stressful, worrying, and isolating event, and psychiatric morbidity following hospitalization has largely been omitted from the literature [2]. For proper long-term psychiatric management of hospitalized COVID-19 patients, it is imperative to understand the prevalence of psychiatric disorders following discharge from the hospital. The primary objective of this cross-sectional study was to determine the prevalence of psychiatric morbidity in hospitalized COVID-19 patients following discharge. A secondary objective was to determine if a prior history of psychiatric illness increased the odds of screening positive for psychiatric disorders.

This cross-sectional study included all patients who were admitted into a Cleveland Clinic Health System hospital, tested positive for COVID-19 between March 13, 2020 to August 12, 2020, and were discharged home or to a skilled nursing facility. Patients meeting inclusion criteria were sent EPIC MyChart portal recruitment messages with a link to a REDCap survey that included validated screening scales for posttraumatic stress disorder (PTSD-5), anxiety (GAD-7), and depression (CES-D 10). Patients were also asked if they had any clinician-diagnosed psychiatric illnesses prior to their hospitalization for COVID-19. Clinically meaningful cutoffs for each scale were set at 3, 10, and 10 respectively [3–6]. One reminder message was sent two months after the initial invitation to participate to patients who did not respond to the initial survey wave.

For comparison of categorical demographic variables, Pearson chi-squared or Fisher's exact tests were used, while independent sample *t*-tests were used for age. Hospital length of stay and time since discharge were compared with Mann-Whitney tests.

Surveys were sent to 1129 discharged COVID-19 positive patients via EPIC MyChart and 215 were completed, representing a response rate of 19%. Patient demographics are summarized in Supplemental Table 1.

Overall, 57% screened positive for posttraumatic stress-disorder (PTSD), anxiety or depression. Specifically, 34%, 24%, and 42% of patients screened positive for PTSD, anxiety, and depression respectively. Among patients without a prior psychiatric history, 42% screened positive for one psychiatric disorder. In contrast, among patients with a prior psychiatric history, 78% screened positive for one disorder (Table 1). Patients who endorsed a prior diagnosis of psychiatric illness were more likely to screen positive for PTSD (OR: 3.3, 95% CI: 1.8, 5.9), anxiety (OR: 5.8, 95% CI: 2.9, 11.6), and depression (OR: 5.3, 95% CI: 2.9, 9.8) than patients without a prior psychiatric history.

However, patients without a prior psychiatric illness were also vulnerable to psychiatric morbidity, with 23%, 11.2%, and 37.2% screening positive for PTSD, anxiety, and depression respectively. Patients who responded less than 60 days after their hospitalization were equally as likely to screen positive for a psychiatric disorder (43%) than patients who responded after 60 days (44%) (p=0.88).

To our knowledge, this is the first study to describe a high prevalence of psychiatric morbidity following COVID-19 hospitalization using electronic portal recruitment. We report a similar prevalence of psychiatric morbidity following other major infectious outbreaks, such as the severe acute respiratory syndrome outbreak in 2002 and Middle East respiratory syndrome outbreak in 2012 [9]. Mazza et al. recently identified that 28%, 31%, and 42% of hospitalized patients screened positive PTSD, depression, and for anxiety respectively, and we report a similar prevalence of psychiatric morbidity [10]. Discharged patients were equally as likely to screen positive for psychological disorders within 60 days of discharge and after, indicating the need for long-term psychiatric follow-up of COVID-19 hospitalized patients.

Not surprisingly, we also identified that patients with a prior diagnosis of a psychiatric illness were more likely to have psychologic morbidity than patients without a prior psychiatric illness. While our study could not separate the effect of hospitalization from the morbidity of prior psychiatric disease, it is clear that patients with previous psychiatric conditions will require close psychiatric monitoring and treatment after discharge.

Our results should be taken in the context of their limitations. We utilized a convenience sample via electronic portal recruitment messaging which had a response rate of 20%. However, this is comparable to response rates in other studies utilizing portal recruitment [7,8]. Furthermore, patients who were experiencing psychiatric morbidity may have been more interested and more likely to participate in our

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Table 1
Prevalence of psychiatric morbidity in COVID-19 inpatients with and without prior psychiatric history.

	All patients N (%)	No prior psychiatric history N (%)	Prior psychiatric history N (%)	Odds Ratio (95% CI)
PTSD-5 positive[a,b]	72 (34.1%)	28 (23.0%)	44 (49.4%)	3.3 (1.8, 5.9)
GAD-7 positive[b]	52 (24.2%)	14 (11.2%)	38 (42.2%)	5.8 (2.9, 11.6)
CES-D 10 positive[a,b]	87 (41.8%)	45 (37.2%)	66 (75.9%)	5.3 (2.9, 9.8)
Any positive screen[b]	122 (56.7%)	52 (41.6%)	70 (77.8%)	4.9 (2.7, 9.1)

[a] For percentages, the denominators are based on available data with missing values excluded.
[b] PTSD-5 positive defined as scores $\geq$ 3; GAD-7 positive defined as scores $\geq$ 10; CES-D 10 positive defined as scores $\geq$ 10.

study, as the recruitment letter noted that we were studying psychological distress after COVID-19 hospitalization. Thus, the high prevalence of psychiatric morbidity observed may be an overestimate due to response bias.. Additionally, our characterization of prior psychiatric illness came from survey data; however, our question specified "clinician-diagnosed" disorder to increase the validity of this measure. Finally, some patients may have been hospitalized for other reasons and simply tested positive for COVID-19 incidentally. These patients would still have faced the same stressors such as isolation and stigma that symptomatic patients faced.

In conclusion, we report a high prevalence of psychiatric comorbidity in hospitalized COVID-19 patients, especially in patients with a prior psychiatric illness. As such, COVID-19 patients should receive psychiatric monitoring and crisis psychological interventions after discharge.

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Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.genhosppsych.2020.12.013.

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Philip R. Wang[a], Precious C. Oyem[a], Adele C. Viguera[b,*]
[a] *Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, United States of America*
[b] *Neurological Institute, Psychiatry & Psychology, Cleveland Clinic, Cleveland, OH, United States of America*

[*] Corresponding author.
E-mail address: viguera@ccf.org (A.C. Viguera).