Mental Health Conditions and Severe COVID-19 Outcomes after Hospitalization, United States

Appendix

Appendix Table 1. Outcomes of hospitalized COVID-19 patients, by mental health condition diagnosis, in the Premier Healthcare Database Special COVID-19 Release, March 2020-July 2021 (n = 664,956)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Anxiety, n (%)</th>
<th>Depression, n (%)</th>
<th>Bipolar, n (%)</th>
<th>Schizophrenia, n (%)</th>
<th>No MHC, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU Admission</td>
<td>59,349 (51.7%)</td>
<td>45,943 (47.6%)</td>
<td>7,111 (46.3%)</td>
<td>5,811 (47.2%)</td>
<td>219,281 (45.1%)</td>
</tr>
<tr>
<td>Invasive Mechanical Ventilation</td>
<td>20,312 (17.7%)</td>
<td>13,841 (14.4%)</td>
<td>2,241 (14.6%)</td>
<td>2,104 (17.1%)</td>
<td>63,940 (13.2%)</td>
</tr>
<tr>
<td>30-Day Readmission</td>
<td>9,840 (8.6%)</td>
<td>9,218 (9.6%)</td>
<td>1,527 (9.9%)</td>
<td>1,201 (9.8%)</td>
<td>29,724 (6.1%)</td>
</tr>
<tr>
<td>In-Hospital Mortality</td>
<td>17,873 (15.6%)</td>
<td>13,303 (13.8%)</td>
<td>1,720 (11.2%)</td>
<td>1,780 (14.5%)</td>
<td>61,375 (12.6%)</td>
</tr>
<tr>
<td>Length of Stay, days, mean (SD)</td>
<td>10.3 (12.3)</td>
<td>9.4 (11.6)</td>
<td>9.2 (11.7)</td>
<td>10.6 (13.3)</td>
<td>7.7 (9.0)</td>
</tr>
</tbody>
</table>

Abbreviations: ICU = intensive care unit, MHC = mental health condition, SD = standard deviation.

Appendix Table 2. Regression equations used for inferential analyses.

Outcome: ICU Admission, Invasive Mechanical Ventilation, 30-Day Readmission, In-Hospital Mortality (logistic regression)

Unadjusted Model: \[
\frac{p_i}{1-p_i} = \beta_0 + \beta_1X_{1i} + \epsilon_i
\]

Adjusted Model: \[
\frac{p_i}{1-p_i} = \beta_0 + \beta_1X_{1i} + \beta_2X_{2i} + \beta_3X_{3i} + \beta_4X_{4i} + \beta_5X_{5i} + \beta_6X_{6i} + \beta_7X_{7i} + \beta_8X_{8i} + \beta_9X_{9i} + \epsilon_i
\]

Outcome: Length of Stay (Poisson regression)

Unadjusted Model: \[\ln(\lambda_i) = \beta_0 + \beta_1X_{1i} + \epsilon_i\]

Adjusted Model: \[\ln(\lambda_i) = \beta_0 + \beta_1X_{1i} + \beta_2X_{2i} + \beta_3X_{3i} + \beta_4X_{4i} + \beta_5X_{5i} + \beta_6X_{6i} + \beta_7X_{7i} + \beta_8X_{8i} + \beta_9X_{9i} + \epsilon_i\]

\(X_1 = \) mental health condition  
\(X_2 = \) age  
\(X_3 = \) sex  
\(X_4 = \) race/ethnicity  
\(X_5 = \) insurance type  
\(X_6 = \) admission month  
\(X_7 = \) urbanicity  
\(X_8 = \) U.S. Census Division region  
\(X_9 = \) Elixhauser Comorbidity Index

All regression analyses use mixed-effects models with a random intercept and variance components covariance structure, using the PROC GLIMMIX function in SAS 9.4.
Appendix Figure. Unadjusted odds ratios for outcomes of hospitalized COVID-19 patients by mental health condition diagnosis compared to patients without any mental health condition diagnoses in the Premier Healthcare Database Special COVID-19 Release, March 2020-July 2021 (n = 664,956). For each condition, odds ratios represent the odds of the given outcome for patients with the condition compared to patients without any mental health conditions. For length of stay, percents represent the percent difference in length of stay for patients with the condition compared to patients without any mental health conditions. Bolded values indicate statistical significance (two-sided α = 0.05), adjusted for multiple comparisons using the Bonferroni-Holm method.